DRAFT

Appendix K
Data Usability Summary Reports

Appendix K
Data Usability Evaluation
Summary Sheet

Lab ID and Validation Stage
180-115815-1 Stage 2A
180-115861-1 Stage 2A
180-115861-2 Stage 4
180-115925-1 Stage 2A
180-115925-2 Stage 2A
180-115999-1 Stage 2A
180-116000-1 Stage 2A
180-116070-1 Stage 2A
180-116071-1 Stage 2A
180-116109-1 Stage 2A
180-116110-1 Stage 2A
180-116199-1 Stage 2A
180-116200-1 Stage 2A
180-115927-1 Stage 2A
180-116002-1 Stage 2A
180-116002-2 Stage 2A
180-116247-1 Stage 2A
180-116247-2 Stage 2A
180-116310-1 Stage 2A
180-116310-2 Stage 2A
180-116365-1 Stage 2A
180-116365-2 Stage 2A
180-116404-1 Stage 2A
180-116404-2 Stage 2A
180-116404-3 Stage 2A
180-116462-1 Stage 2A
180-116462-2 Stage 2A
180-116462-3 Stage 2A
180-116462-4 Stage 2A
180-116529-1 Stage 2A
180-116529-2 Stage 2A
180-116529-3 Stage 2A
180-116609-1 Stage 2A
180-116609-2 Stage 2A
180-116665-1 Stage 2A
180-116665-2 Stage 2A
180-116665-3 Stage 2A
180-116665-4 Stage 4
180-116686-1 Stage 2A

DRAFT

Lab ID and Validation Stage
180-116686-2 Stage 2A
180-116723-1 Stage 4
180-116771-1 Stage 2A
180-116724-1 Stage 4
180-116773-1 Stage 2A
180-116864-1 Stage 2A
180-116914-1 Stage 2A
180-117387-1 Stage 4
180-117390-1 Stage 2A
180-117425-1 Stage 2A
180-117459-1 Stage 2A
180-117476-1 Stage 2A
180-117542-1 Stage 2A
180-117621-1 Stage 2A
180-118872-1 Stage 2A
180-119009-1 Stage 2A
180-119460-1 Stage 2A
180-119460-2 Stage 2A
180-119462-1 Stage 2A
180-119462-2 Stage 2A
180-119510-1 Stage 2A
180-119510-2 Stage 2A
180-119511-1 Stage 2A
180-119589-1 Stage 2A
180-119649-1 Stage 2A
180-119671-1 Stage 2A
180-119671-2 Stage 2A
180-119767-1 Stage 2A
180-119767-2 Stage 2A
180-119810-2 Stage 4
180-119815-1 Stage 4
180-119815-2 Stage 2A
180-119841-1 Stage 2A
180-119841-2 Stage 2A
180-119861-1 Stage 2A
180-119861-2 Stage 2A
180-119930-1 Stage 2A
180-119938-1 Stage 2A
180-119938-1 Stage 2A
180-120028-1 Stage 2A
180-120028-2 Stage 2A
180-120029-1 Stage 2A
180-120162-1 Stage 2A

DRAFT

Lab ID and Validation Stage
180-120163-1 Stage 2A
180-120245-1 Stage 2A
180-120245-2 Stage 2A
180-120257-1 Stage 2A
180-120259-1 Stage 2A
180-120413-1 Stage 2A
180-120434-1 Stage 2A
180-120679-1 Stage 4
180-120743-1 Stage 2A
180-120857-1 Stage 2A
180-120955-1 Stage 2A
180-121010-1 Stage 2A
180-121427-1 Stage 2A
180-121547-1 Stage 2A
180-121310-1 Stage 2A
180-121355-1 Stage 2A
180-121424-1 Stage 2A
180-121472-1 Stage 2A
180-121474-1 Stage 2A
180-121474-2 Stage 2A
180-121548-1 Stage 2A
180-121548-2 Stage 2A
180-121702-1 Stage 2A
180-121703-1 Stage 2A
180-121704-1 Stage 2A
180-121704-2 Stage 2A
180-121704-3 Stage 2A
180-121704-4 Stage 2A
180-121705-1 Stage 2A
180-121747-1 Stage 2A
180-121747-2 Stage 2A
180-121822-1 Stage 2A
180-121850-1 Stage 2A
180-121897-1 Stage 2A
180-121903-1 Stage 4
180-122000-1 Stage 2A
180-121899-1 Stage 2A
180-121899-2 Stage 2A
180-121981-1 Stage 2A
180-122085-1 Stage 4
180-122084-1 Stage 2A
180-123098-2 Stage 2A
180-123134-1 Stage 2A

DRAFT

Lab ID and Validation Stage
180-123547-1 Stage 2A
180-123901-2 Stage 2A
180-123971-1 Stage 2A
180-124354-1 Stage 2A
180-124378-1 Stage 2A
180-124487-1 Stage 2A
180-124580-1 Stage 4
180-124628-1 Stage 2A
180-123985-1 Stage 4
180-123985-2 Stage 4
180-123399-1 Stage 2A
180-123399-2 Stage 2A
180-123449-1 Stage 2A
180-123449-2 Stage 2A
180-124973-1 Stage 2A
180-123398-1 Stage 4
180-124670-1 Stage 4
180-124763-1 Stage 2A
180-124763-2 Stage 2A
180-124763-3 Stage 2A
180-124918-1 Stage 2A
180-124920-1 Stage 2A
180-124920-2 Stage 2A
180-124972-1 Stage 2A
180-124974-1 Stage 2A
180-125052-1 Stage 2A
180-125087-1 Stage 2A
180-125090-1 Stage 2A
180-125090-2 Stage 2A
180-125127-1 Stage 4
180-125129-1 Stage 2A
180-125366-1 Stage 2A
180-125253-1 Stage 2A
180-125431-1 Stage 2A
180-127066-2 Stage 2A
180-127140-1 Stage 2A
180-127205-2 Stage 2A
180-127265-1 Stage 2A
180-127265-2 Stage 2A
180-127415-1 Stage 2A
180-127595-1 Stage 4
180-127595-2 Stage 2A
180-126485-1 Stage 2A

DRAFT

Lab ID and Validation Stage
180-126501-1 Stage 2A
180-126593-1 Stage 2A
180-126608-1 Stage 2A
180-126702-1 Stage 2A
180-126846-1 Stage 2A
180-126905-1 Stage 4
180-126939-1 Stage 2A
180-127485-1 Stage 2A
180-127488-1 Stage 2A
180-127581-1 Stage 2A
180-127582-1 Stage 4
180-128571-1 Stage 2A
180-128571-2 Stage 2A
180-128606-1 Stage 2A
180-128606-2 Stage 4
180-129378-1 Stage 2A
180-129155-1 Stage 2A
180-129230-1 Stage 4
180-129376-1 Stage 2A
180-129534-1 Stage 2A
180-128986-1 Stage 2A
180-129052-1 Stage 4
180-129169-1 Stage 2A
180-129325-1 Stage 2A
180-131154-1 Stage 2A
180-131315-1 Stage 2A
180-131405-1 Stage 2A
180-131408-1 Stage 2A
180-131408-2 Stage 2A
180-139185-1 Stage 2A
180-140136-1 Stage 4
180-140570-1 Stage 2A
180-140570-2 Stage 4
180-143039-1 Stage 2A
180-141239-1 Stage 2A
180-141239-1 Stage 4
180-142957-1 Stage 2A
180-150618-1 Stage 2A
180-150618-2 Stage 2A
180-150768-1 Stage 2A
180-150773-1 Stage 2A
180-150773-2 Stage 2A
180-150941-1 Stage 2A

DRAFT

Lab ID and Validation Stage
180-150941-2 Stage 2A
180-151397-1 Stage 2A
180-151397-2 Stage 2A
180-151463-1 Stage 2A
180-151548-1 Stage 2A
180-151548-2 Stage 2A
180-151661-1 Stage 2A
180-151663-1 Stage 2A
180-151663-2 Stage 2A
180-151879-1 Stage 2A
180-151879-2 Stage 4
180-152019-1 Stage 2A
180-152019-2 Stage 2A
180-152096-1 Stage 2A
180-152096-2 Stage 2A
180-152188-1 Stage 4
180-152188-2 Stage 2A
180-152383-1 Stage 2A
180-150822-1 Stage 2A
180-150822-2 Stage 2A
180-150942-1 Stage 2A
180-150942-2 Stage 2A
180-151002-1 Stage 2A
180-151002-2 Stage 2A
180-151075-1 Stage 2A
180-151216-1 Stage 2A
180-151216-2 Stage 2A
180-151220-1 Stage 4
180-151220-2 Stage 2A
180-151260-1 Stage 2A
180-151260-2 Stage 2A
180-151399-1 Stage 2A
180-151399-2 Stage 2A
180-151480-1 Stage 2A
180-151480-2 Stage 2A
180-151481-1 Stage 4
180-151481-2 Stage 2A
180-151549-1 Stage 2A
180-151549-2 Stage 2A
180-151549-3 Stage 2A
180-151672-1 Stage 2A
180-151676-1 Stage 2A
180-151676-2 Stage 2A

DRAFT

Lab ID and Validation Stage
180-151881-1 Stage 2A
180-151881-2 Stage 4
180-151894-1 Stage 2A
180-151894-2 Stage 2A
180-151945-1 Stage 2A
180-151945-2 Stage 2A
180-152020-1 Stage 2A
180-152020-2 Stage 2A
180-152105-1 Stage 2A
180-152384-1 Stage 2A
180-152384-2 Stage 2A
180-154838-1 Stage 2A
180-161517-1 Stage 2A
180-161919-1 Stage 2A
180-162460-1 Stage 2A
180-162460-2 Stage 4
180-162461-1 Stage 2A
180-162461-2 Stage 2A
180-162560-1 Stage 2A
180-162560-2 Stage 2A
180-162561-1 Stage 4
180-162561-2 Stage 2A
180-163732-1 Stage 2A
180-163732-2 Stage 2A
180-163732-3 Stage 2A
180-163732-4 Stage 2A
180-163732-5 Stage 2A
180-163807-1 Stage 4
180-163807-2 Stage 2A
180-163807-3 Stage 2A
180-163807-4 Stage 2A
180-163870-1 Stage 2A
180-165353-1 Stage 2A
180-165353-2 Stage 2A
180-165447-1 Stage 4
180-165447-2 Stage 4
180-168236-1 Stage 2A
180-168236-2 Stage 2A
180-168289-1 Stage 4
180-168289-2 Stage 4

DRAFT

Data Usability Evaluation

Former Sperry Remington Site North Portion – Slide Rail Area Soil and Groundwater Investigation

April 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington Site North Portion - Slide Rail Area project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (US EPA) National Functional Guidance for Data Review. Forty-six non-detect results assessed for this project (43 for 1,4-dioxane, two for 1,2,3-trichlorobenzene and one for 1,2,4-trichlorobenzene) were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-115815-1 Stage 2A	180-116070-1 Stage 2A
180-115861-1 Stage 2A	180-116071-1 Stage 2A
180-115861-2 Stage 4	180-116109-1 Stage 2A
180-115925-1 Stage 2A	180-116110-1 Stage 2A
180-115925-2 Stage 2A	180-116199-1 Stage 2A
180-115999-1 Stage 2A	180-116200-1 Stage 2A
180-116000-1 Stage 2A	

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Inorganic and Organic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Twelve ESdat quality assurance (QA) reports and one stage 4 data validation report (DVR) were completed for the DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania, performed the analytical testing. A DQA was performed on the following laboratory reports listed by laboratory job IDs in Table 1.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and a stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

DRAFT

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD), field duplicate pairs and serial dilutions.; RPDs, %Ds and %RSDS were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the metals and VOC data based on MS/MSD RPD exceedances. Qualifications applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. No data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. No qualifications were applied due to LCS/LCSD RPD exceedances.

Eleven field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria of 50%. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. No qualifications were applied due to serial dilution %D exceedances.

Laboratory duplicates were not analyzed.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery (%R) of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

DRAFT

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedance were UJ qualifications as estimated less than the MDL. No data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were UJ qualifications as estimated less than the MDL, J qualifications as estimated, J- qualifications as estimated with a low bias, J+ qualifications as estimated with a high bias and R qualified as rejected. Three VOC non-detect results (two results for 1,2,3-trichlorobenzene and one result for 1,2,4-trichlorobenzene) were rejected due to MS/MSD recoveries less than 20%.

The frequency of trip blanks, field blanks, equipment blanks and method blanks met the requirements for the project and supports the DQOs. Qualifications were not applied to the data due to blank contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J+ qualifications as estimated with a high bias. No rejections were applied due to the surrogate recovery exceedances.

Total and dissolved polychlorinated biphenyls (PCBs) were analyzed. Qualifications were not applied to the data due to the total and dissolved PCBs assessment.

Total and dissolved metals were analyzed. There were instances when a dissolved metal was detected at a concentration greater than the total metal concentration in the sample. Qualifications that were applied to the data based on total and dissolved metals RPDs that were not calculable were J qualifications as estimated and UJ qualifications as estimated less than the MDL. No data were rejected due to the total and dissolved metals assessment.

Total and dissolved mercury were analyzed. Qualifications were not applied to the data due to the total and dissolved mercury assessment.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

DRAFT

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Forty-three non-detect results for 1,4-dioxane, two non-detect result for 1,2,3-trichlorobenzene and one non-detect result for 1,2,4-trichlorobenzene assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J, J-, and J+ qualified as estimated and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds did not meet the project specific PQLs.

Forty-three non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process and are listed in the ESdat QA reports and Stage 4 DVR.

The discrepancies did not impact the usability of the data but should be noted by the data user.

DRAFT

Holding Time

No sample analysis was performed outside of the method or QAPP specified holding time.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J, J-, and J+ qualified as estimated and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Forty-three non-detect results for 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration and two non-detect results for 1,2,3-trichlorobenzene and one non-detect result for 1,2,4-trichlorobenzene were R qualified as rejected due to MS/MSD recoveries less than 20%. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (US EPA 540-R-2017-002).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (US EPA 540-R-2017-001).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

Appendix B Data Quality Assessments

DRAFT

Data Usability Evaluation

Former Sperry Remington – IRM6 PDI

April 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington-IRM6 PDI project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (US EPA) National Functional Guidance for Data Review. Forty-one non-detect results for 1,4-dioxane, eight non-detect results for benzaldehyde, three non-detect results for 2,4-dinitrophenol and one non-detect result for 4,6-dinitro-2-methylphenol assessed for this project were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-115927-1 Stage 2A	180-116462-2 Stage 2A
180-115927-2 Stage 4	180-116462-3 Stage 2A
180-116002-1 Stage 2A	180-116462-4 Stage 2A
180-116002-2 Stage 2A	180-116529-1 Stage 2A
180-116247-1 Stage 2A	180-116529-2 Stage 2A
180-116247-2 Stage 2A	180-116529-3 Stage 2A
180-116310-1 Stage 2A	180-116609-1 Stage 2A
180-116310-2 Stage 2A	180-116609-2 Stage 2A
180-116365-1 Stage 2A	180-116665-1 Stage 2A
180-116365-2 Stage 2A	180-116665-2 Stage 2A
180-116402-1 Stage 2A	180-116665-3 Stage 2A
180-116404-1 Stage 2A	180-116665-4 Stage 4
180-116404-2 Stage 2A	180-116686-1 Stage 2A
180-116404-3 Stage 2A	180-116686-2 Stage 2A
180-116404-4 Stage 2A	180-116723-1 Stage 4
180-116462-1 Stage 2A	180-116771-1 Stage 2A

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-

R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Twenty-nine ESdat quality assurance (QA) reports and three stage 4 data validation reports (DVRs) were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; North Canton, Ohio and West Sacramento, California performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets

DRAFT

of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions.; RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. No data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. No qualifications were applied to the data due to LCS/LCSD RPD exceedances.

Twenty-two field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria of 50%. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. Qualifications that were applied to the data due to serial dilution %D exceedances were J qualifications as estimated.

Laboratory duplicates were not analyzed.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified.

DRAFT

Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedance were UJ qualifications as estimated less than the MDL. No data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J- qualification as estimated with low bias, J+ qualification as estimated with high bias, UJ qualification as estimated less than the MDL and R qualification as rejected. Eight non-detect results for benzaldehyde, three non-detect results for 2,4-dinitrophenol and one non-detect result for 4,6-dinitro-2-methylphenol were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. No qualifications were applied to the data due to blank contamination.

Surrogates were reported for the organic analyses. Qualifications were applied to the data based on surrogate recovery exceedances. Qualifications that were applied to the data due to surrogate recovery exceedances were J+ qualification as estimated with high bias. No data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds that were outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were J qualification as estimated and UJ qualification as estimated less than the MDL. No data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards were analyzed with each sample and associated QC sample. No data were qualified or rejected due to low internal standard responses.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

DRAFT

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Forty-one non-detect results for 1,4-dioxane, eight non-detect results for benzaldehyde, three non-detect results for 2,4-dinitrophenol and one non-detect result for 4,6-dinitro-2-methylphenol assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, U qualified as not detected at the RL, J- qualified as estimated with low bias, J+ qualified as estimated with high bias and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds did not meet the project specific PQLs.

Forty-one non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process and are listed in the ESdat QA reports and Stage 4 DVR.

The discrepancies did not impact the usability of the data but should be noted by the data user.

DRAFT

Holding Time

None of the sample analyses were performed outside of the method or QAPP specified holding times.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J, J-, J+ qualified as estimated, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Forty-one non-detect results for 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration. Eight non-detect results for benzaldehyde, three non-detect results for 2,4-dinitrophenol and one non-detect result for 4,6-dinitro-2-methylphenol were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (US EPA 540-R-2017-002).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (US EPA 540-R-2017-001).

USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016 (US EPA 542-B-16-001).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

Appendix A Data Quality Assessments

DRAFT

Data Usability Evaluation

Former Sperry Remington – FFC TCE Soil Investigation

April 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington FFC TCE Soil Investigation project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (US EPA) National Functional Guidance for Data Review. One hundred non-detect results for 1,4-dioxane assessed for this project were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Three ESdat quality assurance (QA) reports and one stage 4 data validation report (DVR) were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania, performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

DRAFT

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-116724-1 Stage 4	180-116864-1 Stage 2A
180-116773-1 Stage 2A	180-116914-1 Stage 2A

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and a stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions.; RPDs, %Ds and %RSDS were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

DRAFT

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. No data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. No qualifications were applied to the data due to LCS/LCSD RPD exceedances.

Twelve field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria of 50%. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions and laboratory duplicates were not analyzed.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedance were UJ qualifications as estimated less than the MDL. No data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications

DRAFT

that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated. No data were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. No qualifications were applied to the data due to blank contamination.

Surrogates were reported for the organic analyses. No qualifications were applied to the data due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds were outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL. No data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards were analyzed with each sample and associated QC sample. Internal responses were low and outside of the method specified acceptance criteria for sample SSHS-B3583-SUB-6-8. Qualifications that were applied to the data due to low internal standard responses were UJ qualifications as estimated less than the MDL. No data were rejected due to low internal standard responses.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. One hundred non-detect results for 1,4-dioxane assessed in

DRAFT

this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds did not meet the project specific PQLs.

One hundred non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process and are listed in the ESdat QA reports and Stage 4 DVR.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

No sample analysis was performed outside of the method or QAPP specified holding time.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J, J-, and J+ qualified as estimated and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

One hundred non-detect results for 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (US EPA 540-R-2017-002).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

Appendix A Data Quality Assessments

DRAFT

Data Usability Evaluation

Former Sperry Remington – Groundwater

May 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington-Groundwater project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (US EPA) National Functional Guidance for Data Review. Fifty-two non-detect results for 1,4-dioxane, two non-detect results for hexachlorocyclopentadiene, one non-detect result for 4-chloroaniline, one non-detect result for hexachlorobutadiene, one non-detect result for hexachloroethane and one non-detect result for 3,3'-dichlorobenzidine assessed for this project were rejected (R qualified) and are discussed below. Otherwise, no evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Ten ESdat quality assurance (QA) reports and one stage 4 data validation report (DVR) were completed for this DUE. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; North Canton, Ohio; Edison, New Jersey; and West Sacramento, California performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs (Table 1).

DRAFT

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-117176-1 Stage 2A
180-117176-2 Stage 2A
180-117387-1 Stage 4
180-117390-1 Stage 2A
180-117425-1 Stage 2A
180-117459-1 Stage 2A

180-117476-1 Stage 2A
180-117542-1 Stage 2A
180-117621-1 Stage 2A
180-118872-1 Stage 2A
180-119009-1 Stage 2A

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD), field duplicate pairs and serial dilutions.; RPDs, %Ds and %RSDS were considered during the DQA.

DRAFT

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. No qualifications were applied to the data due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. No qualifications were applied to the data due to LCS/LCSD RPD exceedances.

Five field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria of 30%. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. No qualifications were applied to the data due to serial dilution %D exceedances.

Laboratory duplicates were not analyzed.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualification applied to the data based on LCS and LCS/LCSD recovery exceedance

DRAFT

was a UJ qualification as estimated less than the MDL. No data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, UJ qualification as estimated less than the MDL and R qualification as rejected. One non-detect result for 1,4-dioxane, two non-detect results for hexachlorocyclopentadiene, one non-detect result for 4-chloroaniline, one non-detect result for hexachlorobutadiene, one non-detect result for hexachloroethane and one non-detect result for 3,3'-dichlorobenzidine were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. No qualifications were applied to the data due to blank contamination.

The frequency of the initial calibration blank (ICB) continuing calibration blank (CCB) met the requirements for the project and supports the DQOs. One estimated PFAS result was U qualified as not detected at the RL due to CCB contamination. No data were rejected due to CCB contamination.

Trip blanks were shipped with the VOC samples. Four estimated methylene chloride results were U qualified as not detected at the RL due to trip blank contamination. No data were rejected due to trip contamination.

Surrogates were reported for the organic analyses. Qualifications were applied to the data based on surrogate recovery exceedances. Qualifications that were applied to the data due to surrogate recovery exceedances were J qualifications as estimated and UJ qualifications as estimated less than the MDLs. No data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were J qualification as estimated and UJ qualification as estimated less than the MDL. No data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data based on isotope dilution recoveries were J qualification as estimated and UJ qualification as estimated less than the MDL. No data were rejected due to low internal standard responses.

PCB-1248, -1254 and -1260 were detected in multiple samples. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these

DRAFT

samples were J qualified as estimated. No data were rejected due to multiple PCBs detected in the samples.

Seven PFAS concentrations were I flagged to indicate the result was an estimated maximum possible concentration (EMPC). Therefore, based on professional and technical judgment these concentrations were J qualified as estimated.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Fifty-two non-detect results for 1,4-dioxane, two non-detect results for hexachlorocyclopentadiene, one non-detect result for 4-chloroaniline, one non-detect result for hexachlorobutadiene, one non-detect result for hexachloroethane and one non-detect result for 3,3'-dichlorobenzidine assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds did not meet the project specific PQLs and are noted in detail in the individual DVRs.

Fifty-one non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

DRAFT

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process and are listed in the ESdat QA reports and Stage 4 DVR.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

No sample analysis was performed outside of the method or QAPP specified holding time.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J, J-, J+ qualified as estimated, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Fifty-two non-detect results for 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration. One non-detect results for 1,4-dioxane, two non-detect results for hexachlorocyclopentadiene, one non-detect result for 4- chloroaniline, one non-detect result for hexachlorobutadiene, one non-detect result for hexachloroethane and one non-detect result for 3,3'-dichlorobenzidine were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan/ Field Sampling Plan Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (US EPA 542-R-20-007).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

DRAFT

Data Usability Evaluation

Former Sperry Remington – Deep Soil Investigation

June 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington-Deep Soil Investigation project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (US EPA) National Functional Guidance for Data Review. One hundred forty-seven non-detect results for 1,4-dioxane, twenty-nine non-detect results for benzaldehyde and one non-detect result for 2,4-dinitrophenol and non-detect VOC results in five samples assessed for this project were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-119460-1 Stage 2A
180-119460-2 Stage 2A
180-119462-1 Stage 2A
180-119462-2 Stage 2A
180-119510-1 Stage 2A
180-119510-2 Stage 2A
180-119511-1 Stage 2A
180-119583-1 Stage 2A
180-119583-2 Stage 2A
180-119589-1 Stage 2A
180-119649-1 Stage 2A
180-119671-1 Stage 2A
180-119671-2 Stage 2A
180-119734-1 Stage 2A
180-119767-1 Stage 2A
180-119767-2 Stage 2A
180-119810-1 Stage 4
180-119815-1 Stage 4
180-119815-2 Stage 2A

180-119841-1 Stage 2A
180-119841-2 Stage 2A
180-119861-1 Stage 2A
180-119861-2 Stage 2A
180-119930-1 Stage 2A
180-119938-1 Stage 2A
180-119938-2 Stage 2A
180-120028-1 Stage 2A
180-120028-2 Stage 2A
180-120029-1 Stage 2A
180-120162-1 Stage 2A
180-120163 Stage 2A
180-120245-1 Stage 2A
180-120245-2 Stage 2A
180-120257-1 Stage 2A
180-120259-1 Stage 2A
180-120413-1 Stage 2A
180-120434-1 Stage 2A

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Thirty-five ESdat quality assurance (QA) reports and two stage 4 data validation report (DVR) were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; Edison, New Jersey and West Sacramento, California performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

DRAFT

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions.; RPDs, %Ds and %RSDS were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. No data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. Qualifications applied to the data based on LCS/LCSD RPD exceedance were J qualifications as estimated. No data were rejected due to the LCS/LCSD RPD exceedances.

Forty soil field duplicate pairs and four groundwater field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria of 50%. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. Qualifications that were applied to the data due to serial dilution %D exceedances were J qualifications as estimated. No data were rejected due to the serial dilution %D exceedances.

Laboratory duplicates were not analyzed.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the

DRAFT

assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedance were UJ qualifications as estimated less than the MDL and R qualified as rejected. Twenty-nine non-detect results for benzaldehyde were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J- qualification as estimated with low bias, J+ qualification as estimated with high bias, UJ qualification as estimated less than the MDL and R qualification as rejected. One non-detect result for benzaldehyde and one non-detect result for 2,4-dinitrophenol were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Qualifications that were applied to the data due to blank contamination were U qualifications as not detected at the RL. No data were rejected due to the blank contamination.

The frequency of the initial calibration blank (ICB) continuing calibration blank (CCB) met the requirements for the project and supports the DQOs. No data were rejected or qualified due to ICB or CCB contamination.

Trip blanks were shipped with the VOC samples. No data were rejected or qualified due to trip contamination.

Surrogates were reported for the organic analyses. No data were qualified or rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds were outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were UJ qualification as estimated less than the MDL. No data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data based on internal standard and isotope dilution recoveries were UJ qualification as estimated less than

DRAFT

the MDL and J+ qualified as estimated with high bias. No data were rejected due to low internal standard responses.

PCB-1248, -1254 and -1260 were detected in multiple samples. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated. No data were rejected due to multiple PCBs detected in the samples.

One perfluorobutanesulfonic acid (PFBS) concentration was Cl flagged to indicate the peak identified by the data system exhibited chromatographic interference that could not be resolved. Therefore, based on professional and technical judgment, the PFBS concentration was J qualified as estimated. No data were rejected due to chromatographic interference in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. - One hundred forty-seven non-detect results for 1,4-dioxane, twenty-nine non-detect results for benzaldehyde, one non-detect result for 2,4-dinitrophenol and non-detect VOC results in five samples assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, U qualified as not detected at the RL, J- qualified as estimated with low bias, J+ qualified as estimated with high bias and UJ qualified as estimated less than the MDL.

DRAFT

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds did not meet the project specific PQLs.

One hundred forty-seven non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

The VOC analysis of samples SSHS-B3874-SUB-24-26, SSHS-B3874-SUB-18-20, SSHS-B3874-SUB-20-22, SSHS-B3874-SUB-22-24 and SSHS-B3874-SUB-26-28 were performed outside of the method or QAPP specified holding time. Qualifications applied to the data based on holding time exceedance were R qualifications as rejected. Two hundred seventy non-detect VOC results were rejected due to holding time exceedances.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J, J-, J+ qualified as estimated, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

One hundred forty-seven non-detect results for 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration. Twenty-nine non-detect results for benzaldehyde were rejected due to LCS/LCSD recovery exceedances. One non-detect result for 2,4-dinitrophenol was rejected due to MS/MSD recovery exceedances. Two hundred seventy non-detect VOC results were rejected due to holding time exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (US EPA 540-R-20-007).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

Appendix A Data Quality Assessments

DRAFT

Data Usability Evaluation

Former Sperry Remington – Groundwater

July 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington-Groundwater project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (US EPA) National Functional Guidance for Data Review. Thirty-seven non-detect results for 1,4-dioxane, one non-detect result for 3,3'-dichlorobenzidine and two non-detect results for hexachlorocyclopentadiene assessed for this project were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-120679-1 Stage 4	180-121010-1 Stage 2A
180-120743-1 Stage 2A	180-121427-1 Stage 2A
180-120857-1 Stage 2A	180-121547-1 Stage 2A
180-120955-1 Stage 2A	

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Six ESdat quality assurance (QA) reports and one stage 4 data validation report (DVR) were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; Canton, Ohio; Edison, New Jersey and West Sacramento, California performed the

DRAFT

analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions.; RPDs, %Ds and %RSDS were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. No data were qualified or rejected due to the MS/MSD RPD exceedances.

DRAFT

LCS/LCSD pairs were analyzed with the data set. No data were qualified or rejected due to the LCS/LCSD RPD exceedances.

Three groundwater field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria of 30%. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were not analyzed with the data set.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedance were UJ qualifications as estimated less than the MDL and J qualifications as estimated. No data were rejected due to the LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, UJ qualification as estimated less than the MDL and R qualification as rejected. One non-detect result for 3,3'-dichlorobenzidine and two non-detect results for hexachlorocyclopentadiene were rejected due to MS/MSD recovery exceedances.

DRAFT

The frequency of method blanks met the requirements for the project and supports the DQOs. Qualifications that were applied to the data due to blank contamination were U qualifications as not detected at the RL and J+ qualifications as estimated with a high bias. No data were rejected due to the blank contamination.

The frequency of the initial calibration blank (ICB) continuing calibration blank (CCB) met the requirements for the project and supports the DQOs. No data were rejected or qualified due to ICB or CCB contamination.

Trip blanks were shipped with the VOC samples. No data were rejected or qualified due to trip contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were UJ qualifications as estimated less than the MDL and J- qualifications as estimated with a low bias. No data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds were outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were UJ qualification as estimated less than the MDL. No data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data based on internal standard and isotope dilution recoveries were UJ qualification as estimated less than the MDL. No data were rejected due to low internal standard responses.

One perfluoroheptanoic acid (PFHpA) concentration and two perfluorooctanesulfonic acid (PFOS) concentrations were I flagged to indicate the results were estimated maximum possible concentrations. Therefore, based on professional and technical judgment, the PFHpA and PFOS concentrations were J qualified as estimated. No data were rejected due to chromatographic identification in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were

DRAFT

performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Thirty-seven non-detect results for 1,4-dioxane, twenty-nine non-detect results for benzaldehyde, one non-detect result for 2,4-dinitrophenol and non-detect VOC results in five samples assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, U qualified as not detected at the RL, J- qualified as estimated with low bias, J+ qualified as estimated with high bias and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds did not meet the project specific PQLs.

Thirty-seven non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

No data were qualified or rejected due to holding time exceedances.

DRAFT

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J, J-, J+ qualified as estimated, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Thirty-seven non-detect results for 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration. One non-detect result for 3,3'-dichlorobenzidine and two non-detect results for hexachlorocyclopentadiene were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (US EPA 540-R-20-007).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

Appendix A Data Quality Assessments

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI

March 2022

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. One hundred eleven non-detect results for 1,4-dioxane, one non-detect result for 2,4-dinitrophenol, and the non-detect Volatile Organic Compounds (VOCs) results in samples SSHS-RI-B3882-TEMP and TRIP BLANK assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-121310-1 Stage 2A
180-121355-1 Stage 2A
180-121424-1 Stage 2A
180-121472-1 Stage 2A
180-121474-1 Stage 2A
180-121474-2 Stage 2A
180-121546-1 Stage 2A
180-121548-1 Stage 2A
180-121548-2 Stage 2A
180-121702-1 Stage 2A
180-121703-1 Stage 2A
180-121704-1 Stage 2A

180-121704-2 Stage 2A
180-121704-3 Stage 2A
180-121704-4 Stage 2A
180-121705-1 Stage 2A
180-121747-1 Stage 2A
180-121747-2 Stage 2A
180-121822-1 Stage 2A
180-121850-1 Stage 2A
180-121897-1 Stage 2A
180-121903-1 Stage 4
180-122000-1 Stage 2A

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance

DRAFT

was used as applicable to the methods employed for sample analyses. One stage 4 data validation report (DVR) and twenty-two ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; West Sacramento, California; and Edison, New Jersey; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Twenty-two ESdat QA reports and one Stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

DRAFT

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications that were applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Sediment field duplicate pairs and water field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. Qualifications that were applied to the data based on serial dilution exceedances were J qualifications as estimated. None of the data were rejected based on serial dilution exceedances.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

DRAFT

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedances were J qualifications as estimated, J+ qualifications as estimated with a high bias and UJ qualifications as estimated less than the MDL. None of the data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J+ qualifications as estimated with a high bias, J- qualifications as estimated with a low bias, UJ qualifications as estimated less than the MDL and R qualifications as rejected. One non-detect result of 2,4-dinitrophenol was rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Qualifications were applied to the data based on blank contamination. Qualifications applied to the data based on blank contamination were U qualifications as not detected at the RL and J+ qualifications as estimated with a high bias. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. None of the data were qualified or rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses and recoveries outside of the validation specified acceptance criteria. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to isotope dilution recovery exceedances were UJ qualifications as estimated less than the MDL. None of the data were rejected due to internal standard response.

One perfluorooctanesulfonic acid (PFOS) concentration was I flagged to indicate the result was an estimated maximum possible concentration. Therefore, based on professional and technical judgment, this PFOS concentration was J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

Negative metals results and results greater than the MDL were reported for non-spiked metals in metals interference check standards at concentrations greater than the MDL. Qualifications that were applied to the data were J qualifications as estimated and J- qualifications as estimated with a low bias. None of the data were rejected due to interference check standards results.

DRAFT

Multiple PCBs with shared peaks were detected in the samples; therefore, qualifications were applied to the data. Qualifications that were applied to the data were J qualification as estimated. None of the data were rejected due to multiple PCBs with shared peaks were detected in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

The samples were analyzed for both total and dissolved metals and PCBs. For compounds with both a non-detect total result and dissolved result greater than the MDL and less than the RL, the results were qualified. Qualifications were also applied to total and dissolved concentrations when the dissolved concentration was greater than the total concentration with the RPD greater than 30%. Qualifications that were applied to the data based on total and dissolved metals and PCBs assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on total and dissolved metals and PCBs assessment.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. One hundred eleven non-detect results of 1,4-dioxane, one non-detect result of 2,4-dinitrophenol, and the non-detect VOC results in samples SSHS-RI-B3882-TEMP and TRIP BLANK were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, J- qualified as estimated with a low bias and UJ qualified as estimated less than the MDL or RL.

DRAFT

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

One hundred eleven non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the VOC analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

The samples SSHS-RI-B3882-TEMP and TRIP BLANK were analyzed beyond the 14 days holding time from sample collection to analysis. The non-detect VOC results in samples SSHS-RI-B3882-TEMP and TRIP BLANK were R qualified as rejected due to holding time exceedances.

The containers for PCB analysis of sample SSHS-B3917-SUB-18-20 was stored at a temperature above 0-6 degrees Celsius (ºC). Therefore, based on professional and technical judgment, the PCB-1248 and PCB-1254 concentrations in sample SSHS-B3917-SUB-18-20 were J qualified as estimated, and the non-detect results of PCBs in sample SSHS-B3917-SUB-18-20 were UJ qualified as estimated less than the MDLs due to improper sample preservation.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with a high bias, J- qualified as estimated with a low bias and UJ qualified as estimated less than the MDL and RL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

One hundred eleven non-detect results for 1,4-dioxane were rejected due to low RRF. One non-detect result of 2,4-dinitrophenol was rejected due to MS/MSD recovery exceedances. The non-detect VOC results in samples SSHS-RI-B3882-TEMP and TRIP BLANK were rejected due to

DRAFT

holding time exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI

March 2022

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Twenty-six non-detect results for 1,4-dioxane and one non-detect result for benzaldehyde assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-121899-1 Stage 2A	180-121986-2 Stage 2A
180-121899-2 Stage 2A	180-122085-1 Stage 4
180-121981-1 Stage 2A	180-122085-3 Stage 2A
180-121986-1 Stage 2A	

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. One stage 4 data validation report (DVR) and six ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh,

DRAFT

Pennsylvania; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Six ESdat QA reports and one Stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. None of the data were qualified or rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

DRAFT

Sediment field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions and laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were UJ qualifications as estimated less than the MDL and R qualifications as rejected. One non-detect result of benzaldehyde was rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. None of the data were qualified or rejected due to blank contamination.

DRAFT

Surrogates were reported for the organic analyses. None of the data were qualified or rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses and recoveries outside of the validation specified acceptance criteria. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to internal standard response exceedances were UJ qualifications as estimated less than the MDL. None of the data were rejected due to internal standard response.

Multiple PCBs with shared peaks were detected in the samples; therefore, qualifications were applied to the data. Qualifications that were applied to the data were J qualification as estimated. None of the data were rejected due to multiple PCBs with shared peaks were detected in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Twenty-six non-detect results of 1,4-dioxane and one non-

DRAFT

detect result of benzaldehyde were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

Twenty-six non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the Volatile Organic Compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data were qualified or rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Twenty-six non-detect results for 1,4-dioxane were rejected due to low RRF. One non-detect result of benzaldehyde was rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI

September 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington-Groundwater project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (US EPA) National Functional Guidance for Data Review. Three hundred thirty-nine non-detect results for 1,4-dioxane, five non-detect results for 2,4-dinitrophenol, thirteen non-detect results for benzaldehyde, one non-detect result for 1,1,2-trichloro-1,2,2-trifluoroethane, one non-detect result for 1,2,3-trichlorobenzene, one non-detect result for 1,2,4-trichlorobenzene and non-detect results for VOCs for samples DUP-41, SSHS-B3706-SUB-0-0.17, SSHS-B4100-SUB-10-12, SSHS-B4100-SUB-12-14, SSHS-B4100-SUB-14-16, SSHS-B4100-SUB-16-18, SSHS-B4100-SUB-22-24, SSHS-B4100-SUB-26-28, SSHS-B4100-SUB-28-30, SSHS-B4100-SUB-30-32, SSHS-B4100-SUB-32-34, SSHS-B4100-SUB-34-36, SSHS-B4100-SUB-36-38, SSHS-B4100-SUB-38-40, SSHS-B4100-SUB-4-6, SSHS-B4100-SUB-6-8, SSHS-B4100-SUB-8-10, SSHS-B4003-SUB-20-22, SSHS-B4003-SUB-24-26, SSHS-B4003-SUB-26-28, SSHS-B4003-SUB-6-8, SSHS-B4003-SUB-8-10, SSHS-B4006-SUB-0.17-1 and SSHS-B510A-SUB-4-6 assessed for this project were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-121763-1 Stage 2A	180-122999-1 Stage 2A
180-121823-1 Stage 2A	180-123022-1 Stage 4
180-121823-2 Stage 4	180-123098-1 Stage 2A
180-122084-1 Stage 2A	180-123098-2 Stage 2A
180-122516-1 Stage 2A	180-123134-1 Stage 2A
180-122571-1 Stage 2A	180-123249-1 Stage 2A
180-122571-2 Stage 2A	180-123252-1 Stage 2A
180-122674-1 Stage 2A	180-123313-1 Stage 2A
180-122674-2 Stage 2A	180-123448-1 Stage 4
180-122736-1 Stage 4	180-123464-1 Stage 2A
180-122758-1 Stage 2A	180-123464-2 Stage 2A
180-122849-1 Stage 2A	180-123547-1 Stage 2A

180-123627-1 Stage 2A
180-123627-2 Stage 2A
180-123627-3 Stage 2A
180-123686-1 Stage 2A
180-123748-1 Stage 2A
180-123748-2 Stage 2A
180-123777-1 Stage 2A

180-123777-2 Stage 2A
180-123777-3 Stage 2A
180-123825-1 Stage 2A
180-123825-2 Stage 2A
180-123901-1 Stage 2A
180-123901-2 Stage 2A

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Thirty-three ESdat quality assurance (QA) reports and four stage 4 data validation reports (DVRs) were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; North Canton, Ohio; Edison, New Jersey and West Sacramento, California and Eurofins Lancaster Laboratories performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

DRAFT

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions.; RPDs, %Ds and %RSDS were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications that were applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. No data were qualified or rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. No data were qualified or rejected due to the LCS/LCSD RPD exceedances.

Groundwater field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. Qualifications that were applied to the data based on serial dilution exceedances were J qualifications as estimated.

Laboratory duplicates were not analyzed with the data set.

DRAFT

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedance were UJ qualifications as estimated less than the MDL, J qualifications as estimated, and R qualifications as rejected. Eight non-detect results for benzaldehyde were rejected due to less than 10% LCS recovery.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J+ qualifications as estimated with a high bias, J- qualifications as estimated with a low bias, UJ qualifications as estimated less than the MDL and R qualifications as rejected. Five non-detect results for 2,4-dinitrophenol, five non-detect results for benzaldehyde, one non-detect result for 1,1,2-trichloro-1,2,2-trifluoroethane, one non-detect result for 1,2,3-trichlorobenzene and one non-detect result for 1,2,4-trichlorobenzene were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Qualifications that were applied to the data due to blank contamination were U qualifications as not detected at the RL and J+ qualifications as estimated with a high bias. No data were rejected due to the blank contamination.

The frequency of the initial calibration blank (ICB) continuing calibration blank (CCB) met the requirements for the project and supports the DQOs. No data were rejected or qualified due to ICB or CCB contamination.

DRAFT

Trip blanks were shipped with the VOC samples. No data were rejected or qualified due to trip contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were UJ qualifications as estimated less than the MDL, J qualifications as estimated and J+ qualifications as estimated with a high bias. No data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds were outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL and J qualifications as estimated. No data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data based on internal standard and isotope dilution recoveries were J qualification as estimated, J+ qualifications as estimated with a high bias and UJ qualification as estimated less than the MDL. No data were rejected due to low internal standard and isotope dilution responses.

One perfluorooctanesulfonic acid (PFOS) concentration was I flagged to indicate the result was an estimated maximum possible concentration. Therefore, based on professional and technical judgment, the PFOS concentration was J qualified as estimated. No data were rejected due to chromatographic identification in the samples.

Five 1,1,2-trichloro-1,2,2-trifluoroethane concentrations were E flagged to indicate the sample results exceeded the calibration range. Therefore, based on professional and technical judgment, the 1,1,2-trichloro-1,2,2-trifluoroethane concentrations were J qualified as estimated. No data were rejected due to calibration exceedances.

Non-spiked metals were detected in metals interference check standards at concentrations greater than the MDL. Qualifications that were applied to the data were J qualification as estimated, J- qualifications as estimated with a low bias, J+ qualifications as estimated with a high bias and UJ qualification as estimated less than the MDL. No data were rejected due to low internal standard responses.

Multiple PCBs with shared peaks were detected in the samples; therefore, qualifications were applied to the data. Qualifications that were applied to the data were J qualification as estimated. No data were rejected due to low internal standard responses.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical

DRAFT

procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Three hundred thirty-nine non-detect results for 1,4-dioxane, five non-detect results for 2,4-dinitrophenol, thirteen non-detect results for benzaldehyde, one non-detect result for 1,1,2-trichloro-1,2,2-trifluoroethane, one non-detect result for 1,2,3-trichlorobenzene, one non-detect result for 1,2,4-trichlorobenzene and non-detect results for VOCs in twenty-four samples assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, U qualified as not detected at the RL, J- qualified as estimated with low bias, J+ qualified as estimated with high bias and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds did not meet the project specific PQLs.

Three hundred thirty-nine non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA

DRAFT

process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

Twenty-four soil samples were received beyond the 48 hours from sample collection to freezing. The qualifications that were applied to the data based on holding time exceedance were J qualifications as estimated and R qualifications as rejected.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J, J-, J+ qualified as estimated, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Three hundred thirty-nine non-detect results for 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration. Eight non-detect results for benzaldehyde were rejected due to less than 10% LCS recovery. Five non-detect results for 2,4-dinitrophenol, five non-detect results for benzaldehyde, one non-detect result for 1,1,2-trichloro-1,2,2-trifluoroethane, one non-detect result for 1,2,3-trichlorobenzene and one non-detect result for 1,2,4-trichlorobenzene were rejected due to MS/MSD recovery exceedances. Non-detect VOC results for twenty-four soil samples were rejected due to holding time exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (US EPA 540-R-20-007).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

Appendix A Data Quality Assessments

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Groundwater

September 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington-Groundwater project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (US EPA) National Functional Guidance for Data Review. Forty-four non-detect results for 1,4-dioxane, one non-detect result for 2,4-dimethylphenol, one non-detect result for 4-chloroaniline, one non-detect result for hexachlorocyclopentadiene and two non-detect results for 3,3'-dichlorobenzidine assessed for this project were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-123971-1 Stage 2A	180-124487-1 Stage 2A
180-124354-1 Stage 2A	180-124580-1 Stage 4
180-124378-1 Stage 2A	180-124628-1 Stage 2A

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Five ESdat quality assurance (QA) reports and one stage 4 data validation report (DVR) were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh,

DRAFT

Pennsylvania, North Canton, Ohio, Edison, New Jersey and West Sacramento; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and a stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions.; RPDs, %Ds and %RSDS were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on MS/MSD RPD exceedances were J

DRAFT

qualifications as estimated and UJ qualifications as estimated less than the method detection limit (MDL). No data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. No data were qualified or rejected due to the LCS/LCSD RPD exceedances.

Groundwater field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the MDL or reporting limit (RL), the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. No data were qualified or rejected due to serial dilution exceedances.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedance were UJ qualifications as estimated less than the MDL. No data were rejected due to the LCS and LCS/LCSD pair recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications

DRAFT

that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J- qualifications as estimated with a low bias, UJ qualifications as estimated less than the MDL and R qualifications as rejected. One non-detect result for 1,4-dioxane, one non-detect result for 2,4-dimethylphenol, one non-detect result for 4-chloroaniline, and one non-detect result for hexachlorocyclopentadiene and two non-detect results for 3,3'-dichlorobenzidine were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Qualifications that were applied to the data due to blank contamination were U qualifications as not detected at the RL and J+ qualifications as estimated with a high bias. No data were rejected due to the blank contamination.

The frequency of the initial calibration blank (ICB) continuing calibration blank (CCB) met the requirements for the project and supports the DQOs. No data were rejected or qualified due to ICB or CCB contamination.

Trip blanks were shipped with the VOC samples. No data were rejected or qualified due to trip contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were UJ qualifications as estimated less than the MDL. No data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds were outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL. No data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data based on internal standard and isotope dilution recoveries were UJ qualifications as estimated less than the MDL. No data were rejected due to low internal standard and isotope dilution responses.

Two perfluorooctanesulfonic acid (PFOS) concentrations and one perfluorobutanesulfonic acid (PFBS) were I flagged to indicate these results were estimated maximum possible concentrations. Therefore, based on professional and technical judgment, the PFOS and PFBS concentrations were J qualified as estimated. No data were rejected due to chromatographic identification in the samples.

Non-spiked metals were detected in metals interference check standards at concentrations greater than the MDL. Qualifications that were applied to the data were J qualification as estimated and UJ qualification as estimated less than the MDL. No data were rejected due to low internal standard responses.

DRAFT

Multiple PCBs with shared peaks were detected in the samples; therefore, qualifications were applied to the data. Qualifications that were applied to the data were J qualification as estimated. No data were rejected due to low internal standard responses.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Forty-four non-detect results for 1,4-dioxane, one non-detect result for 2,4-dimethylphenol, one non-detect result for 4-chloroaniline, one non-detect result for hexachlorocyclopentadiene and two non-detect results for 3,3'-dichlorobenzidine assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, U qualified as not detected at the RL, J- qualified as estimated with low bias, J+ qualified as estimated with high bias and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions

DRAFT

due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds did not meet the project specific PQLs.

Forty-three non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

No data were qualified or rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J, J-, J+ qualified as estimated, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Forty-three non-detect results for 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration. One non-detect result for 2,4-dimethylphenol, one non-detect result for 4-chloroaniline, one non-detect result for hexachlorocyclopentadiene and two non-detect results for 3,3'-dichlorobenzidine were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (US EPA 540-R-20-007).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

Appendix A Data Quality Assessments

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI

October 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Twenty non-detect results for 1,4-dioxane and one non-detect result for benzaldehyde assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-123985-1 Stage 4	180-123985-2 Stage 4

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. One stage 4 data validation report (DVR) was completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 100% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania and West Sacramento, California performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and

evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

A Stage 4 DVR was completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDS were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. None of the data were qualified or rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to the LCS/LCSD RPD exceedances.

Sediment field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration

DRAFT

greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. Qualifications that were applied to the data based on serial dilution exceedances were J qualifications as estimated. None of the data were rejected based on serial dilution exceedances.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to LCS recoveries.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J- qualifications as estimated with a low bias, UJ qualifications as estimated less than the MDL and R qualifications as rejected. One non-detect result for benzaldehyde was rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to the blank contamination.

DRAFT

The frequency of the initial calibration blank (ICB) and continuing calibration blank (CCB) met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to ICB or CCB contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were UJ qualifications as estimated less than the MDL and J qualifications as estimated. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data based on internal standard and isotope dilution recoveries were UJ qualification as estimated less than the MDL. None of the data were rejected due to low internal standard and isotope dilution responses.

Six PFAS concentrations were I flagged to indicate the results were estimated maximum possible concentrations. Therefore, based on professional and technical judgment, these PFAS concentrations were J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

Negative metals results were reported for non-spiked metals in metals interference check standards at concentrations greater than the MDL. Qualifications that were applied to the data were J qualification as estimated and UJ qualification as estimated less than the MDL. None of the data were rejected due to interference check standards results.

Multiple PCBs with shared peaks were detected in the samples; therefore, qualifications were applied to the data. Qualifications that were applied to the data were J qualification as estimated. None of the data were rejected due to multiple PCBs with shared peaks were detected in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

DRAFT

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Twenty non-detect results for 1,4-dioxane and one non-detect result for benzaldehyde assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, U qualified as not detected at the RL, J- qualified as estimated with low bias and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds may not meet the project specific PQLs.

Twenty non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data was qualified or rejected due to holding time exceedance.

DRAFT

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J, J-, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Twenty non-detect results for 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration. One non-detect result for benzaldehyde were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (US EPA 540-R-20-007).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

Appendix A Data Quality Assessments

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI

October 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Non-detect results for the VOCs in samples SSHS-B3933-SUB-12-14 and SSHS-B3933-SUB-6-8 assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-123399-1 Stage 2A	180-124973-1 Stage 2A
180-123399-2 Stage 2A	180-123398-1 Stage 4
180-123449-1 Stage 2A	180-124670-1 Stage 4
180-123449-2 Stage 2A	

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Two stage 4 data validation report (DVR) and five ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania and North Canton, Ohio; and Eurofins Lancaster Laboratories performed the

analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and Stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDS were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications that were applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. No data were qualified due to the MS/MSD RPD exceedances.

DRAFT

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to the LCS/LCSD RPD exceedances.

Sediment field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedances were J qualifications as estimated. None of the data were rejected due on LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated. None of the data were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to the blank contamination.

DRAFT

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J+ qualifications as estimated with a high bias. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. None of the data were qualified or rejected due to low internal standard and isotope dilution responses.

None of the data were qualified or rejected due to chromatographic identification in the samples.

Multiple PCBs with shared peaks were detected in the samples; therefore, qualifications were applied to the data. Qualifications that were applied to the data were J qualification as estimated. None of the data were rejected due to multiple PCBs with shared peaks were detected in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a

DRAFT

percentage of usable analytical data. The non-detect VOC results for two samples were assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds may not meet the project specific PQLs.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

Two soil samples were analyzed beyond the 14 days holding time from sample freezing to analysis. The qualifications that were applied to the data based on holding time exceedance were J qualifications as estimated and R qualifications as rejected.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Non-detect results for VOCs in two soil samples were rejected due to holding time exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI

November 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. One non-detect result each for 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dibromo-3-chloropropane, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,3,4,6-tetrachlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 2,4-dinitrophenol, 2-nitrophenol, 4,6-dinitro-2-methylphenol, 4-nitrophenol, hexachlorocyclopentadiene and pentachlorophenol; four non-detect results for benzaldehyde; and two-hundred ten non-detect results for 1,4-dioxane assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-124763-1 Stage 2A
180-124763-2 Stage 2A
180-124763-3 Stage 2A
180-124793-1 Stage 2A
180-124793-2 Stage 2A
180-124877-1 Stage 2A
180-124877-2 Stage 4
180-124918-1 Stage 2A
180-124920-1 Stage 2A
180-124920-2 Stage 2A
180-124972-1 Stage 2A

180-124974-1 Stage 2A
180-125049-1 Stage 4
180-125049-2 Stage 2A
180-125052-1 Stage 2A
180-125087-1 Stage 2A
180-125090-1 Stage 2A
180-125090-2 Stage 2A
180-125127-1 Stage 4
180-125129-1 Stage 2A
180-125366-1 Stage 2A

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria

DRAFT

generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. One stage 4 data validation report (DVR) and eighteen ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; Edison, New Jersey; West Sacramento, California; North Canton, Ohio; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and a Stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike

DRAFT

duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications that were applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to the LCS/LCSD RPD exceedances.

Sediment field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL) or for compounds with both a concentration greater than the MDL and a non-detect result, the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. Qualifications that were applied to the data based on serial dilution exceedances were J qualifications as estimated. None of the data were rejected based on serial dilution exceedances.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

DRAFT

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedances were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualification as estimated, J+ qualification as estimated with a high bias, J- qualification as estimated with a low bias, UJ qualification as estimated less than the MDL and R qualified as rejected. One non-detect result each for 2,3,4,6-tetrachlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 2,4-dinitrophenol, 2-nitrophenol, 4,6-dinitro-2-methylphenol, 4-nitrophenol, hexachlorocyclopentadiene and pentachlorophenol and four non-detect results for benzaldehyde were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Qualifications were applied to the data based on blank contamination. Qualifications applied to the data based on blank contamination were J+ qualification as estimated with a high bias and U qualification as not detected at the RL. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J+ qualifications as estimated with a high bias. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to low internal standard responses were UJ qualification as estimated less than the MDL and R qualified as rejected. One non-detect result each for 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dibromo-3-chloropropane, 1,2-dichlorobenzene, 1,3-dichlorobenzene and 1,4-dichlorobenzene were rejected due to low internal standard response less than 20%.

DRAFT

Seventeen PFAS concentrations were I flagged to indicate the results were estimated maximum possible concentrations. Therefore, based on professional and technical judgment, these PFAS concentrations were J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

Negative metals results and concentrations greater than the MDL were reported for non-spiked metals in metals interference check standards at concentrations greater than the MDL. Qualifications that were applied to the data were J qualification as estimated, J- qualification as estimated with a low bias and UJ qualification as estimated less than the MDL. None of the data were rejected due to interference check standards results.

Multiple PCBs with shared peaks were detected in the samples; therefore, qualifications were applied to the data. Qualifications that were applied to the data were J qualification as estimated. None of the data were rejected due to multiple PCBs with shared peaks were detected in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Two hundred ten non-detect results for 1,4-dioxane, one non-detect result each for 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dibromo-3-chloropropane, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 2,3,4,6-tetrachlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 2,4-dinitrophenol, 2-nitrophenol, 4,6-dinitro-2-methylphenol, 4-nitrophenol, hexachlorocyclopentadiene and pentachlorophenol and four non-detect results for benzaldehyde

DRAFT

assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, J- qualified as estimated with a low bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds may not meet the project specific PQLs.

Two hundred nine non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

One soil sample was extracted beyond the 7 days holding time from sample collection to extraction for 1,4-dioxane analysis by US EPA Method 8270E using selected ion monitoring (SIM). The qualifications that were applied to the data based on holding time exceedance were R qualifications as rejected. One non-detect result for 1,4-dioxane was rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with a high bias, J- qualified as estimated with a low bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

One non-detect result each for 2,3,4,6-tetrachlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, 2,4-dichlorophenol, 2,4-dinitrophenol, 2-nitrophenol, 4,6-dinitro-2-

DRAFT

methylphenol, 4-nitrophenol, hexachlorocyclopentadiene and pentachlorophenol and four non-detect results for benzaldehyde were rejected due to MS/MSD recovery exceedances. Two hundred nine non-detect results for 1,4-dioxane were rejected due to low RRF. One non-detect result for 1,4-dioxane was rejected due to holding time exceedance. One non-detect result each for 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dibromo-3-chloropropane, 1,2-dichlorobenzene, 1,3-dichlorobenzene and 1,4-dichlorobenzene were rejected due to less than twenty percent internal standard response. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI

February 2022

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Two hundred eighty-five non-detect results for 1,4-dioxane, seven non-detect results for benzaldehyde, one non-detect result for 4,6-dinitro-2-methylphenol, one non-detect result for diethyl phthalate, one non-detect result for dimethyl phthalate, one non-detect result for pentachlorophenol, the non-detect results associated with the internal standard 1,4-dichlorobenzene-d4 in samples DUP-11 and SSHS-B4170-SUB-16-18 and the non-detect VOC results in sample SSHS-B4170-SUB-12-14 assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-125253-1 Stage 2A
180-125431-1 Stage 2A
180-127013-1 Stage 2A
180-127013-2 Stage 2A
180-127066-1 Stage 2A
180-127066-2 Stage 2A
180-127084-1 Stage 2A
180-127084-2 Stage 2A
180-127140-1 Stage 2A

180-127140-2 Stage 2A
180-127205-1 Stage 2A
180-127205-2 Stage 2A
180-127265-1 Stage 2A
180-127265-2 Stage 2A
180-127415-1 Stage 2A
180-127595-1 Stage 4
180-127595-2 Stage 2A

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance

was used as applicable to the methods employed for sample analyses. One stage 4 data validation report (DVR) and sixteen ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; West Sacramento, California; Amherst, New York; and North Canton, Ohio; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Sixteen ESdat QA reports and one Stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

DRAFT

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications that were applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to the LCS/LCSD RPD exceedances.

Sediment field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL) or for compounds with both a concentration greater than the MDL and a non-detect result, the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. None of the data were qualified or rejected based on serial dilution exceedances.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

DRAFT

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedances were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J+ qualifications as estimated with a high bias, J- qualifications as estimated with a low bias, UJ qualifications as estimated less than the MDL and R qualified as rejected. Seven non-detect results for benzaldehyde, one non-detect result for 4,6-dinitro-2-methylphenol, one non-detect result for diethyl phthalate, one non-detect result for dimethyl phthalate and one non-detect result for pentachlorophenol were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Qualifications were applied to the data based on blank contamination. Qualifications applied to the data based on blank contamination were U qualifications as not detected at the RL. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J qualifications as estimated. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses and recoveries outside of the validation specified acceptance criteria. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to isotope dilution recovery exceedances were J qualifications as estimated, J+ qualifications as estimated with a high bias, UJ qualifications as estimated less than the MDL and R qualified as rejected. The non-detect results associated with the internal standard 1,4-dichlorobenzene-d4 in samples DUP-11 and SSHS-B4170-SUB-16-18 and the non-detect VOC results in sample SSHS-B4170-SUB-12-14 were rejected due to low internal standard responses.

Nine PFAS concentrations were I flagged to indicate the results were estimated maximum possible concentrations. Therefore, based on professional and technical judgment, these PFAS concentrations were J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

DRAFT

There were detections for non-spiked metals in metals interference check standards at concentrations greater than the MDL. Qualifications that were applied to the data were J qualifications as estimated, J- qualifications as estimated with a low bias and UJ qualifications as estimated less than the MDL. None of the data were rejected due to interference check standards results.

Multiple PCBs with shared peaks were detected in the samples; therefore, qualifications were applied to the data. Qualifications that were applied to the data were J qualification as estimated. None of the data were rejected due to multiple PCBs with shared peaks were detected in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Two hundred eighty-five non-detect results for 1,4-dioxane, seven non-detect results for benzaldehyde, one non-detect result for 4,6-dinitro-2-methylphenol, one non-detect result for diethyl phthalate, one non-detect result for dimethyl phthalate, one non-detect result for pentachlorophenol, the non-detect results associated with the internal standard 1,4-dichlorobenzene-d4 in samples DUP-11 and SSHS-B4170-SUB-16-18 and the non-detect VOC results in sample SSHS-B4170-SUB-12-14 were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, J- qualified as estimated with a low bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

DRAFT

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds may not meet the project specific PQLs.

One concentration of fluoranthene, one concentration of phenanthrene, one concentration of pyrene and one concentration of acetone were J qualified as estimated due to calibration range exceedances.

Two hundred eighty-five non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data were qualified or rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with a high bias, J- qualified as estimated with a low bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Two hundred eighty-five non-detect results for 1,4-dioxane were rejected due to low RRF. Seven non-detect results for benzaldehyde, one non-detect result for 4,6-dinitro-2-methylphenol, one non-detect result for diethyl phthalate, one non-detect result for dimethyl phthalate and one non-detect result for pentachlorophenol were rejected due to MS/MSD recovery exceedances. The non-detect results associated with the internal standard 1,4-dichlorobenzene-d4 in samples DUP-11 and SSHS-B4170-SUB-16-18 and the non-detect VOC results in sample SSHS-B4170-SUB-12-14

DRAFT

were rejected due to low internal standard responses. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI Groundwater

November 2021

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Non-detect volatile organic compounds (VOCs) results for sample MW-89S, one non-detect result for 3,3'-dichlorobenzidine, two non-detect results for 2,4-dimethylphenol, one non-detect result for 2,4-dinitrophenol, two non-detect results for hexachlorocyclopentadiene and sixty-two results for 1,4-dioxane assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-126485-1 Stage 2A	180-126702-1 Stage 2A
180-126501-1 Stage 2A	180-126846-1 Stage 2A
180-126593-1 Stage 2A	180-126905-1 Stage 4
180-126608-1 Stage 2A	180-126939-1 Stage 2A

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. One stage 4 data validation report (DVR) and seven ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; Edison, New Jersey; West Sacramento and California; North Canton, Ohio performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and Stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

DRAFT

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. None of the data were qualified or rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to the LCS/LCSD RPD exceedances.

Groundwater field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL or both a concentration greater than the MDL and a non-detect result, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. None of the data were qualified or rejected based on serial dilution exceedances.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due on LCS and LCS/LCSD recovery exceedances.

DRAFT

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualification as estimated, UJ qualification as estimated less than the MDL and R qualified as rejected. One non-detect result for 3,3'-dichlorobenzidine, two non-detect results for 2,4-dimethylphenol, one non-detect result for 2,4-dinitrophenol and two non-detect results for hexachlorocyclopentadiene were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to the blank contamination.

Trip blank, field blanks and equipment blanks were collected and submitted with the samples and met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to target analytes detected in the field blanks. Qualifications due to field blank contamination were U qualified as not detected at the RL and J+ qualified as estimated with high bias. None of the data were rejected due to the blank contamination.

Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) were met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to target analytes detected in bracketing CCBs. Qualifications due to CCB contamination were U qualified as not detected at the RL.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J+ qualifications as estimated with a high bias. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. None of the data were qualified or rejected due to internal standard response.

One perfluorodecanoic acid (PFDA) concentration was I flagged to indicate the result was an estimated maximum possible concentration. Therefore, based on professional and technical judgment, this PFDA concentration was J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

Negative metals results and results greater than the MDL were reported for non-spiked metals in metals interference check standards at concentrations greater than the MDL. Qualifications that were applied to the data were J qualification as estimated and UJ qualification as estimated less than the MDL. None of the data were rejected due to interference check standards results.

DRAFT

Multiple PCBs with shared peaks were detected in the samples. None of the data were qualified or rejected due to multiple PCBs with shared peaks were detected in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

The samples were analyzed for both total and dissolved metals and PCBs. For compounds with both a non-detect total result and dissolved result greater than the MDL and less than the RL, the results were qualified. Qualifications were also applied to total and dissolved concentrations when the dissolved concentration was greater than the total concentration with the RPD greater than 30%. Qualifications that were applied to the data based on total and dissolved metals and PCBs assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on total and dissolved metals and PCBs assessment.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Non-detect VOCs results for sample MW-89S, one non-detect result for 3,3'-dichlorobenzidine, two non-detect results for 2,4-dimethylphenol, one non-detect result for 2,4-dinitrophenol, two non-detect results for hexachlorocyclopentadiene and sixty-two results for 1,4-dioxane assessed in this DUE were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

DRAFT

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds may not meet the project specific PQLs.

Sixty-two non-detect results for 1,4-dioxane were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

Sample MW-89S was collected in preserved vials; however, the pH values were measured above the criteria of < 2; therefore, the sample was considered unpreserved. The sample was analyzed beyond the 7 days holding time from sample collection to analysis. The non-detect VOC results in sample MW-89S were rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with a high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

One non-detect result for 3,3'-dichlorobenzidine, two non-detect results for 2,4-dimethylphenol, one non-detect result for 2,4-dinitrophenol and two non-detect results for hexachlorocyclopentadiene were rejected due to MS/MSD recovery exceedances. Sixty-two non-detect results for 1,4-dioxane were rejected due to low RRF. The non-detect VOC results in sample MW-89S were rejected due to holding time exceedance. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI

January 2022

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Thirty-five non-detect results for 1,4-dioxane analyzed by USEPA Method 8260C assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by laboratory Job ID and Validation Stage

180-127485-1 Stage 2A	180-128571-2 Stage 2A
180-127488-1 Stage 2A	180-128606-1 Stage 2A
180-127581-1 Stage 2A	180-128606-2 Stage 4
180-127582-1 Stage 4	180-129378-1 Stage 2A
180-128571-1 Stage 2A	

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Two stage 4 data validation report (DVR) and seven ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh,

Pennsylvania; West Sacramento, California; and North Canton, Ohio; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

ESdat QA reports and two Stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications that

DRAFT

were applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to the LCS/LCSD RPD exceedances.

Sediment field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL) or for compounds with both a concentration greater than the MDL and a non-detect result, the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. None of the data were qualified or rejected based on serial dilution exceedances.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications were applied to the data based on LCS and LCS/LCSD recovery exceedances. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedances were UJ qualifications as estimated less than the MDL. None of the data were rejected due to LCS and LCS/LCSD recovery exceedances.

DRAFT

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J+ qualifications as estimated with a high bias, J- qualifications as estimated with a low bias and UJ qualifications as estimated less than the MDL.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Qualifications were applied to the data based on blank contamination. Qualifications applied to the data based on blank contamination were J+ qualifications as estimated with a high bias and U qualifications as not detected at the RL. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were UJ qualifications as estimated less than the MDL. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. None of the data were qualified or rejected based on internal standard responses.

Seven PFAS concentrations were I flagged to indicate the results were estimated maximum possible concentrations. Therefore, based on professional and technical judgment, these PFAS concentrations were J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

There were detections for non-spiked metals in metals interference check standards at concentrations greater than the MDL or results more negative than the MDL. Qualifications that were applied to the data were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected due to interference check standards results.

Multiple PCBs with shared peaks were detected in the samples; therefore, qualifications were applied to the data. Qualifications that were applied to the data were J qualification as estimated. None of the data were rejected due to multiple PCBs with shared peaks were detected in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical

DRAFT

procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Thirty-five non-detect results for 1,4-dioxane analyzed by USEPA Method 8260C were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, J- qualified as estimated with a low bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the practical quantitation limit (PQL). In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the project specific PQLs as outlined in the QAPP. The undiluted RLs met the project specific PQLs. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the PQLs for individual compounds may not meet the project specific PQLs.

Thirty-five non-detect results for 1,4-dioxane analyzed by USEPA Method 8260C were rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compound analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

DRAFT

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data were qualified or rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with a high bias, J- qualified as estimated with a low bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Thirty-five non-detect results for 1,4-dioxane analyzed by USEPA Method 8260C were rejected due to low RRF. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

APPENDIX A

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI GW

April 2022

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. The non-detect semivolatile organic compounds (SVOCs) results for sample 20211102-FB, forty-six non-detect results of 1,4-dioxane by EPA Method 8260C, one non-detect result of 2,4-dinitrophenol, one non-detect result of 3,3'-dichlorobenzidine, one non-detect result of 4-chloroaniline and three non-detect results of hexachlorocyclopentadiene assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by Laboratory Job IDs and Validation Stages

180-129155-1 Stage 2A	180-129376-1 Stage 2A
180-129230-1 Stage 4	180-129534-1 Stage 2A

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. One stage 4 data validation report (DVR) and three ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania; North Canton, Ohio; Edison, New Jersey; and West Sacramento, California; performed the analytical testing. A DQA was performed on each of the laboratory reports listed in Table 1 by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Three ESdat QA reports and one Stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

DRAFT

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. None of the data were qualified or rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Water field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. None of the data were qualified or rejected based on serial dilution exceedances.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedances were UJ qualifications as estimated less than the MDL. None of the data were rejected due to LCS and LCS/LCSD recovery exceedances.

DRAFT

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, UJ qualifications as estimated less than the MDLs and R qualifications as rejected. One non-detect result of 2,4-dinitrophenol, one non-detect result of 3,3'-dichlorobenzidine, one non-detect result of 4-chloroaniline and three non-detect results of hexachlorocyclopentadiene were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Trip blank, field blanks and equipment blanks were collected and submitted with the samples and met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to target analytes detected in the method and field blanks. Qualifications due to blank contamination were U qualifications as not detected at the RL, U qualifications as not detected at the sample results and J+ qualifications as estimated with high biases. None of the data were rejected due to the blank contamination.

Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) were met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to target analytes detected in bracketing CCBs. Qualifications due to CCB contamination were U qualified as not detected at the RL. None of the data were rejected due to ICB and CCB contamination.

Surrogates were reported for the organic analyses. None of the data were qualified or rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds were UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to internal standard response exceedances were UJ qualifications as estimated less than the MDLs. None of the data were rejected due to internal standard response.

Negative metals results and results greater than the MDL were reported for non-spiked metals in metals interference check standards. Qualifications that were applied to the data were J qualification as estimated and UJ qualification as estimated less than the MDL. None of the data were rejected due to interference check standards results.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical

DRAFT

procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

The samples were analyzed for both total and dissolved metals and PCBs. For compounds with both a non-detect total result and dissolved result greater than the MDL and less than the RL, the results were qualified. Qualifications that were applied to the data based on total and dissolved metals and PCBs assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on total and dissolved metals and PCBs assessment.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. The non-detect SVOCs results for sample 20211102-FB, forty-six non-detect results of 1,4-dioxane by EPA Method 8260C, one non-detect result of 2,4-dinitrophenol, one non-detect result of 3,3'-dichlorobenzidine, one non-detect result of 4-chloroaniline and three non-detect results of hexachlorocyclopentadiene were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected at the RL, U qualified as not detected at the sample result and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria, with the exceptions noted in the DVR. In addition, elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound

DRAFT

concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

Forty-six non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the Volatile Organic Compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

Sample 20211102-FB was extracted 2 days beyond the 7-day holding time from sample collection to extraction. The non-detect SVOC results in sample 20211102-FB were rejected and the SVOC concentrations were J qualified as estimated due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected at the RL, U qualified as not detected at the sample result and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Forty-six non-detect results for 1,4-dioxane were rejected due to low RRF. One non-detect result of 2,4-dinitrophenol, one non-detect result of 3,3'-dichlorobenzidine, one non-detect result of 4-chloroaniline and three non-detect results of hexachlorocyclopentadiene were rejected due to MS/MSD recovery exceedances. The non-detect SVOC results in sample 20211102-FB were rejected due to holding time exceedance. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Sitewide RI

April 2022

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Forty-four non-detect results for 1,4-dioxane by 8260C assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by Laboratory Job IDs and Validation Stages

180-128986-1 Stage 2A	180-129169-1 Stage 2A
180-129052-1 Stage 4	180-129325-1 Stage 2A

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. One stage 4 data validation report (DVR) and three ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh, Pennsylvania and North Canton, Ohio; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed in Table 1 by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Three ESdat QA reports and one Stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. None of the data were qualified or rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Solid field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the

DRAFT

RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions and laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications that were applied to the data due to MS/MSD recovery exceedances were UJ qualifications as estimated less than the MDL. None of the data were rejected due to MS and MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. None of the data were qualified or rejected due to blank contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J qualifications as estimated, UJ qualifications as estimated less than the MDL and J- qualifications as estimated with a low bias. None of the data were rejected due to the surrogate recovery exceedances.

DRAFT

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses and recoveries outside of the validation specified acceptance criteria. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to internal standard response exceedances were J qualifications as estimated, UJ qualifications as estimated less than the MDL and J- qualifications as estimated with a low bias. None of the data were rejected due to internal standard response.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Forty-four non-detect results of 1,4-dioxane were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with a low bias and UJ qualified as estimated less than the MDL.

DRAFT

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

Forty-four non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data were qualified or rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with a low bias and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Forty-four non-detect results for 1,4-dioxane were rejected due to low RRF. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – IRM6 PDI

April 2022

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Three non-detect results of 1,4-dioxane by 8260C and one non-detect result of 2,4-dinitrophenol assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by Laboratory Job IDs and Validation Stages

180-131154-1 Stage 2A	180-131405-1 Stage 2A
180-131238-1 Stage 4	180-131408-1 Stage 2A
180-131238-2 Stage 2A	180-131408-2 Stage 2A
180-131315-1 Stage 2A	

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (US EPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (US EPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of US EPA Region 2 validation guidance and US EPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. One stage 4 data validation report (DVR) and six ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins TestAmerica located in Pittsburgh,

Pennsylvania and Edison, New Jersey; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed in Table 1 by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Six ESdat QA reports and one Stage 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD RPD exceedances. Qualifications that were applied to the data based on MS/MSD RPD exceedance were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

DRAFT

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Water field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. Qualifications were applied to the data due to serial dilution %Ds outside of the validation specified acceptance criteria. Qualifications that were applied to the data based on serial dilution %Ds were J qualifications as estimated. None of the data were rejected based on serial dilution exceedances.

Laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications applied to the data based on LCS and LCS/LCSD recovery exceedances were J qualification as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications were applied to the data based on MS/MSD recovery exceedances. Qualifications

DRAFT

that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J- qualifications as estimated with low biases, UJ qualifications as estimated less than the MDLs and R qualifications as rejected. One non-detect result of 2,4-dinitrophenol was rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Qualifications were applied to the data due to target analytes detected in the method and field blanks. Qualifications due to blank contamination were J+ qualifications as estimated with high biases. None of the data were rejected due to the blank contamination.

Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) were met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to ICB and CCB contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J+ qualifications as estimated with a high bias and UJ qualifications as estimated less than the MDLs. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications were applied to the data due to CCV %Ds outside of the validation specified acceptance criteria with low responses. Qualifications that were applied to the data based on CCV %Ds were UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to internal standard response exceedances were UJ qualifications as estimated less than the MDLs. None of the data were rejected due to internal standard response.

Negative metals results and results greater than the MDL were reported for non-spiked metals in metals interference check standards at concentrations greater than the MDL. Qualifications that were applied to the data were J qualification as estimated, J+ qualification as estimated with a high bias, J- qualification as estimated with a low bias and UJ qualification as estimated less than the MDL. None of the data were rejected due to interference check standards results.

The samples contain mixtures of polychlorinated biphenyls (PCBs) 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated. None of the data were rejected due to multiple PCBs detected in the samples.

DRAFT

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using US EPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Three non-detect results of 1,4-dioxane and one non-detect result of 2,4-dinitrophenol were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, J- qualified as estimated with low bias and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

Three non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the Volatile Organic Compounds (VOCs) analysis.

DRAFT

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

The analyses were performed within the holding times. None of the data were qualified or rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced US EPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Three non-detect results for 1,4-dioxane were rejected due to low RRF. One non-detect result for 2,4-dinitrophenol was rejected due to MS/MSD recovery exceedance. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (US EPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Dry Well SVS, FL Area SCV and Trench Box

October 2022

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Fifty-five non-detect results for 1,4-dioxane, one non-detect result of 4,6-dinitro-2-methylphenol, two non-detect results of 2,4-dinitrophenol and two non-detect results of benzaldehyde assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-139185-1 Stage 2A	180-140570-2 Stage 4
180-140136-1 Stage 4	180-143039-1 Stage 2A
180-140570-1 Stage 2A	

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (USEPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of USEPA Region 2 validation guidance and USEPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Three stages 2A and 4 data validation reports (DVRs) and two ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins located in Pittsburgh, Pennsylvania and

West Sacramento, California; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Two ESdat QA reports and three Stages 2A and 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

DRAFT

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Solid field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions and laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications that were applied to the data due to LCS/LCSD recovery exceedances were J+ qualifications as estimated with a high bias and J qualifications as estimated. None of the data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J+ qualifications as estimated with high biases, J- qualifications as estimated with low biases, UJ qualifications as estimated less than the MDL and R qualifications as rejected. One non-detect result of 4,6-dinitro-2-methylphenol, two non-detect results of 2,4-

DRAFT

dinitrophenol and two non-detect results of benzaldehyde were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Qualifications that were applied to the data due to blank contamination were U qualifications as not detected at the RLs. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J qualification as estimated and J+ qualification as estimated with a high bias. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to internal standard response exceedances were J qualifications as estimated. None of the data were rejected due to internal standard response.

Four perfluorooctanesulfonic acid (PFOS) concentrations were I flagged to indicate the results were estimated maximum possible concentrations. Therefore, based on professional and technical judgment, these PFOS concentrations were J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

Lead was detected in the interference check standard. Qualifications that were applied to the data due to the interference detection were J+ qualifications as estimated with a high bias. None of the data were rejected due to interference.

Two PCB results were J qualified as estimated due to contribution from shared quantitation peaks between the detected Aroclors. None of the data were rejected due to contribution from shared quantitation peaks.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

DRAFT

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using USEPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Fifty-five non-detect results of 1,4-dioxane, one non-detect result of 4,6-dinitro-2-methylphenol, two non-detect results of 2,4-dinitrophenol and two non-detect results of benzaldehyde were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

Fifty-five non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the Volatile Organic Compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

DRAFT

None of the data were qualified or rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced USEPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL .

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Fifty-five non-detect results for 1,4-dioxane were rejected due to low RRF. One non-detect result of 4,6-dinitro-2-methylphenol, two non-detect results of 2,4-dinitrophenol and two non-detect results of benzaldehyde were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – Groundwater

October 2022

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Thirteen non-detect results for 1,4-dioxane and one non-detect result for hexachlorocyclopentadiene assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-141239-1 Stages 2A and 4	180-142957-1 Stage 2A

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (USEPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of USEPA Region 2 validation guidance and USEPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. One stages 2A and 4 data validation report (DVR) and one ESdat quality assurance (QA) report were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins located in Pittsburgh, Pennsylvania; Barberton, Ohio; Edison, New Jersey and West Sacramento, California; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

One ESdat QA report and one Stages 2A and 4 DVR were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. None of the data were qualified or rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Water field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the

DRAFT

RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions and laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications that were applied to the data due to LCS/LCSD recovery exceedances were UJ qualifications as estimated less than the MDL. None of the data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, UJ qualifications as estimated less than the MDL and R qualifications as rejected. One non-detect result for hexachlorocylcopentadiene were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Qualifications that were applied to the data due to blank contamination were U qualifications as not detected at the RLs and J+ qualifications as estimated with high biases. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. None of the data were qualified or rejected due to the surrogate recovery exceedances.

DRAFT

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL and J qualifications as estimated. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. None of the data were qualified or rejected due to internal standard response.

Lead was detected in the interference check standard. Since lead was present in the standard as a contaminant and based on professional and technical judgment, no qualifications were applied to the data. None of the data were rejected due to interference.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using USEPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

The samples were analyzed for both total and dissolved metals and PCBs. For compounds with both a non-detect total result and dissolved result greater than the MDL and less than the RL, the results were qualified. Qualifications that were applied to the data based on total and dissolved metals and PCBs assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on total and dissolved metals and PCBs assessment.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a

DRAFT

percentage of usable analytical data. Thirteen non-detect results of 1,4-dioxane and one non-detect result for hexachlorocylcopentadiene were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected and the RL and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

Thirteen non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the Volatile Organic Compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

The samples were received at the laboratory within and outside of the criteria of 0-6 degrees Celsius. No sample preservation issues were noted by the laboratory, with the following exception. The laboratory narrative indicated the sample cooler received at 6.7 degrees Celsius contained DRO samples. Based on professional and technical judgment, the non-detect results of DRO in the samples were UJ qualified as estimated less than the MDLs. None of the data were rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced USEPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected and the RL and UJ qualified as estimated less than the MDL.

DRAFT

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Thirteen non-detect results for 1,4-dioxane were rejected due to low RRF. One non-detect result for hexachlorocyclopentadiene were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – EoG RI

May 2023

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Forty-five non-detect results for 1,4-dioxane, one non-detect result of antimony, one non-detect result of 2,4-dinitrophenol and three non-detect results of benzaldehyde assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualifications.

DRAFT

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-150618-1 Stage 2A	180-151661-1 Stage 2A
180-150618-2 Stage 2A	180-151663-1 Stage 2A
180-150768-1 Stage 2A	180-151663-2 Stage 2A
180-150773-1 Stage 2A	180-151879-1 Stage 2A
180-150773-2 Stage 2A	180-151879-2 Stage 4
180-150941-1 Stage 2A	180-152019-1 Stage 2A
180-150941-2 Stage 2A	180-152019-2 Stage 2A
180-151397-1 Stage 2A	180-152096-1 Stage 2A
180-151397-2 Stage 2A	180-152096-2 Stage 2A
180-151463-1 Stage 2A	180-152188-1 Stage 4
180-151548-1 Stage 2A	180-152188-2 Stage 2A
180-151548-2 Stage 2A	180-152383-1 Stage 2A

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (USEPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of USEPA Region 2 validation guidance and USEPA

National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Two stage 4 data validation reports (DVRs) and twenty-two ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level .

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins located in Pittsburgh, Pennsylvania, West Sacramento, California and Edison, New Jersey; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Twenty-two ESdat QA reports and two Stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike

DRAFT

duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD RPD exceedances were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Solid field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDLs. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions and laboratory duplicates were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

DRAFT

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications that were applied to the data due to LCS/LCSD recovery exceedances were UJ qualifications as estimated less than the MDLs and J qualifications as estimated. None of the data were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J- qualifications as estimated with low biases, UJ qualifications as estimated less than the MDL and R qualifications as rejected. One non-detect result of antimony, one non-detect result of 2,4-dinitrophenol and three non-detect results of benzaldehyde were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Qualifications that were applied to the data due to blank contamination were U qualifications as not detected at the RLs and J+ qualification as estimated with a high bias. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J+ qualifications as estimated with a high bias. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to internal standard response and isotope dilution standards exceedances were J qualifications as estimated, J+ qualification as estimated with a high bias and UJ qualifications as estimated less than the MDLs. None of the data were rejected due to internal standard response and isotope dilution standards exceedances.

One perfluorooctanesulfonic acid (PFOS) concentration was I flagged to indicate the result was estimated maximum possible concentration. Therefore, based on professional and technical judgment, the PFOS concentration was J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

One methylcyclohexane concentration was E flagged to indicate the sample result exceeded the calibration range. Therefore, based on professional and technical judgment, the methylcyclohexane concentration was J qualified as estimated. None of the data were rejected due to calibration range exceedances.

DRAFT

PCB results were J qualified as estimated due to contribution from shared quantitation peaks between the detected Aroclors. None of the data were rejected due to contribution from shared quantitation peaks.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using USEPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Forty-five non-detect results of 1,4-dioxane, one non-detect result of antimony, one non-detect result of 2,4-dinitrophenol and three non-detect results of benzaldehyde were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDLs.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

DRAFT

Forty-five non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data were qualified or rejected due to holding time exceedance.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced USEPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDLs.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Forty-five non-detect results for 1,4-dioxane were rejected due to low RRF. One non-detect result of antimony, one non-detect result of 2,4-dinitrophenol and three non-detect results of benzaldehyde were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – IRM6 RI-PDI

June 2023

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The majority of the data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. Two hundred and ninety non-detect results for 1,4-dioxane, forty-eight non-detect results of dichlorodifluoromethane, two non-detect results of 2,4-dinitrophenol, benzaldehyde and antimony, one non-detect result each of 4,6-dinitro-2-methylphenol, phenol, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene and styrene and the non-detect VOC results in thirty-three samples assessed for this sample group were rejected (R qualified) and are discussed below. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualifications.

DRAFT

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-150822-1 Stage 2A	180-151481-1 Stage 4
180-150822-2 Stage 2A	180-151481-2 Stage 2A
180-150942-1 Stage 2A	180-151549-1 Stage 2A
180-150942-2 Stage 2A	180-151549-2 Stage 2A
180-151002-1 Stage 2A	180-151549-3 Stage 2A
180-151002-2 Stage 2A	180-151672-1 Stage 2A
180-151075-1 Stage 2A	180-151676-1 Stage 2A
180-151216-1 Stage 2A	180-151676-2 Stage 2A
180-151216-2 Stage 2A	180-151881-1 Stage 2A
180-151220-1 Stage 4	180-151881-2 Stage 4
180-151220-2 Stage 2A	180-151894-1 Stage 2A
180-151260-1 Stage 2A	180-151894-2 Stage 2A
180-151260-2 Stage 2A	180-151945-1 Stage 2A
180-151399-1 Stage 2A	180-151945-2 Stage 2A
180-151399-2 Stage 2A	180-152020-1 Stage 2A
180-151480-1 Stage 2A	180-152020-2 Stage 2A
180-151480-2 Stage 2A	180-152105-1 Stage 2A

180-152384-1 Stage 2A	180-154838-1 Stage 2A
180-152384-2 Stage 2A	

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (USEPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of USEPA Region 2 validation guidance and USEPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Three stage 4 data validation reports (DVRs) and thirty-five ESdat quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins located in Pittsburgh, Pennsylvania; Barberton, Ohio; West Sacramento, California and Edison, New Jersey; performed the analytical testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Thirty-five ESdat QA reports and three Stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

DRAFT

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD RPD exceedances were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Solid field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDLs. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Laboratory duplicates were not analyzed with the data set.

Serial dilutions were analyzed with the data set. Qualifications that were applied to the data due to serial dilution exceedances were J qualifications as estimated. None of the data were rejected due to serial dilution exceedances.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD

DRAFT

pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications that were applied to the data due to LCS/LCSD recovery exceedances were UJ qualifications as estimated less than the MDLs, J qualifications as estimated, and R qualifications as rejected. Thirty-three non-detect results of dichlorodifluoromethane were rejected due to LCS and LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J- qualifications as estimated with low biases, J+ qualifications as estimated with high biases, UJ qualifications as estimated less than the MDL and R qualifications as rejected. Two non-detect results of 2,4-dinitrophenol, benzaldehyde and antimony and one non-detect result each of 4,6-dinitro-2-methylphenol, dichlorodifluoromethane, phenol, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene and styrene were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks were submitted with the sample set. Qualifications that were applied to the data due to blank contamination were U qualifications as not detected at the RLs and J+ qualification as estimated with a high bias. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. Qualifications that were applied to the data due to surrogate recovery exceedances were J qualifications as estimated, J- qualifications as estimated with a low bias and UJ qualifications as estimated less than the MDL. None of the data were rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

DRAFT

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data due to internal standard response and isotope dilution standards exceedances were J qualifications as estimated, J- qualifications as estimated with a low bias and UJ qualifications as estimated less than the MDLs. None of the data were rejected due to internal standard response and isotope dilution standards exceedances.

Fifteen perfluorooctanesulfonic acid (PFOS) concentrations, two perfluorohexanoic acid concentrations, three perfluorohexanesulfonic acid concentrations and one perfluorododecanoic acid concentrations were I flagged to indicate the result was estimated maximum possible concentration. Therefore, based on professional and technical judgment, the concentrations for these PFAS analytes were J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

One perfluorotridecanoic acid (PFTriA) concentration was E flagged to indicate the sample result exceeded the calibration range. Therefore, based on professional and technical judgment, the perfluorotridecanoic acid concentration was J qualified as estimated. None of the data were rejected due to calibration range exceedances.

PCB results were J qualified as estimated due to contribution from shared quantitation peaks between the detected Aroclors. None of the data were rejected due to contribution from shared quantitation peaks.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using USEPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

DRAFT

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Two hundred and ninety non-detect results of 1,4-dioxane, thirty-four non-detect results of dichlorodifluoromethane, two non-detect results of 2,4-dinitrophenol, benzaldehyde and antimony, one non-detect result each of 4,6-dinitro-2-methylphenol, phenol, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene and styrene and the non-detect VOC results in thirty-three samples were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDLs.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

Two hundred and ninety non-detect results for 1,4-dioxane were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compounds (VOCs) analysis.

Due to an analysis anomaly for one sample, the VOCs results were reported on a wet weight basis. Therefore, based on professional and technical judgment, the acetone concentration in this sample was J qualified as estimated and the non-detect VOC results in this sample were UJ qualified as estimated less than the MDLs.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

Thirty-three samples were analyzed for VOCs outside of the holding time requirement. One sample was analyzed for mercury outside of the holding time requirement. Qualifications that were

DRAFT

applied to the data due to holding time exceedances were J qualifications as estimated, J- qualifications as estimated with low biases and R qualifications as rejected. The non-detect VOC results in thirty-three samples were rejected due to holding time exceedances.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced USEPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDLs.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

Two hundred and ninety non-detect results for 1,4-dioxane were rejected due to low RRF. Thirty-three non-detect results of dichlorodifluoromethane were rejected due to LCS and LCS/LCSD recovery exceedances. Two non-detect results of 2,4-dinitrophenol, benzaldehyde and antimony and one non-detect result each of 4,6-dinitro-2-methylphenol, dichlorodifluoromethane, phenol, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene and styrene were rejected due to MS/MSD recovery exceedances. The non-detect VOC results in thirty-three samples were rejected due to holding time exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018.

USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-005).

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-006).

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016.

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016.

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – IRM6 RI-PDI

November 2023

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability. None of the data was rejected. All qualified data should be used within the limitation of the qualifications.

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-161517-1 Stage 2A	180-162461-2 Stage 2A
180-161919-1 Stage 2A	180-162560-1 Stage 2A
180-162460-1 Stage 2A	180-162560-2 Stage 2A
180-162460-2 Stage 4	180-162561-1 Stage 4
180-162461-1 Stage 2A	180-162561-2 Stage 2A

DRAFT

Geosyntec validated 100% of the dataset per the requirements of *Guidance on Environmental Data Verification and Data Validation* (USEPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York , September 2018. Validation criteria generally conformed to the specifications of USEPA Region 2 validation guidance and USEPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Two stage 4 data validation reports (DVRs) and nine stage 2A quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins located in Pittsburgh, Pennsylvania; Barberton, Ohio; West Sacramento, California and Edison, New Jersey; performed the analytical

testing. A DQA was performed on each of the following laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Nine Stage 2A QA reports and two Stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are located in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), matrix spike/matrix spike duplicate pairs (MS/MSD) and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD RPD exceedances were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

DRAFT

LCS/LCSD pairs were analyzed with the data set at the appropriate frequency of 1/20 samples. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDLs. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Laboratory duplicates were not analyzed with the data set.

Serial dilutions were analyzed with the data set. None of the data were qualified or rejected due to serial dilution exceedances.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected due to MS/MSD recovery exceedances.

DRAFT

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks, field blanks and equipment blanks were submitted with the sample set. Qualifications that were applied to the data due to blank contamination were U qualifications as not detected at the RLs and J+ qualification as estimated with a high bias. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. None of the data were qualified or rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. None of the data were qualified or rejected due to internal standard response and isotope dilution standards exceedances.

One perfluorooctanesulfonic acid (PFOS) concentration was I flagged to indicate the result was an estimated maximum possible concentration. Therefore, based on professional and technical judgment, the PFOS concentration was J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

Beryllium and thallium results in interference check standards were more negative than the MDL. Therefore, based on professional and technical judgment, the associated beryllium and thallium concentrations were J qualified as estimated and the non-detect results were UJ qualified as estimated less than the MDLs. None of the data were rejected due to negative interference check result in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using USEPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

DRAFT

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDLs.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted RLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

Based on professional and technical judgment, non-detect results for 1,4-dioxane were UJ qualified as estimated less than the MDLs due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data were qualified or rejected due to holding time exceedances.

Summary

The data that was assessed during this process are considered usable based on the information provided and per the referenced USEPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDLs.

DRAFT

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018

USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-005)

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-006)

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – NAF West

March 2024

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability, with the following exceptions. Five non-detect results of benzaldehyde were rejected due to matrix spike/matrix spike duplicate (MS/MSD) recovery exceedances. All qualified data should be used within the limitation of the qualifications.

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-163732-1 Stage 2A	180-163807-1 Stage 4
180-163732-2 Stage 2A	180-163807-2 Stage 2A
180-163732-3 Stage 4	180-163807-3 Stage 2A
180-163732-4 Stage 2A	180-163807-4 Stage 2A
180-163732-5 Stage 2A	180-163870-1 Stage 2A

DRAFT

Geosyntec validated 100% of the data set per the requirements of *Guidance on Environmental Data Verification and Data Validation* (USEPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York, September 2018. Validation criteria generally conformed to the specifications of USEPA Region 2 validation guidance and USEPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Two stage 4 data validation reports (DVRs) and eight stage 2A quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins located in Pittsburgh, Pennsylvania;

Lancaster, Pennsylvania; and West Sacramento, California; performed the analytical testing. A DQA was performed on each of the laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Eight Stage 2A QA reports and two Stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), MS/MSD and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD RPD exceedances were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set at the appropriate frequency of 1/20 samples. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

DRAFT

Field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDLs. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Laboratory duplicates were analyzed with the data set. Qualifications were applied to concentrations with RPDs greater than the laboratory specified acceptance criteria. Qualifications that were applied to the data based on laboratory duplicate assessment were J qualifications as estimated. None of the data were rejected based on laboratory duplicate RPD results outside of QAPP acceptance criteria.

Serial dilutions were analyzed with the data set. None of the data were qualified or rejected due to serial dilution exceedances.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J qualifications as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with

DRAFT

high bias and UJ qualifications as estimated less than the MDL. Five non-detect results of benzaldehyde were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks, field blanks and equipment blanks were submitted with the sample set. None of the data were qualified or rejected due to blank contamination.

Surrogates were reported for the organic analyses. None of the data were qualified or rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data based on internal standard response exceedance were UJ qualifications as estimated less than the MDL. None of the data were rejected due to internal standard response and isotope dilution standards exceedances.

Four perfluorohexanesulfonic acid (PFHxS) concentrations were "I" flagged to indicate the results were estimated maximum possible concentrations. Therefore, based on professional and technical judgment, the PFHxS concentrations were J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

One perfluorooctane sulfonic acid (PFOS) concentration was "E" flagged to indicate the sample result exceeded the calibration range. Therefore, based on professional and technical judgment, the PFOS concentration was J qualified as estimated. None of the data were rejected due to calibration range exceedances.

PCB results were J qualified as estimated due to contribution from shared quantitation peaks between the detected PCBs. None of the data were rejected due to contribution from shared quantitation peaks.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved using standard or similar techniques to collect and analyze representative samples.

DRAFT

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using USEPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Five non-detect results of benzaldehyde were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted MDLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDLs for individual compounds may not meet the screening criteria.

Based on professional and technical judgment, non-detect results for 1,4-dioxane were UJ qualified as estimated less than the MDLs due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data were qualified or rejected due to holding time exceedances.

DRAFT

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced USEPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability, with the following exceptions.

Five non-detect results of benzaldehyde were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018

USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-005)

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-006)

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – GW-IG Monitoring

March 2024

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability, with the following exceptions. Two non-detect results of hexachlorocyclopentadiene and one non-detect result of atrazine were rejected due to matrix spike/matrix spike duplicate (MS/MSD) recovery exceedances, and non-detect VOC results in one sample were rejected due to internal standard response exceedance. All qualified data should be used within the limitation of the qualifications.

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-165353-1 Stage 2A	180-165447-1 Stage 4
180-165353-2 Stage 2A	180-165447-2 Stage 4

DRAFT

Geosyntec validated 100% of the data set per the requirements of *Guidance on Environmental Data Verification and Data Validation* (USEPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York, September 2018. Validation criteria generally conformed to the specifications of USEPA Region 2 validation guidance and USEPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Two stage 4 data validation reports (DVRs) and two stage 2A quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins located in Pittsburgh, Pennsylvania;

Lancaster, Pennsylvania; and West Sacramento, California; performed the analytical testing. A DQA was performed on each of the laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Two Stage 2A QA reports and two Stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), MS/MSD and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD RPD exceedances were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set at the appropriate frequency of 1/20 samples. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

DRAFT

Field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Laboratory duplicates and serial dilutions were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. None of the data were qualified or rejected due to LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J+ qualifications as estimated with a high bias, J qualifications as estimated and UJ qualifications as estimated less than the MDL. Two non-detect results of hexachlorocyclopentadiene and one non-detect result of atrazine were rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks, field blanks and equipment blanks were submitted with the sample set. Qualifications that were applied to the data due to blank contamination were J+ qualifications as estimated with a high bias and U qualifications as not detected at the RL or sample result. None of the data were rejected due to blank contamination.

DRAFT

Surrogates were reported for the organic analyses. None of the data were qualified or rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. Qualifications that were applied to the data based on internal standard responses outside of the validation specified acceptance criteria were J-qualification as estimated with low bias and J+ qualifications as estimated with high bias. Non-detect VOC results in one sample were rejected due to internal standard response exceedance.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using USEPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. Two non-detect results of hexachlorocyclopentadiene, one non-detect result of atrazine and Non-detect VOC results in one sample were found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J- qualified as estimated with low bias, J+ qualified as estimated with high bias, U qualified as not detected at the RL or sample result and UJ qualified as estimated less than the MDL.

DRAFT

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted MDLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDL for individual compounds may not meet the screening criteria.

Based on professional and technical judgment, non-detect results for 1,4-dioxane were UJ qualified as estimated less than the MDL due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data were qualified or rejected due to holding time exceedances.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced USEPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability, with the following exceptions.

One sample's non-detect VOC results were rejected due to internal standard response exceedance, and two non-detect results of hexachlorocyclopentadiene and one non-detect result of atrazine were rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018

USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-005)

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-006)

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Data Usability Evaluation

Former Sperry Remington – GW-IG Monitoring

April 2024

This data usability evaluation (DUE) provides a summary indicating that the analytical data for the Former Sperry Remington project contained in the sample delivery groups/work orders (SDGs/WOs) listed below by Job ID are adequate for their intended purpose, based on a review of the associated quality control (QC) non-conformances and information provided by the data quality assessment (DQA) process. The data that was assessed during this process are considered usable based on the information provided, the project specific quality assurance project plan (QAPP) specifications, the referenced standard operating procedures (SOPs) and per general compliance with United States Environmental Protection Agency (USEPA) National Functional Guidance for Data Review. No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications were applied to the data and may limit their usability, with the following exception. One non-detect result of hexachlorocyclopentadiene was rejected due to matrix spike/matrix spike duplicate (MS/MSD) recovery exceedances. All qualified data should be used within the limitation of the qualifications.

Table 1: DQA Listing by Laboratory Job ID and Validation Stage

180-168236-1 Stage 2A	180-168289-1 Stage 4
180-168236-2 Stage 2A	180-168289-2 Stage 4

DRAFT

Geosyntec validated 100% of the data set per the requirements of *Guidance on Environmental Data Verification and Data Validation* (USEPA 240-R-02-004 QA/G-8, November 2002), Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (USEPA 540-R-08-005, January 2009) and QAPP/ Field Sampling Plan (FSP), Former Sperry Remington Site-North Portion, City of Elmira, Chemung County, New York, September 2018. Validation criteria generally conformed to the specifications of USEPA Region 2 validation guidance and USEPA National Functional Guidance for Organic and Inorganic Data Review. The most recent guidance was used as applicable to the methods employed for sample analyses. Two stage 4 data validation reports (DVRs) and two stage 2A quality assurance (QA) reports were completed for this DQA. Validation qualifiers, reason codes and comments (as warranted) were added to the electronic data deliverables (EDDs) for upload to the project data base. The data were validated at 95% Stage 2A validation level and 5% Stage 4 validation level.

DQAs are assessments of the laboratory QC data, the laboratory report and laboratory narrative to identify and summarize QC nonconformances. Eurofins located in Pittsburgh, Pennsylvania; Edison, New Jersey; and West Sacramento, California; performed the analytical testing. A DQA was performed on each of the laboratory reports listed by laboratory job IDs.

The DUE is an evaluation to determine if the analytical data (that may include nonconformances) are of sufficient quality for the intended purpose. The DUE uses the results of the DQA and evaluates the quality of the analytical data in relation to the project-specific data quality objectives (DQOs), as applicable and the intended use of the data. One of the primary purposes of the DUE is to determine if any bias that might be present in the analytical results, as identified during the DQA, affects the usability of the data for the intended purpose.

The initial DUE evaluates precision, accuracy and sensitivity of the analytical data compared to DQOs. Representativeness, completeness and comparability should be evaluated as part of a DUE and should be considered when incorporating analytical data into the final project site assessment.

Two Stage 2A QA reports and two Stage 4 DVRs were completed for the DQAs developed for the Job IDs listed in Table 1 and are in Appendix A of this document. A summary of the overall precision, accuracy and sensitivity of the analytical data is discussed in the following text.

Data Usability Evaluation

Precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCs parameters) are used to describe the quality of analytical data in quantitative and qualitative terms using the information provided by the laboratory QC information. Each of the PARCCS parameters as they relate to the data is discussed below.

Precision

Precision expresses the closeness of agreement, or degree of dispersion, between a series of measurements. Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the DQOs.

Precision is measured through the calculation of the relative percent difference (RPD) of two data sets generated from a similar source, percent difference (%D) of a measured data point to an accepted reference or true value, or percent relative standard deviation (%RSD) from multiple sets of data. Measurement of precision is achieved by the analysis of laboratory duplicates, laboratory control sample/laboratory control sample duplicate pairs (LCS/LCSD), MS/MSD and field duplicate pairs and serial dilutions. RPDs, %Ds and %RSDs were considered during the DQA.

Overall, the data assessed for precision did not show a consistent low or high bias. Instances where precision exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD RPD exceedances were J qualifications as estimated. None of the data were rejected due to the MS/MSD RPD exceedances.

LCS/LCSD pairs were analyzed with the data set at the appropriate frequency of 1/20 samples. None of the data were qualified or rejected due to LCS/LCSD RPD exceedances.

Field duplicate pairs were collected with the sample sets. For compounds with both a non-detect result and result greater than the method detection limit (MDL) or reporting limit (RL), the RPD

DRAFT

was considered noncalculable. For compounds with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL, the RPD was considered noncalculable. Qualifications were also applied to concentrations with RPDs greater than the QAPP acceptance criteria. Qualifications that were applied to the data based on field duplicate assessment were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on field duplicate RPD results outside of QAPP acceptance criteria.

Laboratory duplicates and serial dilutions were not analyzed with the data set.

Accuracy

Accuracy is used to describe the agreement between an observed value and an accepted reference or true value. The goal is to maintain a level of analytical accuracy consistent with the DQOs.

Accuracy is measured through the calculation of the percent recovery of the measured value against the expected value. Measurement of accuracy is achieved by the analysis of LCS/LCSD pairs, LCSs, MS/MSD pairs, MSs, surrogate recoveries (organic only) and internal standard fortification (organic and metals only). Accuracy with regard to bias is also measured through the analysis of blanks, method blanks, field blanks, equipment blanks and trip blanks. Finally, accuracy is assessed through appropriate and acceptable calibration and calibration checks per method requirements. All provide information regarding the accuracy of the data through the assessment of bias that may be introduced to the analytical result through sampling or sample preparation and analytical procedures.

It should be noted that in some cases recovery and/or bias did not result in qualification of the data. For instance, high recoveries of compounds in the MS/MSD samples or LCS/LCSD, or LCS or blank contamination associated with non-detect results for those compounds were not qualified. Additionally, blank contamination less than the RL does not usually result in qualification of the associated results if the sample concentrations are greater than the RL.

The frequency of LCSs and LCS/LCSD pairs met the requirements for the project and supports the DQOs. Qualifications that were applied to the data due to LCS/LCSD recovery exceedances were UJ qualifications as estimated less than the MDL. None of the data were rejected due to LCS/LCSD recovery exceedances.

MS/MSD pairs were requested at the appropriate frequency of one per twenty (1/20) samples. Qualifications that were applied to the data due to MS/MSD recovery exceedances were J+ qualifications as estimated with a high bias, J qualifications as estimated and UJ qualifications as estimated less than the MDL. One non-detect result of hexachlorocyclopentadiene was rejected due to MS/MSD recovery exceedances.

The frequency of method blanks met the requirements for the project and supports the DQOs. Trip blanks, field blanks and equipment blanks were submitted with the sample set. The trip shipped with the samples in laboratory report 180-168289-1 was received broken; therefore, a trip blank was not analyzed for these samples. Qualifications that were applied to the data due to blank

DRAFT

contamination were J+ qualifications as estimated with a high bias and U qualifications as not detected at the RL or sample result. None of the data were rejected due to blank contamination.

Surrogates were reported for the organic analyses. None of the data were qualified or rejected due to the surrogate recovery exceedances.

The frequency of the initial calibration verification (ICV) and continuing calibration verification (CCV) standards met the requirements for the project and supports the DQOs. Qualifications that were applied to the data based on CCV %Ds and recoveries outside of the validation specified acceptance criteria were J qualifications as estimated and UJ qualifications as estimated less than the MDL. None of the data were rejected based on CCV %Ds and recoveries outside of the validation specified acceptance criteria.

Internal standards and/or isotope dilution standards were analyzed with each sample and associated QC sample for the organic and metals analyses. None of the data were qualified or rejected based on internal standards and/or isotope dilution standards exceedance.

One perfluorooctane sulfonic acid (PFOS) concentration was "I" flagged to indicate the result was an estimated maximum possible concentration. Therefore, based on professional and technical judgment, the PFOS concentration was J qualified as estimated. None of the data were rejected due to chromatographic identification in the samples.

Representativeness and Comparability

Representativeness is a qualitative measurement that describes how well the analytical data characterize an area of concern. Many factors can influence how representative the analytical results are for an area sampled. These factors include the selection of appropriate analytical procedures, the sampling plan, matrix heterogeneity and the procedures and protocols used to collect, preserve and transport samples.

Comparability refers to the equivalency of sets of data. This goal is achieved through the use of standard or similar techniques to collect and analyze representative samples.

For the purposes of this DUE, it was noted that the data are considered representative and comparable based on the analytical methodologies employed by the laboratory. The analyses were performed using USEPA SW846 methodology for sample preparation and sample analysis as listed in the laboratory reports.

Overall, the data assessed for representativeness and comparability did not show a consistent low or high bias for a particular analyte indicating a systematic or matrix related trend for a compound or analytical method. Instances where representativeness and comparability exceeded acceptance criteria were limited to those listed in the DQAs. Samples were qualified accordingly in the associated EDD for upload to the project data base.

Completeness

Completeness is a quantitative measure that is used to evaluate how many valid analytical data were obtained in comparison to the amount that was planned. Completeness is expressed as a percentage of usable analytical data. One non-detect result of hexachlorocyclopentadiene was

DRAFT

found to be rejected based on the information provided by the DQA reports. Therefore, the completeness percentage is determined to be <100% but >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected at the RL or sample result and UJ qualified as estimated less than the MDL.

Sensitivity

Sensitivity is related to the screening criteria listed as outlined in the QAPP. In this context, sensitivity refers to the capability of a method or instrument to detect a given analyte at a given concentration and reliably quantitate the analyte at that concentration. The quantified results are then compared to the screening criteria. The undiluted MDLs met the screening criteria. Elevated non-detect results were reported for some of the data because of sample dilutions due to either matrix interference or high target compound concentrations. In these cases, the MDL for individual compounds may not meet the screening criteria.

Based on professional and technical judgment, non-detect results for 1,4-dioxane were UJ qualified as estimated less than the MDL due to low relative response factors (RRFs) in the initial calibrations of the volatile organic compounds (VOCs) analysis.

Chain of Custody Review

The chain of custody (COC) is an important legal document that tracks the samples from collection through shipping and handling, preparation and analysis and finally disposal. During the DQA process the COCs associated with the data were reviewed for completeness and accuracy. Some discrepancies were noted during the DQA process.

The discrepancies did not impact the usability of the data but should be noted by the data user.

Holding Time

None of the data were qualified or rejected due to holding time exceedances.

Summary

The majority of the data that was assessed during this process are considered usable based on the information provided and per the referenced USEPA National Functional Guidance for Data Review. The completeness percentage is >95%. The completeness percentage includes data that are J qualified as estimated, J+ qualified as estimated with high bias, U qualified as not detected at the RL and UJ qualified as estimated less than the MDL.

No evidence of an overall directional bias was observed due to associated field or laboratory QC exceedances, although some qualifications applied to the data may limit their usability, with the following exceptions.

One non-detect result of hexachlorocyclopentadiene was rejected due to MS/MSD recovery exceedances. Rejected data are not considered usable. All other qualified data should be used within the limitation of the qualification.

DRAFT

REFERENCES

Quality Assurance Project Plan (QAPP)/ Field Sampling Plan (FSP) Former Sperry Remington Site – North Portion, 777 South Main Street, City of Elmira, Chemung County, New York, September 2018

USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-005)

USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (USEPA 540-R-20-006)

USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C

USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010

Hazardous Waste Support Section, SOP No. HW-37A, Revision 0, SOM02.2, Polychlorinated Biphenyl Aroclor Data Validation, June 2015

USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016

Hazardous Waste Support Section, SOP No. HW-3C, Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016

New York State Department of Environmental Conservation (DEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

Appendix A Data Quality Assessments

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS
AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher that the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower that the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Data not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Appendix K
Data Validation Report
Summary Sheet

Data Validation Reports - Lab ID
180-90231-1
180-95047-3
180-95162-1
180-100148-3
180-101084-2
180-101084-3
180-105660-1
180-108931-1
180-115861-2
180-116665-4
180-116723-1
180-116724-1
180-117387-1
180-119815-1
180-120679-1
180-121903-1
180-122085-1
180-123398-1
180-124670-1
180-123985-1
180-123985-2
180-124580-1
180-126905-1
180-129052-1
180-129230-1
180-140136-1
180-141239-1
180-162640-2
180-162561-1
180-165447-1
180-165447-2
180-197473-1
180-193078-1
180-193128-1
180-198541-1

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	January 1, 2020
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-90231-1**

SITE: Former Sperry Remington Site-North

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of thirty-two solid samples, including three samples for matrix spike/matrix spike duplicate (MS/MSD) analyses, seven field duplicate samples and two equipment blanks, collected on 16 May 2019, as part of the Former Sperry Remington Site-North sampling event.

TestAmerica Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C and 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA 3541/8270D and 3520C/8270D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A and 3510C/8082A
- Metals by USEPA Methods 3005A/6010C and 3050B/6010C
- Mercury by USEPA Methods 7470A and 7471B
- Percent Solids by Standard Method (SM) 2540G

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives, with the following exceptions.

The non-detect results of 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and technical and professional judgment.

Non-detect results of benzaldehyde in the SVOC analyses were R qualified as rejected due to LCS recoveries less than 10%.

DRAFT

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-001)
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-90231-1	SSHS-B2805-SUB-8-10
180-90231-2	SSHS-B2676-SUB-4-6
180-90231-2 MS	SSHS-B2676-SUB-4-6 MS
180-90231-2 MSD	SSHS-B2676-SUB-4-6 MSD
180-90231-3	SSHS-B2676-SUB-8-10
180-90231-4	SSHS-B2648-SUB-0.17-2
180-90231-5	SSHS-B2648-SUB-4-6
180-90231-6	SSHS-B2648-SUB-6-8
180-90231-7	SSHS-B2780-SUB-2-4
180-90231-8	SSHS-B2780-SUB-4-6
180-90231-9	SSHS-B2780-SUB-6-8
180-90231-10	PS-FD-12
180-90231-11	PS-FD-11
180-90231-12	SSHS-B2780-SUB-8-10
180-90231-13	SSHS-B2780-SUB-10-12
180-90231-13 MS	SSHS-B2780-SUB-10-12 MS
180-90231-13 MSD	SSHS-B2780-SUB-10-12 MSD
180-90231-14	SSHS-B2718-SUB-0.17-2
180-90231-15	SSHS-B2718-SUB-2-4
180-90231-16	SSHS-B2718-SUB-4-6
180-90231-17	SSHS-B2718-SUB-6-8
180-90231-18	SSHS-B2718-SUB-8-10
180-90231-19	SSHS-B2718-SUB-10-12

Laboratory ID	Client ID
180-90231-20	SSHS-B2625-SUB-2-4
180-90231-21	PS-FD-14
180-90231-22	PS-FD-13
180-90231-23	SSHS-B2625-SUB-4-6
180-90231-24	SSHS-B2625-SUB-6-8
180-90231-25	SSHS-B2625-SUB-8-10
180-90231-26	SSHS-B2625-SUB-10-12
180-90231-27	SSHS-B2668-SUB-6-8
180-90231-28	SSHS-B2705-SUB-0.17-2
180-90231-29	SSHS-B2707-SUB-0.17-2
180-90231-29 MS	SSHS-B2707-SUB-0.17-2 MS
180-90231-29 MSD	SSHS-B2707-SUB-0.17-2 MSD
180-90231-30	SSHS-B2706-SUB-0.17-2
180-90231-31	SSHS-B2802-SUB-0.17-2
180-90231-32	PS-FD-16
180-90231-33	PS-FD-15
180-90231-34	SSHS-B2710-SUB-0.17-2
180-90231-35	SSHS-B2704-SUB-0.17-2
180-90231-36	SSHS-B2620-SUB-6-8
180-90231-37	SSHS-B2619-SUB-6-8
180-90231-38	SSHS-B2695-SUB-2-4
180-90231-39	EB-1
180-90231-40	EB-2
180-90231-41	PS-FD-17

DRAFT

The samples were received within the QAPP criteria of ≤ 6ºC.

The laboratory report was revised on December 24, 2019 to include the initial calibration verifications (ICVs) for the VOC, SVOC and PCB data. The revised report was identified as 180-90231-1 Revision 1.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per EPA Methods 5030C/8260C and 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verification
⊗ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
⊗ Equipment Blank
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

1.1.1 Completeness

The VOC data reported in this package are considered to be usable for meeting project objectives, with the following exceptions. The non-detect results of 1,4-dioxane in the VOC analyses were R qualified as rejected due to low RRFs in the initial calibrations and technical and professional judgment. The analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 98.1%.

1.1.2 Analysis Anomaly

Sample SSHS-B2704-SUB-0.17-2 was reanalyzed due to high surrogate recovery and samples SSHS-B2706-SUB-0.17-2 and PS-FD-15 were reanalyzed due to a high recovery of acetone in the associated LCS. The original analyses were considered for validation, based on professional and technical judgment. The reanalyzes were indicated as not reportable on the EDD.

1.2 Holding Times

The holding time for the VOC analysis of a preserved water sample is 14 days from collection to analysis. The holding time for the VOC analysis of a soil sample is 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs for the system performance check standards (SPCCs) met the method specified acceptance criteria. The %RSDs of the calibration check compounds (CCCs) were within the method specified acceptance criteria.

The average RRFs and the %RSDs of the target analytes were within the method (15%) and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

The average RRFs of acetone, methyl acetate and 2-butanone in the calibration performed on instrument CHHP10 on 02/18/19 were low and outside the laboratory specified acceptance criteria. Since the average RRFs of these compounds were within the validation specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

The %RSD of 4-methyl-2-pentanone in the calibration performed on instrument CHHP10 on 02/18/19 was high and outside the method and validation specified acceptance criteria. Since 4-

DRAFT

methyl-2-pentanone was not detected in the associated samples, no qualifications were applied to the data, based on professional and technical judgment.

The %RSDs of bromoform, 1,2-dibromo-3-chloropropane and 1,2,4-trichlorobenzene in the calibration performed on instrument CHHP11 on 04/12/19 were high and outside the method and validation specified acceptance criteria. Since these compounds were not detected in the associated samples, no qualifications were applied to the data, based on professional and technical judgment.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260B; and past validation guidance (NFG, June 2008) has the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRFs for 1,4-dioxane in the initial calibrations were 0.0010 and 0.0052, less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane were R qualified as rejected.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier**	Reason Code***
SSHS-B2718-SUB-0.17-2	1,4-Dioxane	41	U	41	R	9
SSHS-B2705-SUB-0.17-2	1,4-Dioxane	42	U	42	R	9
SSHS-B2707-SUB-0.17-2	1,4-Dioxane	39	U,F1,F2	39	R	9
SSHS-B2706-SUB-0.17-2	1,4-Dioxane	45	U	45	R	9
PS-FD-16	1,4-Dioxane	40	U	40	R	9
PS-FD-15	1,4-Dioxane	39	U	39	R	9
SSHS-B2710-SUB-0.17-2	1,4-Dioxane	39	U,*	39	R	9
SSHS-B2704-SUB-0.17-2	1,4-Dioxane	34	U,*	34	R	9

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits
* -laboratory flag indicating LCS/LCSD recovery or RPD was outside the limits
** Validation qualifiers are defined in Attachment 1 at the end of this report
***Reason codes are defined in Attachment 2 at the end of this report

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
EB-1	1,4-Dioxane	37	U	37	R	9
EB-2	1,4-Dioxane	37	U	37	R	9

µg/L-micrograms per liter

U-not detected at or above the MDL

1.5 Initial and Continuing Calibration Verification (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the results were rejected based on the initial calibration average RRFs, no additional qualifications were applied to the data, based on professional and technical judgment.

The RRFs for the SPCCs met the method specified acceptance criteria. The %RSDs of the CCCs were within the method specified acceptance criteria.

The percent difference or percent drifts (%Ds) between the RRFs in the ICV and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of 1,4-dioxane in the ICV in batch 275582 was high and outside the laboratory specified acceptance criteria, with high bias. Since 1,4-dioxane was not detected in the associated samples, no qualifications were applied to the data.

The %Ds of chloromethane (23.3%), methyl acetate (37.9%), cyclohexane (25.4%), 4-methyl-2-pentanone (53.8%), trans-1,3-dichloropropene (20.2%) and 2-hexanone (35.8%) were high and outside the laboratory specified acceptance criteria with low biases in the CCV in batch 279516. Since the %Ds of chloromethane, methyl acetate and 2-hexanone were within the validation specified acceptance criteria, no qualifications were applied to these compounds, based on professional and technical judgment. However, the non-detect results of cyclohexane, 4-methyl-2-pentanone and trans-1,3-dichloropropene in the associated samples were UJ qualified as estimated less than the MDLs.

The %Ds of trichlorofluoromethane (47.5%), acetone (42.9%), 1,2,4-trichlorobenzene (20.2%) and 1,2,3-trichlorobenzene (47.1%) were high and outside the laboratory specified acceptance criteria with high biases in the CCV in batch 279516. Since trichlorofluoromethane, 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene were not detected in the associated samples, no qualifications were applied to these compounds, based on professional and technical judgment. However, the acetone concentration in the associated sample was J qualified as estimated.

The %Ds of bromomethane (83.7%), chloroethane (62.4%) acetone (89.7%), 2-butanone (85.7%) 4-methyl-2-pentanone (37.6%) 2-hexanone (106.2%) bromoform (53.5%) 1,1,2,2-tetrachloroethane (28.5%) 1,2-dibromo-3-chloropropane (50.6%) were high and outside the laboratory specified acceptance criteria with high biases in the CCV in batch 279388. Since

DRAFT

bromomethane, chloroethane, 2-butanone, 4-methyl-2-pentanone, 2-hexanone, bromoform, 1,1,2,2-tetrachloroethane and 1,2-dibromo-3-chloropropane were not detected and the acetone concentrations were U qualified due to equipment blank contamination in the associated samples, no additional qualifications were applied to the data, based on professional and technical judgment.

The %Ds of dichlorodifluoromethane (37.8%), chloromethane (41.3%), vinyl chloride (46.4%), bromomethane (31.7%), chloroethane (27.5%), trichlorofluoromethane (55.8%), 1,4-dioxane (43.1%) and 4-methyl-2-pentanone (40.8%) were high and outside the laboratory specified acceptance criteria with low biases in batch 279518. Since the %Ds of dichlorodifluoromethane and chloroethane were within the validation specified acceptance criteria and the associated 1,4-dioxane results were rejected due to low RRFs in the initial calibration, no additional qualifications were applied to the dichlorodifluoromethane, chloroethane and 1,4-dioxane data, based on professional and technical judgment. However, the nondetect results of chloromethane, vinyl chloride, bromomethane, trichlorofluoromethane and 4-methyl-2-pentanone in the associated sample were UJ qualified as estimated less than the MDLs.

The %Ds of methylene chloride (26.5%), bromoform (35.1%) and 1,2-dibromo-3-chloropropane (21.7%) were high and outside the laboratory specified acceptance criteria with high biases in the CCV in batch 279518. Since bromoform and 1,2-dibromo-3-chloropropane were not detected in the associated sample and the %D of methylene chloride was within the validation specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

The %Ds of chloromethane (32.2%), vinyl chloride (29.9%), bromomethane (30.9%), trichlorofluoromethane (29.6%), methyl acetate (28.3%), trans-1,2-dichloroethene (20.3%), 1,1-dichloroethane (20.4%), 2-butanone (20.1%), 1,4-dioxane (30.4%), 4-methyl-2-pentanone (43.2%) and trans-1,3-dichloropropene (20.4%) were high and outside the laboratory specified acceptance criteria with low biases in the CCV in batch 279636. Since the %Ds of vinyl chloride, trichlorofluoromethane, methyl acetate and 2-butanone were within the validation specified acceptance criteria and the associated 1,4-dioxane results were rejected due to low RRFs in the initial calibration, no additional qualifications were applied to the vinyl chloride, trichlorofluoromethane, methyl acetate, 2-butanone and 1,4-dioxane data, based on professional and technical judgment. However, the nondetect results of chloromethane, trans-1,2-dichloroethene, 1,1-dichloroethane, 4-methyl-2-pentanone and trans-1,3-dichloropropene were UJ qualified as estimated less than the MDLs.

The %Ds of methylene chloride (26.5%), bromoform (35.1%) and 1,2-dibromo-3-chloropropane (21.7%) were high and outside the laboratory specified acceptance criteria with high biases in the CCV in batch 279636. Since bromoform and 1,2-dibromo-3-chloropropane were not detected in the associated sample and the %D of methylene chloride was within the validation specified

DRAFT

acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B2707-SUB-0.17-2	Bromomethane	4.8	U	4.8	UJ	9
SSHS-B2707-SUB-0.17-2	Trichlorofluoromethane	1.5	U,*,F1	1.5	UJ	9
SSHS-B2707-SUB-0.17-2	Vinyl chloride	3.9	U	3.9	UJ	9
SSHS-B2707-SUB-0.17-2	4-Methyl-2-pentanone (MIBK)	2.0	U,F1,F2	2.0	UJ	9
SSHS-B2707-SUB-0.17-2	Chloromethane	4.1	U	4.1	UJ	9
SSHS-B2710-SUB-0.17-2	1,1-Dichloroethane	1.9	U	1.9	UJ	9
SSHS-B2710-SUB-0.17-2	4-Methyl-2-pentanone (MIBK)	2.0	U	2.0	UJ	9
SSHS-B2710-SUB-0.17-2	Chloromethane	4.1	U	4.1	UJ	9
SSHS-B2710-SUB-0.17-2	Methyl acetate	6.3	U	6.3	UJ	9
SSHS-B2710-SUB-0.17-2	trans-1,2-Dichloroethene	2.7	U	2.7	UJ	9
SSHS-B2710-SUB-0.17-2	trans-1,3-Dichloropropene	1.8	U	1.8	UJ	9
SSHS-B2704-SUB-0.17-2	1,1-Dichloroethane	1.7	U	1.7	UJ	9
SSHS-B2704-SUB-0.17-2	4-Methyl-2-pentanone (MIBK)	1.7	U	1.7	UJ	9
SSHS-B2704-SUB-0.17-2	Chloromethane	3.6	U	3.6	UJ	9
SSHS-B2704-SUB-0.17-2	Methyl acetate	5.5	U	5.5	UJ	9
SSHS-B2704-SUB-0.17-2	trans-1,2-Dichloroethene	2.4	U	2.4	UJ	9
SSHS-B2704-SUB-0.17-2	trans-1,3-Dichloropropene	1.6	U	1.6	UJ	9

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits
* -laboratory flag indicating LCS/LCSD recovery or RPD was outside the limits

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
EB-1	4-Methyl-2-pentanone (MIBK)	1.9	U,*	1.9	UJ	9

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
EB-1	Cyclohexane	1.2	U	1.2	UJ	9
EB-1	trans-1,3-Dichloropropene	1.7	U	1.7	UJ	9
EB-2	4-Methyl-2-pentanone (MIBK)	1.9	U,*	1.9	UJ	9
EB-2	Cyclohexane	1.2	U	1.2	UJ	9
EB-2	trans-1,3-Dichloropropene	1.7	U	1.7	UJ	9
EB-2	Acetone	3.4	J	3.4	J	9

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
* -laboratory flag indicating LCS/LCSD recovery or RPD was outside the limits

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four method blanks were reported (batches 279388, 279516, 279518 and 279636). VOCs were not detected in the method blanks above the MDLs, with the following exception.

Acetone was detected at an estimated concentration greater than the MDL and less than the reporting limit (RL) in the method blank in batch 279518. Therefore, the estimated acetone concentrations in the associated samples were U qualified as not detected at the RL.

Acetone and methylene chloride were detected at estimated concentrations greater than the MDLs and less than the RLs in the method blank in 279636. Since methylene chloride was either not detected or detected above the RL in the associated samples, no qualifications were applied to the methylene chloride data. However, the estimated acetone concentrations in the associated samples were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B2707-SUB-0.17-2	Acetone	17	J,F1,B,F2	21	U	3
SSHS-B2710-SUB-0.17-2	Acetone	18	J,B	21	U	3
SSHS-B2704-SUB-0.17-2	Acetone	13	J,B	19	U	3

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating analyte was detected in both the sample and method blank
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits

DRAFT

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

One sample set specified MS/MSD pair was reported using sample SSHS-B2707-SUB-0.17-2. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

The spike concentrations in the MS/MSD were different due to the amount of sample prepared. Therefore, the RPDs were not assessed, based on professional and technical judgment.

The MS recoveries of acetone, 2-butanone, 1,4-dioxane, 2-hexanone and 4-methyl-2-pentanone and MSD recovery of trichlorofluoromethane were low and outside the laboratory specified acceptance criteria. Since the 1,4-dixoane result was rejected due to low RRF in the initial calibration, no additional qualification was applied to the 1,4-dioxane result, based on professional and technical judgment. However, the acetone concentration was J qualified as estimated and the non-detect result of 2-butanone, 2-hexanone, 4-methyl-2-pentanone and trichlorofluoromethane were UJ qualified as estimated less than the MDLs in sample SSHS-B2707-SUB-0.17-2.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B2707-SUB-0.17-2	2-Butanone (MEK)	3.1	U,F1,F2	3.1	UJ	4
SSHS-B2707-SUB-0.17-2	2-Hexanone	4.4	U,F1,F2	4.4	UJ	4
SSHS-B2707-SUB-0.17-2	Acetone	17	J,F1,B,F2	17	J	4
SSHS-B2707-SUB-0.17-2	4-Methyl-2-pentanone (MIBK)	2.0	U,F1,F2	2.0	UJ	4
SSHS-B2707-SUB-0.17-2	Trichlorofluoromethane	1.5	U,*,F1	1.5	UJ	4

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
B-laboratory flag indicating analyte was detected in both the sample and method blank
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits
* -laboratory flag indicating LCS/LCSD recovery or RPD was outside the limits

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs and one LCS/LCS duplicate (LCSD) pair were reported. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

DRAFT

The recoveries of acetone, bromomethane, 2-butanone and 2-hexanone in the LCS in batch 279388 were high and outside the laboratory specified acceptance criteria. Since bromomethane, 2-butanone and 2-hexanone were not detected and the acetone concentration was U qualified due to equipment blank contamination in the associated samples, no additional qualifications were applied to the data.

The recoveries of 4-methyl-2-pentanone and vinyl chloride in the LCS in batch 279516 were low and outside the laboratory specified acceptance criteria. Therefore, the non-detect results of 4-methyl-2-pentanone and vinyl chloride in the associated samples were UJ qualified as estimated less than the MDLs.

The recoveries of trichlorofluoromethane in the LCS in batch 279518 were low and outside the laboratory specified acceptance criteria. Therefore, the non-detect result of trichlorofluoromethane in the associated sample was UJ qualified as estimated less than the MDLs.

The recoveries of bromoform and RPDs of bromomethane and 1,4-dioxane were high and the recoveries of vinyl chloride were low, all outside the laboratory specified acceptance criteria in the LCS/LCSD in batch 279636. Since 1,4-dioxane, bromoform and bromomethane were not detected in the associated samples, no qualifications were applied to the 1,4-dioxane, bromoform and bromomethane result. However, the non-detect vinyl chloride results in the associated samples were UJ qualified as estimated less than the MDL.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B2707-SUB-0.17-2	Trichlorofluoromethane	1.5	U,*,F1	1.5	UJ	5
SSHS-B2710-SUB-0.17-2	Vinyl chloride	3.9	U,*	3.9	UJ	5
SSHS-B2704-SUB-0.17-2	Vinyl chloride	3.4	U,*	3.4	UJ	5

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits
* -laboratory flag indicating LCS/LCSD recovery or RPD was outside the limits

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
EB-1	4-Methyl-2-pentanone (MIBK)	1.9	U,*	1.9	UJ	5
EB-1	Vinyl chloride	3.7	U,*	3.7	UJ	5
EB-2	4-Methyl-2-pentanone (MIBK)	1.9	U,*	1.9	UJ	5
EB-2	Vinyl chloride	3.7	U,*	3.7	UJ	5

µg/L-micrograms per liter
U-not detected at or above the MDL

* -laboratory flag indicating LCS/LCSD recovery or RPD was outside the limits

1.9 Surrogates

Acceptable surrogate recoveries were reported for the sample analyses, with the following exceptions.

The recoveries of toluene-d8 in the MSD using sample SSHS-B2706-SUB-0.17-2 and LCSD in batch 279636 were low and outside the laboratory specified acceptance criteria. Since the recovery of the remaining three surrogates were within the laboratory specified acceptance criteria, no qualifications were applied to the data.

The recoveries of dibromofluoromethane and 1,2-dichloroethane-d4 in the reanalysis of sample SSHS-B2706-SUB-0.17-2 were high and outside the laboratory specified acceptance criteria. Since the recovery of the remaining two surrogates were within the laboratory specified acceptance criteria, no qualifications were applied to the data.

The recoveries of 1,2-dichloroethane-d4 in the reanalysis of samples PS-FD-15 and SSHS-B2704-SUB-0.17-2 were high and outside the laboratory specified acceptance criteria. Since the recovery of the remaining three surrogates were within the laboratory specified acceptance criteria, no qualifications were applied to the data.

The recoveries of 4-bromofluorobenzene in sample SSHS-B2704-SUB-0.17-2 and the method blank in batch 279636 were high and outside the laboratory specified acceptance criteria. Since the recovery of the remaining three surrogates were within the laboratory specified acceptance criteria, no qualifications were applied to the data.

1.10 Trip Blank

Three trip blanks were submitted with the sample set, 05TB041719SP08, 05TB041719SP10 and 05TB041719SP11. VOCs were not detected in the trip blanks above the MDLs.

1.11 Equipment Blank

Two equipment blanks were collected with the sample set, EB-1 and EB-2. VOCs were not detected in the equipment blanks above the MDLs, with the following exception.

Acetone was detected at an estimated concentration greater than the MDL and less than the RL in EB-2. Therefore, the estimated acetone concentrations greater than the MDL and less than the RL were U qualified as not detected at the RL.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B2707-SUB-0.17-2	Acetone	17	J,F1,B,F2	21	U	3
SSHS-B2710-SUB-0.17-2	Acetone	18	J,B	21	U	3
SSHS-B2704-SUB-0.17-2	Acetone	13	J,B	19	U	3
PS-FD-15	Acetone	15	J,*	21	U	3
SSHS-B2706-SUB-0.17-2	Acetone	22	J,*	24	U	3

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating analyte was detected in both the sample and method blank
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits
* -laboratory flag indicating LCS/LCSD recovery or RPD was outside the limits

1.12 Field Duplicate

Two field duplicate samples were collected with the sample set and reported for the VOCs, PS-FD-15 and PS-FD-16. Acceptable precision [relative percent difference (RPD) ≤ 50%] was demonstrated between the field duplicates and the original samples, SSHS-B2705-SUB-0.17-2 and SSHS-B2710-SUB-0.17-2, respectively, with the following exceptions.

Methylene chloride and acetone were detected at estimated concentrations greater than the MDLs and less than the RLs in PS-FD-15 and were not detected in SSHS-B2705-SUB-0.17-2, resulting in noncalculable RPDs. Since the acetone concentration is PS-FD-15 was U qualified due to equipment blank contamination, no additional qualifications were applied to the acetone data, based on professional and technical judgment. However, the methylene chloride concentration was J qualified as estimated and the non-detect methylene chloride result was UJ qualified as estimated less than the MDL in field duplicate pair SSHS-B2705-SUB-0.17-2/PS-FD-15.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
PS-FD-15	Methylene Chloride	4.7	J	NC	4.7	J	7
SSHS-B2705-SUB-0.17-2	Methylene Chloride	4.4	U		4.4	UJ	7
PS-FD-15	Acetone	15	J,*	NC**	NA	NA	NA
SSHS-B2705-SUB-0.17-2	Acetone	3.6	U,*		NA	NA	NA

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
* -laboratory flag indicating LCS/LCSD recovery or RPD was outside the limits
**-no qualifications, see reason above
NC-not calculable

1.13 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.14 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.15 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.16 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated Level IV report at a minimum of 20%. No discrepancies were identified between the Level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per EPA Methods 3541/8270D and 3520C/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance
✓ Initial Calibration
✓ Initial and Continuing Calibration Verification
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity

DRAFT

✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC data reported in this package are considered to be usable for meeting project objectives, with the following exceptions. Non-detect results of benzaldehyde in the SVOC analyses were R qualified as rejected due to LCS recoveries less than 10%. The analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 98.8%.

2.2 Holding Times

The holding times for the SVOC analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. All ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analysis of a standard to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated %RSD of the RRFs.

The average RRFs for the SPCCs met the method specified acceptance criteria. The %RSDs of the CCCs were within the method specified acceptance criteria.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verification

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

DRAFT

The RRFs for the SPCCs met the method specified acceptance criteria. The %RSDs of the CCCs were within the method specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of di-n-octyl phthalate was high and outside the validation specified acceptance criteria with high bias in the CCV in batch 280164. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to the data, based on professional and technical judgment.

The %Ds of 2,2'-oxybis[1-chloropropane] and pentachlorophenol were high and outside the validation specified acceptance criteria with high biases in the CCV in batch 280033. Since 2,2'-oxybis[1-chloropropane] and pentachlorophenol were not detected in the associated samples, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 279571 and 279947). SVOCs were not detected in the method blanks above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

One sample set specified MS/MSD pair was reported using sample SSHS-B2707-SUB-0.17-2. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

The MS recovery of 3,3'-dichlorobenzidine was low and the RPDs of benzaldehyde, caprolactam and 3,3'-dichlorobenzidine were high, all outside the laboratory specified acceptance criteria. Since benzaldehyde and caprolactam were not detected in sample SSHS-B2707-SUB-0.17-2, no qualifications were applied to the benzaldehyde and caprolactam data. However, the non-detect 3,3'-dichlorobenzidine result in sample SSHS-B2707-SUB-0.17-2 was UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B2707-SUB-0.17-2	3,3'-Dichlorobenzidine	360	U,F1,F2	360	UJ	4

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits

DRAFT

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCS were reported. The recovery results were within the laboratory specified acceptance criteria, with the following exception.

The recovery of benzaldehyde was less than 10% and outside the laboratory specified acceptance criteria in the LCS in batch 279947. Therefore, the non-detect benzaldehyde results in the associated samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B2718-SUB-0.17-2	Benzaldehyde	47	U,*	47	R	5
SSHS-B2705-SUB-0.17-2	Benzaldehyde	48	U,*	48	R	5
SSHS-B2707-SUB-0.17-2	Benzaldehyde	48	U,F2,*	48	R	5
SSHS-B2706-SUB-0.17-2	Benzaldehyde	48	U,*	48	R	5
PS-FD-16	Benzaldehyde	49	U,*	49	R	5
PS-FD-15	Benzaldehyde	47	U,*	47	R	5
SSHS-B2710-SUB-0.17-2	Benzaldehyde	48	U,*	48	R	5
SSHS-B2704-SUB-0.17-2	Benzaldehyde	50	U,*	50	R	5

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F2-laboratory flag indicating MS/MSD RPD was outside the limits
* -laboratory flag indicating LCS/LCSD recovery or RPD was outside the limits

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Equipment Blank

Two equipment blanks were collected with the sample set, EB-1 and EB-2. VOCs were not detected in the equipment blanks above the MDLs.

2.11 Field Duplicate

Two field duplicate samples were collected with the sample set and reported for the SVOCs, PS-FD-15 and PS-FD-16. Acceptable precision [relative percent difference (RPD) ≤ 50%] was demonstrated between the field duplicates and the original samples, SSHS-B2705-SUB-0.17-2 and SSHS-B2710-SUB-0.17-2, respectively, with the following exceptions.

DRAFT

Results with an RPD greater than 50% were J qualified as estimated.

Fluorene was detected at an estimated concentration greater than the MDL and less than the RL in PS-FD-16 and was not detected in SSHS-B2710-SUB-0.17-2, resulting in a noncalculable RPD. Therefore, the fluorene concentration was J qualified as estimated and the non-detect fluorene results was UJ qualified as estimated less than the MDL in field duplicate pair SSHS-B2710-SUB-0.17-2/PS-FD-16.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
PS-FD-15	Benzo[a]anthracene	380	NA	58	380	J	7
SSHS-B2705-SUB-0.17-2	Benzo[a]anthracene	690	NA		690	J	7
PS-FD-15	Benzo[a]pyrene	520	NA	60	520	J	7
SSHS-B2705-SUB-0.17-2	Benzo[a]pyrene	970	NA		970	J	7
PS-FD-15	Benzo[b]fluoranthene	750	NA	60	750	J	7
SSHS-B2705-SUB-0.17-2	Benzo[b]fluoranthene	1400	NA		1400	J	7
PS-FD-15	Benzo[k]fluoranthene	250	NA	70	250	J	7
SSHS-B2705-SUB-0.17-2	Benzo[k]fluoranthene	520	NA		520	J	7
PS-FD-15	Chrysene	420	NA	53	420	J	7
SSHS-B2705-SUB-0.17-2	Chrysene	720	NA		720	J	7
PS-FD-15	Dibenz(a,h)anthracene	160	NA	61	160	J	7
SSHS-B2705-SUB-0.17-2	Dibenz(a,h)anthracene	300	NA		300	J	7
PS-FD-15	Fluoranthene	730	NA	56	730	J	7
SSHS-B2705-SUB-0.17-2	Fluoranthene	1300	NA		1300	J	7
PS-FD-15	Indeno[1,2,3-cd]pyrene	670	NA	57	670	J	7
SSHS-B2705-SUB-0.17-2	Indeno[1,2,3-cd]pyrene	1200	NA		1200	J	7
PS-FD-15	Pyrene	610	NA	57	610	J	7
SSHS-B2705-SUB-0.17-2	Pyrene	1100	NA		1100	J	7
PS-FD-16	Fluorene	17	J	NC	17	J	7
SSHS-B2710-SUB-0.17-2	Fluorene	15	U		15	UJ	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable

DRAFT

NC-not calculable

2.12 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.16 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated Level IV report at a minimum of 20%. No discrepancies were identified between the Level IV report and the EDD.

3.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by EPA methods 3541/8082A and 3510C/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
⊗ Initial and Continuing Calibration Verification
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample

DRAFT

- ✓ Surrogates
- ✓ Equipment Blank
- ⊗ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ⊗ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for these analyses, for this SDG is 100%.

3.2 Holding Times

The holding time for the PCB analysis of a water and solid sample is 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding time is not specified for collection to extraction and from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of PCB-1260 in the CCV on GC column RTX-CLP2 in batch 279511 was high and outside the laboratory specified acceptance criteria with high bias. Since PCB-1260 was not detected in the associated samples, no qualifications were applied to the data, based on professional and technical judgment.

DRAFT

The %Ds of PCB-1242 and PCB-1248 in the CCV on GC column RTX-CLP1 in batch 280021 were high and outside the laboratory specified acceptance criteria with high biases. Since PCB-1242 was not detected in the associated samples and PCB-1248 was reported from the column with a passing CCV, no qualifications were applied to the data, based on professional and technical judgment.

The %Ds of PCB-1221 and PCB-1268 in the CCV on both GC columns in batch 280130 were high and outside the laboratory specified acceptance criteria with low biases. Therefore, the non-detect PCB-1221 and PCB-1268 results in the associated samples were UJ qualified as estimated less than the MDL.

The %D of PCB-1016 in the CCV on GC column RTX-CLP1 in batch 279851 were high and outside the laboratory specified acceptance criteria with high bias. Since PCB-1016 was not detected in the associated samples, no qualifications were applied to the data, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B2695-SUB-2-4	PCB-1268	15	U	15	UJ	9
PS-FD-17	PCB-1268	12	U	12	UJ	9
SSHS-B2695-SUB-2-4	PCB-1221	65	U	65	UJ	9
PS-FD-17	PCB-1221	33	U	33	UJ	9

µg/kg-micrograms per kilogram
U-not detected at or above the MDL

3.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 279891, 279968 and 280270). The PCBs were not detected in the method blanks above the MDLs.

3.6 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported, using samples SSHS-B2676-SUB-4-6 and SSHS-B2707-SUB-0.17-2. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

One or both the recoveries and the RPDs of PCB-1016 and PCB-1260 were high and outside the laboratory specified acceptance criteria in the MS/MSD pair using sample SSHS-B2676-SUB-4-6. Based the concentration of PCBs detected in sample SSHS-B2676-SUB-4-6 that contribute to

DRAFT

the PCB spike recovery and professional and technical judgment, no qualifications were applied to the data.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recovery of decachlorobiphenyl on GC column RTX-CLP2 for sample SSHS-B2707-SUB-0.17-2 was high and outside the laboratory specified acceptance criteria. Since the recovery of the remaining surrogate on both GC columns were within the laboratory specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

3.9 Equipment Blank

Two equipment blanks were collected with the sample set, EB-1 and EB-2. PCBs were not detected in the equipment blanks above the MDLs.

3.10 Field Duplicate

Four field duplicate samples were collected with the sample set and reported for the VOCs, PS-PS-FD-14, PS-FD-15, PS-FD-16 and PS-FD-17. Acceptable precision [relative percent difference (RPD) $\leq$ 50%] was demonstrated between the field duplicates and the original samples, SSHS-B2625-SUB-4-6, SSHS-B2705-SUB-0.17-2, SSHS-B2710-SUB-0.17-2 and SSHS-B2620-SUB-6-8, respectively, with the following exception.

The RPD of PCB-1248 in field duplicate pair SSHS-B2620-SUB-6-8/PS-FD-17 was greater than 50%. Therefore, the PCB-1248 concentrations in field duplicate pair SSHS-B2620-SUB-6-8/PS-FD-17 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
PS-FD-17	PCB-1248	6100	NA	65	6100	J	7
SSHS-B2620-SUB-6-8	PCB-1248	3100	NA		3100	J	7

DRAFT

µg/kg-micrograms per kilogram
NA-not applicable

3.11 Internal Standards

The internal standard areas and retention times were within the method specified acceptance criteria.

3.12 Target Compound Identification

The target compound identifications were within the validation criteria.

3.13 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

Multiple PCBs were detected in the samples that share peaks used to calculate the sample concentrations. Therefore, these concentrations were J qualified as estimated, based on professional and technical judgment.

The PCB-1248 concentration in sample PS-FD-16 was flagged p to indicate the RPD between the two GC columns was greater than 40%. Therefore, the PCB-1248 concentration in sample PS-FD-16 was J qualified as estimated, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
PS-FD-14	PCB-1248	170	NA	170	J	13
PS-FD-14	PCB-1254	67	NA	67	J	13
PS-FD-15	PCB-1248	54	NA	54	J	13
PS-FD-15	PCB-1254	100	NA	100	J	13
PS-FD-15	PCB-1260	82	NA	82	J	13
PS-FD-16	PCB-1248	250	p	250	J	13
PS-FD-16	PCB-1254	250	NA	250	J	13
PS-FD-16	PCB-1260	99	NA	99	J	13
PS-FD-17	PCB-1248	6100	NA	6100	J	13
PS-FD-18	PCB-1254	1500	NA	1500	J	13
PS-FD-19	PCB-1260	460	NA	460	J	13
SSHS-B2619-SUB-6-8	PCB-1248	6700	NA	6700	J	13
SSHS-B2619-SUB-6-9	PCB-1254	2300	NA	2300	J	13
SSHS-B2619-SUB-6-10	PCB-1260	830	NA	830	J	13
SSHS-B2620-SUB-6-8	PCB-1248	3100	NA	3100	J	13

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
SSHS-B2620-SUB-6-9	PCB-1254	1000	NA	1000	J	13
SSHS-B2620-SUB-6-10	PCB-1260	380	NA	380	J	13
SSHS-B2625-SUB-2-4	PCB-1248	3500	NA	3500	J	13
SSHS-B2625-SUB-2-5	PCB-1254	1600	NA	1600	J	13
SSHS-B2625-SUB-2-6	PCB-1260	520	NA	520	J	13
SSHS-B2625-SUB-4-6	PCB-1248	140	NA	140	J	13
SSHS-B2625-SUB-4-7	PCB-1254	48	NA	48	J	13
SSHS-B2648-SUB-0.17-2	PCB-1248	2700	NA	2700	J	13
SSHS-B2648-SUB-0.17-3	PCB-1254	710	NA	710	J	13
SSHS-B2648-SUB-4-6	PCB-1248	410	NA	410	J	13
SSHS-B2648-SUB-4-7	PCB-1254	120	NA	120	J	13
SSHS-B2648-SUB-6-8	PCB-1232	230	NA	230	J	13
SSHS-B2648-SUB-6-9	PCB-1248	210	NA	210	J	13
SSHS-B2648-SUB-6-10	PCB-1254	55	NA	55	J	13
SSHS-B2668-SUB-6-8	PCB-1248	1400	NA	1400	J	13
SSHS-B2668-SUB-6-9	PCB-1254	520	NA	520	J	13
SSHS-B2668-SUB-6-10	PCB-1260	130	NA	130	J	13
0SSHS-B2676-SUB-4-6	PCB-1248	1500	NA	1500	J	13
0SSHS-B2676-SUB-4-7	PCB-1254	450	NA	450	J	13
0SSHS-B2676-SUB-4-8	PCB-1260	180	F2,F1	180	J	13
SSHS-B2676-SUB-8-10	PCB-1248	57	NA	57	J	13
SSHS-B2676-SUB-8-11	PCB-1254	20	NA	20	J	13
SSHS-B2695-SUB-2-4	PCB-1248	11000	NA	11000	J	13
SSHS-B2695-SUB-2-5	PCB-1254	3000	NA	3000	J	13
SSHS-B2695-SUB-2-6	PCB-1260	800	NA	800	J	13
SSHS-B2705-SUB-0.17-2	PCB-1248	45	NA	45	J	13
SSHS-B2705-SUB-0.17-3	PCB-1254	67	NA	67	J	13
SSHS-B2705-SUB-0.17-4	PCB-1260	67	NA	67	J	13
SSHS-B2706-SUB-0.17-2	PCB-1254	650	NA	650	J	13
SSHS-B2706-SUB-0.17-3	PCB-1260	430	NA	430	J	13
SSHS-B2710-SUB-0.17-2	PCB-1248	190	NA	190	J	13
SSHS-B2710-SUB-0.17-3	PCB-1254	200	NA	200	J	13
SSHS-B2710-SUB-0.17-4	PCB-1260	94	NA	94	J	13
SSHS-B2718-SUB-0.17-2	PCB-1248	2900	NA	2900	J	13
SSHS-B2718-SUB-0.17-3	PCB-1254	970	NA	970	J	13
SSHS-B2718-SUB-0.17-4	PCB-1260	340	NA	340	J	13

DRAFT

µg/kg-micrograms per kilogram
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits
p-laboratory flag indicating RPD between the two GC columns was greater than 40%
NA-not applicable

3.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

3.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

4.0 METALS

The samples were analyzed for metals per EPA methods 3005A/6010C and 3050B/6010C. (Mercury was evaluated separately in Section 5.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ⊗ Equipment Blank
- ⊗ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

4.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for these analyses, for this SDG is 100%.

4.2 Holding Times

The holding time for the total metals of a water and solid sample are 180 days from sample collection to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

The method specified initial calibration requirements were metals.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

4.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits, with the following exception.

The recovery of selenium was high and outside the method specified acceptance criteria in a bracketing low level CCV in batch 279637. Since selenium was not detected in the associated samples, no qualifications were applied to the data.

DRAFT

4.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria, with the following exception.

Barium was detected at an estimated concentration greater than the MDL and less than the RL in CCB 680-525473/193. Since barium was detected above the RL in the associated samples, no qualifications were applied to the data.

4.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks (batches 279451, 279610 and 279611) were reported. Metals were not detected in the method blanks above the MDLs, with the following exception.

Copper was detected at an estimated concentration greater the MDL and less than the RL in the method blank in batch 279611. Since copper was detected above the RL in the associated samples, no qualifications were applied to the data.

4.7 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported for total metals using samples SSHS-B2780-SUB-10-12 and SSHS-B2707-SUB-0.17-2. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of antimony were low and the MS recovery and RPD for barium and MSD recovery of zinc were high, all outside the laboratory specified acceptance criteria in the MS/MSD pair using sample SSHS-B2780-SUB-10-12. Therefore, the non-detect antimony result was UJ qualified as estimated less than the MDL, the barium concentration was J qualified as estimated and the zinc concentration was J+ qualified as estimated with high bias in sample SSHS-B2780-SUB-10-12.

The recoveries of antimony and calcium were low and outside the laboratory specified acceptance criteria in the MS/MSD pair using sample SSHS-B2707-SUB-0.17-2. Therefore, the estimated antimony concentration was J qualified as estimated and the calcium concentration was J- qualified as estimated with low bias in sample SSHS-B2707-SUB-0.17-2.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B2780-SUB-10-12	Antimony	0.38	U,F1	0.38	UJ	4
SSHS-B2780-SUB-10-12	Barium	28	F1,F2	28	J	4
SSHS-B2780-SUB-10-12	Zinc	50	F1	50	J+	4
SSHS-B2707-SUB-0.17-2	Antimony	0.61	J,F1	0.61	J	4
SSHS-B2707-SUB-0.17-2	Calcium	8300	F1	8300	J-	4

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits

4.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

4.9 Equipment Blank

Two equipment blanks were collected with the sample set, EB-1 and EB-2. Metals were not detected in the equipment blanks above the MDLs, with the following exceptions.

Barium was detected at an estimated concentration greater than the MDL and less than the RL in EB-1. Since barium was detected above the RL in the associated samples, no qualifications were applied to the data.

Sodium was detected at estimated concentrations greater than the MDL and less than the RL in EB-1 and EB-2. Therefore, the estimated sodium concentrations greater than the MDL and less than the RL were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B2625-SUB-10-12	Sodium	95	J	510	U	3
SSHS-B2625-SUB-6-8	Sodium	50	J	550	U	3
SSHS-B2625-SUB-8-10	Sodium	64	J	540	U	3
SSHS-B2676-SUB-8-10	Sodium	44	J	570	U	3
SSHS-B2704-SUB-0.17-2	Sodium	40	J	590	U	3
PS-FD-15	Sodium	85	J	600	U	3

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B2705-SUB-0.17-2	Sodium	87	J	620	U	3
SSHS-B2706-SUB-0.17-2	Sodium	97	J	580	U	3
SSHS-B2707-SUB-0.17-2	Sodium	67	J	600	U	3
PS-FD-16	Sodium	72	J	590	U	3
SSHS-B2710-SUB-0.17-2	Sodium	66	J	580	U	3
SSHS-B2718-SUB-0.17-2	Sodium	91	J	590	U	3
SSHS-B2718-SUB-10-12	Sodium	74	J	590	U	3
PS-FD-13	Sodium	170	J	590	U	3
SSHS-B2718-SUB-2-4	Sodium	230	J	600	U	3
SSHS-B2718-SUB-4-6	Sodium	160	J	550	U	3
SSHS-B2718-SUB-6-8	Sodium	120	J	540	U	3
SSHS-B2718-SUB-8-10	Sodium	130	J	590	U	3
SSHS-B2780-SUB-10-12	Sodium	82	J	560	U	3
PS-FD-12	Sodium	180	J	590	U	3
SSHS-B2780-SUB-2-4	Sodium	200	J	590	U	3
SSHS-B2780-SUB-4-6	Sodium	270	J	560	U	3
SSHS-B2780-SUB-6-8	Sodium	100	J	580	U	3
SSHS-B2780-SUB-8-10	Sodium	65	J	530	U	3
SSHS-B2802-SUB-0.17-2	Sodium	87	J	610	U	3
PS-FD-11	Sodium	76	J	570	U	3
SSHS-B2805-SUB-8-10	Sodium	75	J	580	U	3

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL

DRAFT

4.10 Field Duplicate

Five field duplicate samples were collected with the sample set and reported for the VOCs, PS-PS-FD-11, PS-FD-12, PS-FD-13, PS-FD-15 and PS-FD-16. Acceptable precision [relative percent difference (RPD) $\leq$ 50%] was demonstrated between the field duplicates and the original samples, SSHS-B2805-SUB-8-10, SSHS-B2780-SUB-2-4, SSHS-B2718-SUB-2-4, SSHS-B2705-SUB-0.17-2 and SSHS-B2710-SUB-0.17-2, respectively, with the following exceptions.

Results with an RPD greater than 50% were J qualified as estimated.

Antimony and beryllium were detected at estimated concentrations greater than the MDLs and less than the RLs in PS-FD-12 and were detected at concentrations greater than the RLs in SSHS-

B2780-SUB-2-4, resulting in noncalculable RPDs. Therefore, the antimony and beryllium concentrations in field duplicate pair PS-FD-12/SSHS-B2780-SUB-2-4 were J qualified as estimated.

Selenium was detected at an estimated concentration greater than the MDL and less than the RL in SSHS-B2780-SUB-2-4 and was detected at a concentration greater than the RL in PS-FD-12, resulting in noncalculable RPD. Therefore, the selenium concentrations in field duplicate pair PS-FD-12/SSHS-B2780-SUB-2-4 were J qualified as estimated.

Selenium was detected at an estimated concentration greater than the MDL and less than the RL in SSHS-B2718-SUB-2-4 and was detected at a concentration greater than the RL in PS-FD-13, resulting in noncalculable RPD. Therefore, the selenium concentrations in field duplicate pair PS-FD-13/SSHS-B2718-SUB-2-4 were J qualified as estimated.

Antimony was detected at an estimated concentration greater than the MDL and less than the RL in PS-FD-15 and was detected at a concentration greater than the RL in SSHS-B2705-SUB-0.17-2, resulting in noncalculable RPD. Therefore, the antimony concentrations in field duplicate pair PS-FD-15/SSHS-B2705-SUB-0.17-2 were J qualified as estimated.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
PS-FD-12	Antimony	1.1	J	NC	1.1	J	7
SSHS-B2780-SUB-2-4	Antimony	1.4	NA		1.4	J	7
PS-FD-12	Beryllium	0.41	J	NC	0.41	J	7
SSHS-B2780-SUB-2-4	Beryllium	0.48	NA		0.48	J	7
PS-FD-12	Selenium	1.5	NA	NC	1.5	J	7
SSHS-B2780-SUB-2-4	Selenium	0.73	J		0.73	J	7
PS-FD-13	Lead	240	NA	85	240	J	7
SSHS-B2718-SUB-2-4	Lead	97	NA		97	J	7
PS-FD-13	Selenium	1.2	NA	NC	1.2	J	7
SSHS-B2718-SUB-2-4	Selenium	1.1	J		1.1	J	7
PS-FD-15	Antimony	0.54	J	NC	0.54	J	7
SSHS-B2705-SUB-0.17-2	Antimony	1.3	NA		1.3	J	7
PS-FD-15	Calcium	9600	NA	78	9600	J	7
SSHS-B2705-SUB-0.17-2	Calcium	22000	NA		22000	J	7

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
PS-FD-16	Iron	55000	NA	86	55000	J	7
SSHS-B2710-SUB-0.17-2	Iron	22000	NA		22000	J	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
NA-not applicable
NC-not calculable

4.11 Compound Quantitation

The compound quantitations were within the validation criteria.

4.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

5.0 MERCURY

The samples were analyzed for mercury per EPA methods 7470A and 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Equipment Blank
- ⊗ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for these analyses, for this SDG is 100%.

5.2 Holding Times

The holding times for the mercury analysis of a water and solid sample are 28 days from sample collection to analysis. The holding times were met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

5.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

DRAFT

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks (batches 279662, 279665 and 279694) was reported. Mercury was not detected in the method blanks above the MDL.

5.7 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported, using samples SSHS-B2780-SUB-10-12 and SSHS-B2707-SUB-0.17-2. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

The RPD of mercury was high and outside the laboratory specified acceptance criteria in the MS/MSD pair using sample SSHS-B2780-SUB-10-12. Since mercury was not detected in sample SSHS-B2780-SUB-10-12, no qualifications were applied to the data.

The MS recovery and RPD were high and the MSD recovery was low, all outside the laboratory specified acceptance criteria in the MS/MSD pair using sample SSHS-B2707-SUB-0.17-2. Therefore, the mercury concentration in sample SSHS-B2707-SUB-0.17-2 was J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B2707-SUB-0.17-2	Mercury	0.35	F1,F2	0.35	J	4

mg/kg-milligrams per kilogram
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits

5.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

5.9 Equipment Blank

Two equipment blanks were collected with the sample set, EB-1 and EB-2. Mercury was not detected in the equipment blanks above the MDL.

5.10 Field Duplicate

DRAFT

Five field duplicate samples were collected with the sample set and reported for the VOCs, PS-PS-FD-11, PS-FD-12, PS-FD-13, PS-FD-15 and PS-FD-16. Acceptable precision [relative percent difference (RPD) ≤ 50%] was demonstrated between the field duplicates and the original samples, SSHS-B2805-SUB-8-10, SSHS-B2780-SUB-2-4, SSHS-B2718-SUB-2-4, SSHS-B2705-SUB-0.17-2 and SSHS-B2710-SUB-0.17-2, respectively, with the following exceptions.

The RPDs of mercury in field duplicate pairs SSHS-B2718-SUB-2-4/PS-FD-13 and SSHS-B2710-SUB-0.17-2/PS-FD-16 were greater than 50%. Therefore, the mercury concentrations in field duplicate pairs SSHS-B2718-SUB-2-4/PS-FD-13 and SSHS-B2710-SUB-0.17-2/PS-FD-16 were J qualified as estimated.

Mercury was detected at an estimated concentration greater than the MDL and less than the RL in SSHS-B2805-SUB-8-10 and was detected at a concentration greater than the RL in PS-FD-11, resulting in a noncalculable RPD. Therefore, the mercury concentrations in field duplicate pair PS-FD-11/SSHS-B2805-SUB-8-10 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
PS-FD-11	Mercury	0.032	NA	NC	0.032	J	7
SSHS-B2805-SUB-8-10	Mercury	0.022	J		0.022	J	7
PS-FD-13	Mercury	0.048	NA	57	0.048	J	7
SSHS-B2718-SUB-2-4	Mercury	0.086	NA		0.086	J	7
PS-FD-16	Mercury	0.18	NA	96	0.18	J	7
SSHS-B2710-SUB-0.17-2	Mercury	0.063	NA		0.063	J	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
NA-not applicable
NC-not calculable

DRAFT

5.11 Compound Quantitation

The compound quantitations were within the validation criteria.

5.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

5.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DRAFT

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	22 April 2020
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-95047-3**

SITE: Former Sperry Remington Site-North

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of twenty solid samples, including one sample for matrix spike/matrix spike duplicate (MS/MSD) analyses, collected on 30 August 2019, as part of the Former Sperry Remington Site-North sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA Methods 3541/8270D
- Diesel Range Organics (DRO) and Oil Range Organics (ORO) by USEPA Methods 3546/8015D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A
- Metals by USEPA Methods 3050B/6010C
- Mercury by USEPA Method 7471B
- Percent Solids by Standard Method (SM) 2540G

Eurofins TestAmerica, Canton, Ohio analyzed the samples for the following analytical test:

- Diesel Range Organics (DRO) and Oil Range Organics (ORO) by USEPA Methods 3546/8015D

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives, with the following exceptions.

DRAFT

The non-detect results of 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-001)
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-95047-41	SSHS-B3003-SUB-0.17-2
180-95047-42	SSHS-B3003-SUB-2-4
180-95047-43	SSHS-B3003-SUB-4-6
180-95047-44	SSHS-B3003-SUB-6-8
180-95047-45	SSHS-B3003-SUB-8-10
180-95047-46	SSHS-B3003-SUB-10-12
180-95047-47	SSHS-B3003-SUB-12-14
180-95047-48	SSHS-B3082-SUB-0.17-2
180-95047-49	SSHS-B3082-SUB-2-4
180-95047-50	SSHS-B3082-SUB-4-6
180-95047-51	SSHS-B3082-SUB-6-8

Laboratory ID	Client ID
180-95047-52	SSHS-B3082-SUB-8-10
180-95047-53	SSHS-B3082-SUB-10-12
180-95047-54	SSHS-B3082-SUB-12-14
180-95047-55	SSHS-B3082-SUB-14-16
180-95047-56	SSHS-B3011-SUB-0.17-2
180-95047-57	SSHS-B3011-SUB-2-4
180-95047-58	SSHS-B3011-SUB-4-6
180-95047-59	SSHS-B3011-SUB-6-8
180-95047-59 MS	SSHS-B3011-SUB-6-8 MS
180-95047-59 MSD	SSHS-B3011-SUB-6-8 MSD
180-95047-60	SSHS-B3011-SUB-8-10

DRAFT

The samples were received within the QAPP criteria of ≤ 6ºC.

Incorrect error corrections were observed on the chain of custody (COC), instead of the proper procedure of a single strike through, correction, and initials and date of person making the corrections.

The prefix "SSHS-" was added to the sample IDs per the client's request, the prefix was not documented on the sample IDs on the COC.

Samples listed on the COC that were not reported in laboratory report 180-950478-1 were reported in laboratory reports 180-95047-1 and 180-95047-2.

The relinquished by signature, date and time was only documented on page 1 of the COC and were missing from pages 2-9 of the COC. The received by date and time were documented as 8/31/19, 10:15.

The solids data, used to report the sample on a dry weight basis, were not validated.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per USEPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for meeting project objectives, with the following exceptions. The non-detect results of 1,4-dioxane were R qualified as rejected due to low RRF in the initial calibration and based on technical and professional judgment.

Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample is 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method (15%) and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exception.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C. The current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. The average RRF for 1,4-dioxane in the initial calibration was 0.0026, less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3003-SUB-0.17-2	1,4-Dioxane	41	U	41	R	9
SSHS-B3003-SUB-12-14	1,4-Dioxane	37	U	37	R	9
SSHS-B3082-SUB-0.17-2	1,4-Dioxane	43	U	43	R	9
SSHS-B3082-SUB-14-16	1,4-Dioxane	33	U	33	R	9
SSHS-B3011-SUB-0.17-2	1,4-Dioxane	40	U	40	R	9

µg/kg-micrograms per kilogram
U-not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The percent differences (%Ds) of acetone (32.3%), 2-butanone (21.8%) and 2-hexanone (36.1%) in the CCV in batch 290734 were high and outside the laboratory specified acceptance criteria, with high biases. Since these three analytes were not detected in the associated samples, no qualifications were applied to the data.

The %D of dichlorodifluoromethane (25.1%) in the CCV in batch 290857 was high and outside the laboratory specified acceptance criteria, with a low bias. Since the %D was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of acetone (29.9%), 2-butanone (23.7%), 1,4-dioxane (20.1%) and 2-hexanone (41.2%) in the CCV in batch 290857 were high and outside the laboratory specified acceptance criteria, with high biases. Since these four analytes were not detected in the associated samples, no qualifications were applied to the data.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualifications were applied to the 1,4-dioxane data, based on professional and technical judgment.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 290734 and 290857). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

1.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCS/LCS duplicate (LCSD) pairs were reported. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exceptions.

DRAFT

The RPDs of acetone and 2-hexanone in the LCS/LCSD pair in batch 290857 were high and outside the laboratory specified acceptance criteria. Since acetone and 2-hexanone were not detected in the associated samples, no qualifications were applied to the data.

1.9 Surrogates

Acceptable surrogate recoveries were reported for the sample analyses.

1.10 Trip Blank

A trip blank was not submitted with the sample set.

1.11 Field Duplicate

Field duplicates were not collected in this sample set.

1.12 Internal Standards

The internal standard areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per USEPA Methods 3541/8270D.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC data reported in this SDG are considered usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

DRAFT

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the initial calibration and the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exception.

The %D of di-n-octyl phthalate in the CCV in batch 290581 was high and outside the laboratory specified acceptance criteria, with a high bias. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 290412). SVOCs were not detected in the method blank above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Duplicate

Field duplicates were not collected in this sample set.

DRAFT

2.11 Internal Standards

The internal standard areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 DIESEL RANGE ORGANICS AND OIL RANGE ORGANICS

The samples were analyzed for DRO (C10-C28) and ORO (C28-C40) per USEPA Methods 3546/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Target Compound Identification
✓ Target Compound Quantitation

DRAFT

✓ Sensitivity
✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The DRO (C10-C28) and ORO (C28-C40) data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the DRO (C10-C28) and ORO (C28-C40) analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

An appropriate initial calibration was performed for DRO (C10-C28). The laboratory calculated the %RSD of the calibration factors (CFs). The %RSD was within the method and laboratory specified acceptance criteria.

The ORO (C28-C40) results were calculated based on the DRO (C10-C28) calibration. An initial calibration was not performed for ORO, nor was an ORO LCS analyzed. Therefore, based on professional and technical judgment, the nondetect ORO results were UJ qualified as estimated less than the MDL and the concentrations were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3003-SUB-0.17-2	Oil Range Organics (C28-C40)	51	J	51	J	9
SSHS-B3003-SUB-12-14	Oil Range Organics (C28-C40)	44	J	44	J	9
SSHS-B3011-SUB-0.17-2	Oil Range Organics (C28-C40)	40	U	40	U	9
SSHS-B3082-SUB-0.17-2	Oil Range Organics (C28-C40)	40	U	40	U	9

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3082-SUB-14-16	Oil Range Organics (C28-C40)	36	U	36	U	9

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL

3.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The %Ds between the CFs in the ICVs and CCVs for DRO (C10-C28) were within the method and laboratory specified acceptance criteria.

3.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 400079). DRO (C10-C28) and ORO (C28-C40) were not detected in the method blank above the MDLs.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specified MS/MSD pair was reported using sample SSHS-B2707-SUB-0.17-2. DRO (C10-C28) was reported in the MS/MSD pair. The recovery and RPD results were within the laboratory specified acceptance criteria.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. DRO (C10-C28) was reported in the LCS. The recovery result was within the laboratory specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

Field duplicates were not collected in this sample set.

3.10 Target Compound Identifications

DRAFT

The target compound identifications were within the validation specified acceptance criteria.

3.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria were not listed in Table 1 of the QAPP for DRO (C10-C28) and ORO (C28-C40).

3.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by USEPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
⊗ Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

4.1 Overall Assessment

DRAFT

The PCBs data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding times for the PCB analysis of a solid sample is 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

4.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exception.

The %D of one peak in the PCB 1016 CCV in batch 291906 on gas chromatography (GC) column RTX-CLP1 was high and outside the laboratory specified acceptance criteria, with a high biases. Since PCB 1016 was not detected in the associated samples, no qualifications were applied to the PCB 1016 data.

4.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 291805 and 292047). The PCBs were not detected in the method blanks above the MDLs.

4.6 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-B3011-SUB-6-8. The recovery and RPD results were within the laboratory specified acceptance criteria.

4.7 Laboratory Control Sample

DRAFT

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

Three field duplicate samples were collected and analyzed for PCBs, SSHS-DUP-58, SSHS-DUP-59 and SSHS-DUP-60. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3003-SUB-2-4, SSHS-B3082-SUB-4-6 and SSHS-B3011-SUB-4-6, respectively, with the following exception.

PCB 1260 was not detected in sample SSHS-B3003-SUB-2-4 and was detected at a concentration greater than the reporting limit (RL) in sample SSHS-DUP-58, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the non-detect PCB 1260 result in sample SSHS-B3003-SUB-2-4 was UJ qualified as estimated less than the MDL and the PCB 1260 concentration in sample SSHS-DUP-58 was J qualified as estimated.

Field duplicates SSHS-DUP-58, SSHS-DUP-59 and SSHS-DUP-60 were reported in laboratory report 180-95050-2.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3003-SUB-2-4	PCB-1260	4.9	U	NC	4.9	UJ	7
SSHS-DUP-58	PCB-1260	240	NA		240	J	7

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

4.10 Internal Standards

The internal standard areas and retention times were within the method specified acceptance criteria, with the following exception.

The response of internal standard 1-bromo-2-nitrobenzene on gas chromatography (GC) column RTX-CLP1 for the MS using sample SSHS-B3011-SUB-6-8 was high and outside the laboratory specified acceptance criteria. Since the internal standard response for sample SSHS-B3011-SUB-

DRAFT

6-8 was within the laboratory specified acceptance criteria, no qualifications were applied to the data.

4.11 Target Compound Identification

The target compound identifications were within the validation criteria.

4.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

PCB 1254 and PCB 1260 were detected in sample SSHS-B3003-SUB-12-14. There are peaks in PCBs 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Therefore, based on professional and technical judgment, the PCB 1254 and PCB 1260 concentrations in sample SSHS-B3003-SUB-12-14 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3003-SUB-12-14	PCB-1254	89	NA	89	J	13
SSHS-B3003-SUB-12-14	PCB-1260	92	NA	92	J	13

µg/kg-micrograms per kilogram
NA-not applicable

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

5.0 METALS

The samples were analyzed for metals per USEPA methods 3050B/6010C. (Mercury was evaluated separately in Section 6.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues

DRAFT

were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ⊗ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ⊗ Serial Dilution
- ✓ Laboratory Control Sample
- ✓ Internal Standard
- ⊗ Field Duplicate
- ✓ Analyte Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding time for the total metals of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria, with the following exceptions.

DRAFT

The recoveries of antimony in a low level CCV (CCVL) in batch 292894 was high and outside the method specified acceptance criteria. Therefore, the estimated antimony concentrations in the associated samples were J qualified as estimated.

The recovery of aluminum in a low level CCV (CCVL) in batch 293154 was low and outside the method specified acceptance criteria. Since the aluminum concentrations in the associated samples were greater than RLs and based on professional and technical judgment, no qualifications were applied to the aluminum data.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3003-SUB-10-12	Antimony	1.0	J,F1	1.0	J	9
SSHS-B3003-SUB-12-14	Antimony	0.60	J	0.60	J	9
SSHS-B3011-SUB-0.17-2	Antimony	0.61	J	0.61	J	9
SSHS-B3011-SUB-2-4	Antimony	0.81	J	0.81	J	9
SSHS-B3011-SUB-4-6	Antimony	0.68	J	0.68	J	9
SSHS-B3011-SUB-6-8	Antimony	0.41	J,F1	0.41	J	9
SSHS-B3011-SUB-8-10	Antimony	0.45	J	0.45	J	9
SSHS-B3082-SUB-0.17-2	Antimony	0.72	J	0.72	J	9
SSHS-B3082-SUB-2-4	Antimony	0.42	J	0.42	J	9
SSHS-B3082-SUB-4-6	Antimony	0.45	J	0.45	J	9

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
F1-laboratory flag indicating MS/MSD recovery was outside the limits

5.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria, with the following exceptions.

Vanadium was detected in bracketing CCBs in batch 292894 at estimated concentrations greater than the MDL and less than the RL. Since vanadium was detected in the associated samples at concentrations greater than the RL, no qualifications were applied to the data.

Vanadium and zinc were detected in bracketing CCBs in batch 293154 at estimated concentrations greater than the MDLs and less than the RLs. Since vanadium and zinc were detected in the associated samples at concentrations greater than the RLs, no qualifications were applied to the data

Iron was detected in bracketing CCBs in batch 293154 at concentrations greater than the RL, at concentrations ranging from 140-148 µg/L. Since the iron concentrations in the associated samples were greater than ten times the CCB concentrations, no qualifications were applied to the iron data.

DRAFT

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 291760, 291764 and 291905). Metals were not detected in the method blanks above the MDLs.

5.7 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported using samples SSHS-B3003-SUB-10-12 and SSHS-B3011-SUB-6-8. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

One or both the recoveries of antimony, chromium, copper, lead and magnesium were low and outside the laboratory specified acceptance criteria and the RPD of copper was high and outside the laboratory specified acceptance criteria in the MS/MSD pair using sample SSHS-B3003-SUB-10-12; the post digestion spike (PDS) recoveries were acceptable. Therefore, the antimony, chromium, copper, lead and magnesium concentrations in sample SSHS-B3003-SUB-10-12 were J qualified as estimated.

The calcium, iron, manganese and zinc concentrations in sample SSHS-B3003-SUB-10-12 were greater than four times the spiked concentrations. Therefore, no qualifications were applied to the calcium, iron, manganese and zinc concentrations in sample SSHS-B3003-SUB-10-12.

The recoveries of antimony in the MS/MSD pair using sample SSHS-B3011-SUB-6-8 were low and outside the laboratory specified acceptance criteria; the PDS recovery was acceptable. Therefore, the antimony concentration in sample SSHS-B3011-SUB-6-8 was J qualified as estimated.

The aluminum, iron and manganese concentrations in sample SSHS-B3011-SUB-6-8 were greater than four times the spiked concentrations. Therefore, no qualifications were applied to the aluminum, iron and manganese concentrations in sample SSHS-B3011-SUB-6-8.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3003-SUB-10-12	Antimony	1.0	J,F1	1.0	J	4
SSHS-B3003-SUB-10-12	Chromium	35	F1	35	J	4
SSHS-B3003-SUB-10-12	Copper	100	F1,F2	100	J	4
SSHS-B3003-SUB-10-12	Lead	38	F1	38	J	4
SSHS-B3003-SUB-10-12	Magnesium	7200	F1	7200	J	4
SSHS-B3011-SUB-6-8	Antimony	0.41	J,F1	0.41	J	4

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL

F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits

5.8 Serial Dilution

Two sample set specific serial dilutions were reported using samples SSHS-B3003-SUB-10-12 and SSHS-B3011-SUB-6-8. The %D results were within the method specified acceptance criteria, with the following exception.

The %D of iron in the serial dilution using sample SSHS-B3003-SUB-10-12 was high and outside the method specified acceptance criteria. Therefore, the iron concentration in sample SSHS-B3003-SUB-10-12 was J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3003-SUB-10-12	Iron	34000	NA	34000	J	8

mg/kg-milligrams per kilogram
NA-not applicable

5.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

5.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

5.11 Field Duplicate

Three field duplicate samples were collected and analyzed for metals, SSHS-DUP-58, SSHS-DUP-59 and SSHS-DUP-60. Acceptable precision (RPD $\leq$50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3003-SUB-2-4, SSHS-B3082-SUB-4-6 and SSHS-B3011-SUB-4-6, respectively, with the following exceptions.

Antimony and cobalt were detected at estimated concentrations greater than the MDLs and less than the RLs in sample SSHS-B3003-SUB-2-4 and were detected at concentrations greater than the RLs in sample SSHS-DUP-58, resulting in noncalculable RPDs. Therefore, based on professional and technical judgment, the antimony and cobalt concentrations in field duplicate pair SSHS-B3003-SUB-2-4/SSHS-DUP-58 were J qualified as estimated.

DRAFT

The RPD for copper in field duplicate pair SSHS-B3003-SUB-2-4/SSHS-DUP-58 was greater than 50%; therefore, based on professional and technical judgment, the copper concentrations in field duplicate pair SSHS-B3003-SUB-2-4/SSHS-DUP-58 were J qualified as estimated.

Field duplicates SSHS-DUP-58, SSHS-DUP-59 and SSHS-DUP-60 were reported in laboratory report 180-95050-2.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3003-SUB-2-4	Antimony	0.59	J	NC	0.59	J	7
SSHS-DUP-58	Antimony	1.4	NA		1.4	J	7
SSHS-B3003-SUB-2-4	Cobalt	5.2	J	NC	5.2	J	7
SSHS-DUP-58	Cobalt	6.8	NA		6.8	J	7
SSHS-B3003-SUB-2-4	Copper	79	NA	68	79	J	7
SSHS-DUP-58	Copper	160	NA		160	J	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
NA-not applicable
NC-not calculable

5.12 Analyte Quantitation

The analyte quantitations were within the validation criteria.

5.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

5.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

6.0 MERCURY

The samples were analyzed for mercury per USEPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ⊗ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

6.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

6.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

6.3 Initial Calibration

The method specified initial calibration requirements were met.

6.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

6.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 292454) was reported. Mercury was not detected in the method blank above the MDL.

DRAFT

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-B3011-SUB-6-8. The recovery and RPD results were within the laboratory specified acceptance criteria.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the laboratory specified acceptance criteria.

6.9 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

6.10 Field Duplicate

Three field duplicate samples were collected and analyzed for mercury, SSHS-DUP-58, SSHS-DUP-59 and SSHS-DUP-60. Acceptable precision (RPD $\leq$50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3003-SUB-2-4, SSHS-B3082-SUB-4-6 and SSHS-B3011-SUB-4-6, respectively, with the following exception.

Mercury was detected in sample SSHS-B3003-SUB-2-4 at a concentration greater than the RL and was detected in sample SSHS-DUP-58 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the mercury concentrations in field duplicate pair SSHS-B3003-SUB-2-4/ SSHS-DUP-58 were J qualified as estimated.

Field duplicates SSHS-DUP-58, SSHS-DUP-59 and SSHS-DUP-60 were reported in laboratory report 180-95050-2.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3003-SUB-2-4	Mercury	0.042	NA	NC	0.042	J	7
SSHS-DUP-58	Mercury	0.036	J		0.036	J	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
NA-not applicable
NC-not calculable

DRAFT

6.11 Compound Quantitation

The compound quantitations were within the validation criteria.

6.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

6.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	21 April 2020
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-95162-1**

SITE: Former Sperry Remington Site-North

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of sixteen solid samples, including two samples for matrix spike/matrix spike duplicate (MS/MSD) analyses, eight field duplicates and one trip blank, collected on 3 September 2019, as part of the Former Sperry Remington Site-North sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C and 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA Methods 3541/8270D
- Diesel Range Organics (DRO) and Oil Range Organics (ORO) by USEPA Methods 3546/8015D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A
- Metals by USEPA Methods 3050B/6010C
- Mercury by USEPA Method 7471B
- Percent Solids by Standard Method (SM) 2540G

Eurofins TestAmerica, Canton, Ohio analyzed the samples for the following analytical test:

- Diesel Range Organics (DRO) and Oil Range Organics (ORO) by USEPA Methods 3546/8015D

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives, with the following exceptions.

DRAFT

The non-detect results of 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and based on technical and professional judgment.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-001)
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-95162-1	SSHS-B3052-SUB-12-14
180-95162-2	SSHS-B3038-SUB-0.17-2
180-95162-3	SSHS-B3038-SUB-2-4
180-95162-4	SSHS-B3038-SUB-4-6
180-95162-5	SSHS-B3038-SUB-6-8
180-95162-5 MS	SSHS-B3038-SUB-6-8 MS
180-95162-5 MSD	SSHS-B3038-SUB-6-8 MSD
180-95162-6	SSHS-B3038-SUB-8-10
180-95162-7	SSHS-B3038-SUB-10-12
180-95162-8	SSHS-B3038-SUB-12-14
180-95162-9	SSHS-B3067-SUB-0.17-2
180-95162-10	SSHS-B3067-SUB-2-4
180-95162-10 MS	SSHS-B3067-SUB-2-4 MS
180-95162-10 MSD	SSHS-B3067-SUB-2-4 MSD
180-95162-11	SSHS-B3067-SUB-4-6

Laboratory ID	Client ID
180-95162-12	SSHS-B3067-SUB-6-8
180-95162-13	SSHS-B3067-SUB-8-10
180-95162-14	SSHS-B3067-SUB-10-12
180-95162-15	SSHS-B3067-SUB-12-14
180-95162-16	SSHS-B3067-SUB-14-16
180-95162-17	SSHS-DUP-64
180-95162-18	SSHS-DUP-65
180-95162-19	SSHS-DUP-66
180-95162-20	SSHS-DUP-67
180-95162-21	SSHS-DUP-68
180-95162-22	SSHS-DUP-69
180-95162-23	SSHS-DUP-70
180-95162-24	SSHS-DUP-71
180-95162-25	SSHS-TB-12

The samples were received within the QAPP criteria of ≤ 6ºC.

The prefix "SSHS-" was added to the sample IDs per the client's request; the prefix was not documented on the sample IDs on the chain of custody (COC).

Samples listed on the COC that were not reported in laboratory report 180-95162-1 were reported in laboratory reports 180-95155-1, 180-95155-2 and 180-95155-3.

DRAFT

There was a time discrepancy for the second sample transfer on page 1 of the COC. The relinquished by date and time were documented as 09/4/19, 1300 and the received by date and time were documented as 9/14/19, 1216.

The relinquished by signature, date and time was not documented pages 2-8 of the COC for the first sample transfer. The received by time was documented as 9/4/19, 1217. It was noted that there were three sample transfers on page 1 of the COC and two sample transfers on pages 2-8 of the COC.

The solids data, used to report the sample on a dry weight basis, were not validated.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per USEPA Methods 5030C/8260C and 5035/8260C

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered to be usable for meeting project objectives, with the following exceptions. The non-detect results of 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibrations and based on technical and professional judgment.

DRAFT

Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for these analyses, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample are 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding time for the VOC analysis of a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exception.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C. The current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. The average RRFs for 1,4-dioxane in the initial calibrations were 0.0026 and 0.0055, less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

The %RSD of 1,4-dioxane in the initial calibration performed on instrument CHHP11 was high and outside the laboratory specified acceptance criteria. Since the 1,4-dioxane results were rejected due to the average RRF, no additional qualifications were applied to the 1,4-dioxane data, based on professional and technical judgment.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3038-SUB-0.17-2	1,4-Dioxane	44	U	44	R	9
SSHS-B3038-SUB-12-14	1,4-Dioxane	34	U	34	R	9
SSHS-B3052-SUB-12-14	1,4-Dioxane	41	U	41	R	9
SSHS-B3067-SUB-0.17-2	1,4-Dioxane	41	U	41	R	9
SSHS-B3067-SUB-14-16	1,4-Dioxane	39	U	39	R	9
SSHS-DUP-65	1,4-Dioxane	39	U	39	R	9
SSHS-DUP-69	1,4-Dioxane	43	U	43	R	9

µg/kg-micrograms per kilogram
U-not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
SSHS-TB-12	1,4-Dioxane	37	U	37	R	9

µg/L-micrograms per liter
U-not detected at or above the MDL

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRFs, no additional qualifications were applied to the 1,4-dioxane data, based on professional and technical judgment.

The %Ds between the RRFs in the initial calibrations and the ICV and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The percent difference (%D) of chloroethane (31.1%) in the ICV in batch 288152 was high and outside the laboratory specified acceptance criteria, with a high bias. Since chloroethane was not detected in the associated samples, no qualifications were applied to the data.

The %Ds of bromomethane (36.2%), chloroethane (87.3%) and dichlorofluoromethane (38.3%) in the CCV in batch 290250 were high and outside the laboratory specified acceptance criteria, with high biases. Since these three analytes were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of dichlorobromomethane (21.5%), cis-1,3-dichloropropene (26.4%), trans-1,3-dichloropropene (21.3%), chlorodibromomethane (24.1%), bromoform (25.2%), 1,2-dibromo-3-

DRAFT

chloropropane (39.4%) and 1,2,4-trichlorobenzene (20.2%) in the CCV in batch 290250 were high and outside the laboratory specified acceptance criteria, with low biases. Since the %Ds of bromoform, 1,2-dibromo-3-chloropropane and 1,2,4-trichlorobenzene in the CCV were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the bromoform, 1,2-dibromo-3-chloropropane and 1,2,4-trichlorobenzene data. However, the non-detect results of dichlorobromomethane, cis-1,3-dichloropropene, trans-1,3-dichloropropene and chlorodibromomethane in the associated sample were UJ qualified as estimated less than the MDLs.

The %D of dichlorodifluoromethane (25.1%) in the CCV in batch 290857 was high and outside the laboratory specified acceptance criteria, with a low bias. Since the %D of dichlorodifluoromethane in the CCV was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of acetone (29.9%), 2-butanone (23.7%), 1,4-dioxane (20.1%) and 2-hexanone (41.2%) in the CCV in batch 291857 were high and outside the laboratory specified acceptance criteria, with high biases. Since acetone, 2-butanone, 1,4-dioxane and 2-hexanone were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of acetone (52.5%), 2-butanone (26.0%), 1,4-dioxane (27.3%), 4-methyl-2-pentanone (25.8%), 2-hexanone (49.8%) and 1,2,4-trichlorobenzene (20.5%) in the CCV in batch 291027 were high and outside the laboratory specified acceptance criteria, with high biases. Since acetone, 2-butanone, 1,4-dioxane, 4-methyl-2-pentanone, 2-hexanone and 1,2,4-trichlorobenzene were not detected in the associated samples, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
SSHS-TB-12	Chlorodibromomethane	2.4	U	2.4	UJ	9
SSHS-TB-12	cis-1,3-Dichloropropene	1.6	U	1.6	UJ	9
SSHS-TB-12	Dichlorobromomethane	2.4	U	2.4	UJ	9
SSHS-TB-12	trans-1,3-Dichloropropene	1.7	U	1.7	UJ	9

µg/L-micrograms per liter
U-not detected at or above the MDL

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 290250, 290857 and 291027). VOCs were not detected in the method blanks above the MDLs.

DRAFT

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCS/LCS duplicate (LCSD) pairs were reported. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of acetone in the LCS/LCSD pair in batch 290250 were low and outside the laboratory specified acceptance criteria. Therefore, the acetone concentration in the associated sample was UJ qualified as estimated less than the MDL.

The RPDs of acetone and 2-hexanone in the LCS/LCSD pair in batch 290857 were high and outside the laboratory specified acceptance criteria. Since acetone and 2-hexanone was not detected in the associated sample, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
SSHS-TB-12	Acetone	3.2	U,*	3.2	UJ	5

µg/L-micrograms per liter
U-not detected at or above the MDL
*laboratory flag indicating LCS and/or LCSD recovery was outside the limits

1.9 Surrogates

Acceptable surrogate recoveries were reported for the sample analyses.

1.10 Trip Blank

One trip blank was submitted with the sample set, SSHS-TB-12. The VOC were not detected in the trip blank above the MDL.

1.11 Field Duplicate

Two field duplicate samples were collected with the sample set and analyzed for VOCs, SSHS-DUP-65 and SSHS-DUP-69. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3002-SUB-0.17-2 and SSHS-B3052-SUB-0.17-2, respectively.

DRAFT

Original samples SSHS-B3002-SUB-0.17-2 and SSHS-B3052-SUB-0.17-2 were reported in laboratory report 180-95155-1.

1.12 Internal Standards

The internal standard areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per USEPA Methods 3541/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates

DRAFT

⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

DRAFT

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the initial calibration and the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exception.

The %D of di-n-octyl phthalate in the CCV in batch 290581 was high and outside the laboratory specified acceptance criteria with high bias. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 290412 and 290602). SVOCs were not detected in the method blanks above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Duplicate

Two field duplicate samples were collected with the sample set and analyzed for SVOCs, SSHS-DUP-65 and SSHS-DUP-69. Acceptable precision (RPD <50% for results greater than five times the quantitation limit was demonstrated between the field duplicates and the original samples, SSHS-B3002-SUB-0.17-2 and SSHS-B3052-SUB-0.17-2, respectively, with the following exceptions.

Results with RPDs greater than 50% in the field duplicate pairs were J qualified as estimated, based on professional and technical judgment.

For analytes with a non-detect result in one sample in the field duplicate pair and a concentration reported in the other sample, the RPDs were not calculable. Therefore, based on professional and

DRAFT

technical judgment, the non-detect results in the field duplicate pair were UJ qualified as estimated less than the MDLs and the concentrations were J qualified as estimated.

For analytes with an estimated concentration greater than the MDL and less than the reporting limit (RL) in one sample in the field duplicate pair and a concentration greater than the RL reported in the other sample, the RPDs were not calculable. Therefore, based on professional and technical judgment, the concentrations in the field duplicate pair were J qualified as estimated.

Original samples SSHS-B3002-SUB-0.17-2 and SSHS-B3052-SUB-0.17-2 were reported in laboratory report 180-95155-1.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3002-SUB-0.17-2	Acenaphthylene	18	U	NC	18	UJ	7
SSHS-DUP-65	Acenaphthylene	21	J		21	J	7
SSHS-B3052-SUB-0.17-2	Acenaphthylene	120	NA	86	120	J	7
SSHS-DUP-69	Acenaphthylene	300	NA		300	J	7
SSHS-B3002-SUB-0.17-2	Anthracene	22	U	NC	22	UJ	7
SSHS-DUP-65	Anthracene	31	J		31	J	7
SSHS-B3052-SUB-0.17-2	Anthracene	110	NA	74	110	J	7
SSHS-DUP-69	Anthracene	240	NA		240	J	7
SSHS-B3002-SUB-0.17-2	Benzo[a]anthracene	16	U	NC	16	UJ	7
SSHS-DUP-65	Benzo[a]anthracene	110	NA		110	J	7
SSHS-B3052-SUB-0.17-2	Benzo[a]anthracene	370	NA	89	370	J	7
SSHS-DUP-69	Benzo[a]anthracene	960	NA		960	J	7
SSHS-B3002-SUB-0.17-2	Benzo[a]pyrene	18	U	NC	18	UJ	7
SSHS-DUP-65	Benzo[a]pyrene	99	NA		99	J	7
SSHS-B3052-SUB-0.17-2	Benzo[a]pyrene	330	NA	81	330	J	7
SSHS-DUP-69	Benzo[a]pyrene	780	NA		780	J	7
SSHS-B3002-SUB-0.17-2	Benzo[b]fluoranthene	21	U	NC	21	UJ	7
SSHS-DUP-65	Benzo[b]fluoranthene	120	NA		120	J	7
SSHS-B3052-SUB-0.17-2	Benzo[b]fluoranthene	400	NA	100	400	J	7
SSHS-DUP-69	Benzo[b]fluoranthene	1200	NA		1200	J	7
SSHS-B3002-SUB-0.17-2	Benzo[g,h,i]perylene	18	U	NC	18	UJ	7
SSHS-DUP-65	Benzo[g,h,i]perylene	66	J		66	J	7

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3052-SUB-0.17-2	Benzo[g,h,i]perylene	260	NA	83	260	J	7
SSHS-DUP-69	Benzo[g,h,i]perylene	630	NA		630	J	7
SSHS-B3002-SUB-0.17-2	Benzo[k]fluoranthene	25	U	NC	25	UJ	7
SSHS-DUP-65	Benzo[k]fluoranthene	43	J		43	J	7
SSHS-B3052-SUB-0.17-2	Benzo[k]fluoranthene	170	NA	83	170	J	7
SSHS-DUP-69	Benzo[k]fluoranthene	410	NA		410	J	7
SSHS-B3002-SUB-0.17-2	Chrysene	16	U	NC	16	UJ	7
SSHS-DUP-65	Chrysene	110	NA		110	J	7
SSHS-B3052-SUB-0.17-2	Chrysene	390	NA	86	390	J	7
SSHS-DUP-69	Chrysene	980	NA		980	J	7
SSHS-B3002-SUB-0.17-2	Dibenz(a,h)anthracene	19	U	NC	19	UJ	7
SSHS-DUP-65	Dibenz(a,h)anthracene	23	J		23	J	7
SSHS-B3052-SUB-0.17-2	Dibenz(a,h)anthracene	17	U	NC	17	UJ	7
SSHS-DUP-69	Dibenz(a,h)anthracene	170	NA		170	J	7
SSHS-B3002-SUB-0.17-2	Fluoranthene	23	J	NC	23	J	7
SSHS-DUP-65	Fluoranthene	170	NA		170	J	7
SSHS-B3052-SUB-0.17-2	Fluoranthene	520	NA	86	520	J	7
SSHS-DUP-69	Fluoranthene	1300	NA		1300	J	7
SSHS-B3052-SUB-0.17-2	Fluorene	15	U	NC	15	UJ	7
SSHS-DUP-69	Fluorene	56	J		56	J	7
SSHS-B3002-SUB-0.17-2	Indeno[1,2,3-cd]pyrene	17	U	NC	17	UJ	7
SSHS-DUP-65	Indeno[1,2,3-cd]pyrene	57	J		57	J	7
SSHS-B3052-SUB-0.17-2	Indeno[1,2,3-cd]pyrene	220	NA	86	220	J	7
SSHS-DUP-69	Indeno[1,2,3-cd]pyrene	550	NA		550	J	7
SSHS-B3002-SUB-0.17-2	Naphthalene	16	U	NC	16	UJ	7
SSHS-DUP-65	Naphthalene	17	J		17	J	7
SSHS-B3002-SUB-0.17-2	Phenanthrene	22	U	NC	22	UJ	7
SSHS-DUP-65	Phenanthrene	100	NA		100	J	7
SSHS-B3052-SUB-0.17-2	Phenanthrene	270	NA	60	270	J	7
SSHS-DUP-69	Phenanthrene	500	NA		500	J	7

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3002-SUB-0.17-2	Pyrene	21	J	NC	21	J	7
SSHS-DUP-65	Pyrene	150	NA		150	J	7
SSHS-B3052-SUB-0.17-2	Pyrene	510	NA	87	510	J	7
SSHS-DUP-69	Pyrene	1300	NA		1300	J	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

2.11 Internal Standards

The internal standard areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported for sample SSHS-DUP-69 due to the dilution analyzed. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 DIESEL RANGE ORGANICS AND OIL RANGE ORGANICS

The samples were analyzed for DRO (C10-C28) and ORO (C28-C40) per USEPA Methods 3546/8015D.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The DRO (C10-C28) and ORO (C28-C40) data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the DRO (C10-C28) and ORO (C28-C40) analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

An appropriate initial calibration was performed for DRO (C10-C28). The laboratory calculated the %RSD of the calibration factors (CFs). The %RSD of DRO (C10-C28) was within the method and laboratory specified acceptance criteria.

The ORO (C28-C40) results were calculated based on the DRO (C10-C28) calibration. An initial calibration was not performed for ORO, nor was an ORO LCS analyzed. Therefore, based on professional and technical judgment, the nondetect ORO results were UJ qualified as estimated less than the MDL.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3038-SUB-0.17-2	Oil Range Organics (C28-C40)	41	U	41	UJ	9
SSHS-B3038-SUB-12-14	Oil Range Organics (C28-C40)	35	U	35	UJ	9
SSHS-B3052-SUB-12-14	Oil Range Organics (C28-C40)	38	U	38	UJ	9
SSHS-B3067-SUB-0.17-2	Oil Range Organics (C28-C40)	41	U	41	UJ	9
SSHS-B3067-SUB-14-16	Oil Range Organics (C28-C40)	36	U	36	UJ	9
SSHS-DUP-65	Oil Range Organics (C28-C40)	39	U	39	UJ	9
SSHS-DUP-69	Oil Range Organics (C28-C40)	42	U	42	UJ	9

mg/kg-milligrams per kilogram
U-not detected at or above the MDL

DRAFT

3.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The %Ds between the CFs in the initial calibration and the ICVs and CCVs for DRO (C10-C28)) were within the method and laboratory specified acceptance criteria, with the following exceptions.

The %Ds of surrogate o-terphenyl were high and outside the validation specified acceptance criteria, with high biases, in the bracketing CCVs in batch 400628. Since the surrogate recoveries in the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of DRO (C10-C28) in the closing, bracketing CCV in batch 400628 was high and outside the laboratory specified acceptance criteria, with a high bias. Since DRO (C10-C28) and ORO (C28-C40) were not detected in the associated samples, no qualifications were applied to the data.

3.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 400373). DRO (C10-C28) and ORO (C28-C40) were not detected in the method blank above the MDLs.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. DRO (C10-C28) was reported in the LCS. The recovery result was within the laboratory specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

Two field duplicate samples were collected with the sample set and analyzed for DRO (C10-C28) and ORO (C28-C40), SSHS-DUP-65 and SSHS-DUP-69. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3002-SUB-0.17-2 and SSHS-B3052-SUB-0.17-2, respectively.

Original samples SSHS-B3002-SUB-0.17-2 and SSHS-B3052-SUB-0.17-2 were reported in laboratory report 180-95155-1.

3.10 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

3.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria were not listed in Table 1 of the QAPP for DRO (C10-C28) and ORO (C28-C40).

3.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

4.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by USEPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
⊗ Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

4.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding times for the PCB analysis of a solid sample is 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and

validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

4.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria.

4.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 292145, 292205 and 292321). The PCBs were not detected in the method blanks above the MDLs.

4.6 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported, using samples SSHS-B3038-SUB-6-8 and SSHS-B3067-SUB-2-4. The recovery and RPD results were within the laboratory specified acceptance criteria.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

Eight field duplicate samples were collected with the sample set and analyzed for PCBs, SSHS-DUP-65, SSHS-DUP-67, SSHS-DUP-68, SSHS-DUP-64, SSHS-DUP-66, SSHS-DUP-69, SSHS-DUP-70 and SSHS-DUP-71. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3002-SUB-0.17-2, SSHS-B3001-SUB-4-6, SSHS-B3037-SUB-0.17-2, SSHS-B3053-SUB-2-4, SSHS-B3038-SUB-8-10, SSHS-B3052-SUB-0.17-2, SSHS-B3023-SUB-4-6 and SSHS-B3036-SUB-4-6, respectively, with the following exceptions.

Results with RPDs greater than 50% in the field duplicate pairs were J qualified as estimated, based on professional and technical judgment.

DRAFT

For analytes with a non-detect result in one sample in the field duplicate pair and a concentration reported in the other sample, the RPDs were not calculable. Therefore, based on professional and technical judgment, the non-detect results in the field duplicate pair were UJ qualified as estimated less than the MDLs and the concentrations were J qualified as estimated.

Original samples SSHS-B3002-SUB-0.17-2, SSHS-B3001-SUB-4-6 and SSHS-B3037-SUB-0.17-2 were reported in laboratory report 180-95155-1, original samples SSHS-B3023-SUB-4-6 and SSHS-B3036-SUB-4-6 were reported in laboratory report 180-95155-2 and original samples SSHS-B3053-SUB-2-4 and SSHS-B3052-SUB-0.17-2 were reported in laboratory report 180-95155-3.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3052-SUB-0.17-2	PCB-1248	1000	NA	61	1000	J	7
SSHS-DUP-69	PCB-1248	530	NA		530	J	7
SSHS-B3002-SUB-0.17-2	PCB-1254	6.3	U	NC	6.3	UJ	7
SSHS-DUP-65	PCB-1254	370	NA		370	J	7
SSHS-B3052-SUB-0.17-2	PCB-1254	640	NA	81	640	J	7
SSHS-DUP-69	PCB-1254	270	NA		270	J	7
SSHS-B3052-SUB-0.17-2	PCB-1260	210	NA	55	210	J	7
SSHS-DUP-69	PCB-1260	120	NA		120	J	7

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

DRAFT

4.10 Internal Standards

The internal standard areas and retention times were within the method specified acceptance criteria.

4.11 Target Compound Identification

The target compound identifications were within the validation criteria.

4.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore,

there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3052-SUB-12-14	PCB-1248	1200	NA	1200	J	13
SSHS-B3052-SUB-12-14	PCB-1254	560	NA	560	J	13
SSHS-B3052-SUB-12-14	PCB-1260	130	NA	130	J	13
SSHS-DUP-68	PCB-1248	1200	NA	1200	J	13
SSHS-DUP-68	PCB-1254	570	NA	570	J	13
SSHS-DUP-68	PCB-1260	240	NA	240	J	13
SSHS-DUP-69	PCB-1248	530	NA	530	J	13
SSHS-DUP-69	PCB-1254	270	NA	270	J	13
SSHS-DUP-69	PCB-1260	120	NA	120	J	13

µg/kg-micrograms per kilogram
NA-not applicable

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

5.0 METALS

The samples were analyzed for metals per USEPA methods 3050B/6010C. (Mercury was evaluated separately in Section 6.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ⊗ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ⊗ Serial Dilution
- ✓ Laboratory Control Sample
- ✓ Internal Standard
- ⊗ Field Duplicate
- ✓ Analyte Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding time for the total metals of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria, with the following exception.

The recoveries of selenium in the low level ICV (ICVL) in batch 293711 and a bracketing low level CCV (CCVL) in batch 293711 were high and outside the method specified acceptance criteria. Therefore, the estimated selenium concentration in the associated sample was J qualified as estimated.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-DUP-68	Selenium	0.71	J	0.71	J	9

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL

5.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria, with the following exceptions.

Vanadium was detected in the ICB in batch 293564 and selenium was detected in a bracketing CCB in batch 293564, both at estimated concentrations greater than the MDLs and less than the RLs. Since vanadium was detected above the RL in the associated samples and selenium was not detected in the associated samples, no qualifications were applied to the data.

Aluminum was detected at estimated concentration greater than the MDL and less than the RL in a bracketing CCB in batch 293711. Since aluminum was detected above the RL in the associated samples, no qualifications were applied to the data.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks (batches 291787 and 291788) were reported. Metals were not detected in the method blanks above the MDLs, with the following exception.

Iron was detected in the method blank in batch 291788 at a concentration greater than the RL, 10.2 mg/kg. Since iron was detected in the associated samples at concentration greater than ten times the method blank concentration, no qualifications were applied to the data.

5.7 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported, using samples SSHS-B3038-SUB-6-8 and SSHS-B3067-SUB-2-4. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

For recoveries or RPDs outside the laboratory specified acceptance criteria laboratory specified acceptance criteria and original sample concentrations greater than four times the spiked concentrations, no qualifications were applied to the data.

The recoveries of antimony, calcium and magnesium in the MS/MSD pair using sample SSHS-B3038-SUB-6-8 were low and outside the laboratory specified acceptance criteria; the post

DRAFT

digestion spike (PDS) recoveries were acceptable. In addition, the calcium and magnesium RPDs were high and outside the laboratory specified acceptance criteria. Therefore, the non-detect antimony result in sample SSHS-B3038-SUB-6-8 was UJ qualified as estimated less than the MDL and the calcium and magnesium concentrations were J qualified as estimated.

The recoveries of antimony and zinc in the MS/MSD pair using sample SSHS-B3067-SUB-2-4 were low and outside the laboratory specified acceptance criteria; the PDS recoveries were acceptable. Therefore, the antimony and zinc concentrations in sample SSHS-B3067-SUB-2-4 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3038-SUB-6-8	Antimony	0.40	U,F1	0.40	UJ	4
SSHS-B3038-SUB-6-8	Calcium	3400	F2,F1	3400	J	4
SSHS-B3038-SUB-6-8	Magnesium	3500	F2,F1	3500	J	4
SSHS-B3067-SUB-2-4	Antimony	0.38	J,F1	0.38	J	4
SSHS-B3067-SUB-2-4	Zinc	50	F1	50	J	4

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits

5.8 Serial Dilution

Two sample set specific serial dilutions were reported, using samples SSHS-B3038-SUB-6-8 and SSHS-B3067-SUB-2-4. The %D results were within the method specified acceptance criteria, with the following exceptions.

The %Ds of iron and manganese in the serial dilution using sample SSHS-B3038-SUB-6-8 were high and outside the method specified acceptance criteria. Therefore, the iron and manganese concentrations in sample SSHS-B3038-SUB-6-8 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3038-SUB-6-8	Iron	19000	NA	19000	J	8
SSHS-B3038-SUB-6-8	Manganese	520	F2	520	J	8

mg/kg-milligrams per kilogram
F2-laboratory flag indicating MS/MSD RPD was outside the limits
NA-not applicable

5.9 Laboratory Control Sample

DRAFT

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

5.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

5.11 Field Duplicate

Eight field duplicate samples were collected with the sample set, SSHS-DUP-65, SSHS-DUP-67, SSHS-DUP-68, SSHS-DUP-64, SSHS-DUP-66, SSHS-DUP-69, SSHS-DUP-70 and SSHS-DUP-71. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3002-SUB-0.17-2, SSHS-B3001-SUB-4-6, SSHS-B3037-SUB-0.17-2, SSHS-B3053-SUB-2-4, SSHS-B3038-SUB-8-10, SSHS-B3052-SUB-0.17-2, SSHS-B3023-SUB-4-6 and SSHS-B3036-SUB-4-6, respectively, with the following exceptions.

Results with RPDs greater than 50% in the field duplicate pairs were J qualified as estimated, based on professional and technical judgment.

For analytes with a non-detect result in one sample in the field duplicate pair and a concentration reported in the other sample, the RPDs were not calculable. Therefore, based on professional and technical judgment, the non-detect results in the field duplicate pair were UJ qualified as estimated less than the MDLs and the concentrations were J qualified as estimated, with the following exception.

The estimated selenium concentration in sample SSHS-DUP-64 was greater the nondetect (MDL) result in sample SSHS-B3053-SUB-2-4, due to the difference in the samples MDLs. Therefore, no qualifications were applied to the selenium data, based on professional and technical judgment.

For analytes with an estimated concentration greater than the MDL and less than the RL in one sample in the field duplicate pair and a concentration greater than the RL reported in the other sample, the RPDs were not calculable. Therefore, based on professional and technical judgment, the concentrations in the field duplicate pair were J qualified as estimated.

Original samples SSHS-B3002-SUB-0.17-2, SSHS-B3001-SUB-4-6 and SSHS-B3037-SUB-0.17-2 were reported in laboratory report 180-95155-1, original samples SSHS-B3023-SUB-4-6 and SSHS-B3036-SUB-4-6 were reported in laboratory report 180-95155-2 and original samples SSHS-B3053-SUB-2-4 and SSHS-B3052-SUB-0.17-2 were reported in laboratory report 180-95155-3.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3001-SUB-4-6	Antimony	0.34	U	NC	0.34	UJ	7
SSHS-DUP-67	Antimony	0.47	J		0.47	J	7
SSHS-B3037-SUB-0.17-2	Antimony	0.43	U	NC	0.43	UJ	7
SSHS-DUP-68	Antimony	0.47	J		0.47	J	7
SSHS-B3053-SUB-2-4	Antimony	0.44	J	NC	0.44	J	7
SSHS-DUP-64	Antimony	0.4	U		0.4	UJ	7
SSHS-B3038-SUB-8-10	Antimony	0.35	U	NC	0.35	UJ	7
SSHS-DUP-66	Antimony	0.4	J		0.4	J	7
SSHS-B3023-SUB-4-6	Antimony	0.37	U	NC	0.37	UJ	7
SSHS-DUP-70	Antimony	0.39	J		0.39	J	7
SSHS-B3052-SUB-0.17-2	Beryllium	0.54	NA	NC	0.54	J	7
SSHS-DUP-69	Beryllium	0.51	J		0.51	J	7
SSHS-B3002-SUB-0.17-2	Calcium	1800	NA	64	1800	J	7
SSHS-DUP-65	Calcium	3500	NA		3500	J	7
SSHS-B3053-SUB-2-4	Calcium	590	J	NC	590	J	7
SSHS-DUP-64	Calcium	610	NA		610	J	7
SSHS-B3052-SUB-0.17-2	Calcium	2000	NA	67	2000	J	7
SSHS-DUP-69	Calcium	4000	NA		4000	J	7
SSHS-B3053-SUB-2-4	Cobalt	6.5	NA	NC	6.5	J	7
SSHS-DUP-64	Cobalt	5.5	J		5.5	J	7
SSHS-B3002-SUB-0.17-2	Copper	14	NA	129	14	J	7
SSHS-DUP-65	Copper	65	NA		65	J	7
SSHS-B3002-SUB-0.17-2	Lead	13	NA	116	13	J	7
SSHS-DUP-65	Lead	49	NA		49	J	7
SSHS-B3023-SUB-4-6	Lead	12	NA	74	12	J	7
SSHS-DUP-70	Lead	26	NA		26	J	7
SSHS-B3053-SUB-2-4	Potassium	550	J	NC	550	J	7
SSHS-DUP-64	Potassium	610	NA		610	J	7
SSHS-B3002-SUB-0.17-2	Selenium	0.66	U	NC	0.66	UJ	7
SSHS-DUP-65	Selenium	0.67	J		0.67	J	7
SSHS-B3037-SUB-0.17-2	Selenium	0.65	U	NC	0.65	UJ	7
SSHS-DUP-68	Selenium	0.71	J		0.71	J	7
SSHS-B3038-SUB-8-10	Selenium	0.53	U	NC	0.53	UJ	7
SSHS-DUP-66	Selenium	0.65	J		0.65	J	7

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3002-SUB-0.17-2	Sodium	40	J	NC	40	J	7
SSHS-DUP-65	Sodium	28	U		28	UJ	7
SSHS-B3053-SUB-2-4	Sodium	35	J	NC	35	J	7
SSHS-DUP-64	Sodium	31	U		31	UJ	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

5.12 Analyte Quantitation

The analyte quantitations were within the validation criteria.

5.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

5.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

6.0 MERCURY

The samples were analyzed for mercury per USEPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ⊗ Field Duplicate
- ✓ Analyte Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

6.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

6.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

6.3 Initial Calibration

The method specified initial calibration requirements were met.

6.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

6.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 292634 and 292641). Mercury was not detected in the method blanks above the MDL.

DRAFT

6.7 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported, using samples SSHS-B3038-SUB-6-8 and SSHS-B3067-SUB-2-4. The recovery and RPD results were within the laboratory specified acceptance criteria.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

6.9 Field Duplicate

Eight field duplicate samples were collected with the sample set, SSHS-DUP-65, SSHS-DUP-67, SSHS-DUP-68, SSHS-DUP-64, SSHS-DUP-66, SSHS-DUP-69, SSHS-DUP-70 and SSHS-DUP-71. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3002-SUB-0.17-2, SSHS-B3001-SUB-4-6, SSHS-B3037-SUB-0.17-2, SSHS-B3053-SUB-2-4, SSHS-B3038-SUB-8-10, SSHS-B3052-SUB-0.17-2, SSHS-B3023-SUB-4-6 and SSHS-B3036-SUB-4-6, respectively, with the following exceptions.

Mercury was detected in sample SSHS-B3002-SUB-0.17-2 at an estimated concentration greater than the MDL and less than the RL and was detected in sample SSHS-DUP-65 at a concentration greater the RL, resulting in a noncalculable the RPD. Therefore, the mercury concentrations in field duplicate pair SSHS-B3002-SUB-0.17-2/SSHS-DUP-65 were J qualified as estimated.

Mercury was not detected in sample SSHS-DUP-67 and was detected in sample SSHS-B3001-SUB-4-6 at a concentration greater the MDL, resulting in a noncalculable RPD. Therefore, the non-detect mercury result in sample SSHS-DUP-67 was UJ qualified as estimated less than the MDL and mercury concentration in sample SSHS-B3001-SUB-4-6 was J qualified as estimated.

Original samples SSHS-B3002-SUB-0.17-2, SSHS-B3001-SUB-4-6 and SSHS-B3037-SUB-0.17-2 were reported in laboratory report 180-95155-1, original samples SSHS-B3023-SUB-4-6 and SSHS-B3036-SUB-4-6 were reported in laboratory report 180-95155-2 and original samples SSHS-B3002-SUB-0.17-2 and SSHS-B3052-SUB-0.17-2 were reported in laboratory report 180-95155-3.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3002-SUB-0.17-2	Mercury	0.032	J	NC	0.032	J	7

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-DUP-65	Mercury	0.070	NA		0.070	J	7
SSHS-B3001-SUB-4-6	Mercury	0.015	J	NC	0.015	J	7
SSHS-DUP-67	Mercury	0.013	U		0.013	UJ	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

6.10 Analyte Quantitation

The analyte quantitations were within the validation criteria.

6.11 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

6.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	21 April 2020
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-100148-3, Revision 1**

SITE: Former Sperry Remington Site-North

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of twenty solid samples, including three samples for matrix spike/matrix spike duplicate (MS/MSD) analyses, collected on 16-17 December 2019, as part of the Former Sperry Remington Site-North sampling event.

Eurofins TestAmerica Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Semivolatile Organic Compounds (SVOCs) by United States (US) Environmental Protection Agency (EPA) Methods 3541/8270D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A
- Metals by USEPA Methods 3050B/6010C
- Mercury by USEPA Method 7471B
- Percent Solids by Standard Method (SM) 2540G

Eurofins TestAmerica Canton, Ohio analyzed the samples for the following analytical test:

- Diesel Range Organics (DRO) by USEPA Methods 3546/8015D

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect results of benzaldehyde in the SVOC analyses were R qualified as rejected due to laboratory control sample (LCS) and MS/MSD recoveries less than 10%.

Qualified data that were not rejected should be used within the limits of the qualifications.

DRAFT

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-001)
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-100148-41	SSHS-B3323-SUB-0.17-2
180-100148-42	SSHS-B3323-SUB-2-4
180-100148-43	SSHS-B3324-SUB-0.17-2
180-100148-44	SSHS-B3324-SUB-2-4
180-100148-45	SSHS-B3319-SUB-0.17-2
180-100148-45 MS	SSHS-B3319-SUB-0.17-2 MS
180-100148-45 MSD	SSHS-B3319-SUB-0.17-2 MSD
180-100148-46	SSHS-B3319-SUB-2-4
180-100148-47	SSHS-B3319-SUB-4-6
180-100148-48	SSHS-B3322-SUB-0.17-2
180-100148-49	SSHS-B3322-SUB-2-4
180-100148-50	SSHS-B3313-SUB-2-4
180-100148-51	SSHS-B3313-SUB-4-6
180-100148-52	SSHS-B3318-SUB-0.17-2

Laboratory ID	Client ID
180-100148-52 MS	SSHS-B3318-SUB-0.17-2 MS
180-100148-52 MSD	SSHS-B3318-SUB-0.17-2 MSD
180-100148-53	SSHS-B3318-SUB-2-4
180-100148-54	SSHS-B3318-SUB-4-6
180-100148-55	SSHS-B3300-SUB-0.17-2
180-100148-56	SSHS-B3300-SUB-2-4
180-100148-56 MS	SSHS-B3300-SUB-2-4 MS
180-100148-56 MSD	SSHS-B3300-SUB-2-4 MSD
180-100148-57	SSHS-B3305-SUB-0.17-2
180-100148-58	SSHS-B3305-SUB-2-4
180-100148-59	SSHS-B3311-SUB-0.17-2
180-100148-60	SSHS-B3311-SUB-2-4

DRAFT

The samples were received within the QAPP criteria of ≤ 6ºC.

Incorrect error correction was observed on the chain of custody (COC) instead of the proper procedure of a single strike through, correction, and initials and date of person making the correction.

Samples listed on the COC that were not reported in laboratory report 180-100148-3 were reported in laboratory reports 180-100148-1, 180-100148-2, 180-100148-4, 180-100148-5 and 180-100148-6.

The relinquished by signature, date and time were documented on page 1 of the (COC) and were missing from pages 2-12 of the COC. The received by date and time were documented as 12/18/19, 1030 on the pages of the COC.

There was a note, handwritten by the laboratory, on the COC cancelling the ORO analyses per the client. Another handwritten note by the laboratory on the COC cancelled the DRO analysis of sample SSHS-B-3300-SUB-2-4.

The solids data, used to report the sample on a dry weight basis, were not validated.

The laboratory report was revised on 2 April 2020 to include the initial calibration for PCBs by USEPA Method 8082A.

1.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per USEPA Methods 3541/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The SVOC data reported in this sample delivery group (SDG) are considered to be usable for supporting project objectives, with the following exceptions. The non-detect results of benzaldehyde were R qualified as rejected due to LCS and MS/MSD recoveries less than 10%.

DRAFT

Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 98.5%.

1.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analysis of a standard to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria.

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The percent differences (%Ds) between the RRFs in the initial calibrations and the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of di-n-octyl phthalate in the CCV in batch 302441 was high and outside the laboratory specified acceptance criteria, with high bias. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to the data.

DRAFT

The %D of 4,6-dinitro-2-methylphenol (25.8%) in the CCV in batch 302866 was high and outside the laboratory specified acceptance criteria, with low bias. Since the %D of 4,6-dinitro-2-methylphenol in the CCV was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 301937). SVOCs were not detected in the method blank above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-B3300-SUB-2-4. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of benzaldehyde in the MS/MSD pair were low and outside the laboratory specified acceptance criteria, less than 10%. Therefore, the non-detect benzaldehyde result in sample SSHS-B3300-SUB-2-4 was R qualified as rejected.

The recoveries of 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol in the MS/MSD pair were low and outside the laboratory specified acceptance criteria. Also, the RPD of 2,4-dinitrophenol in the MS/MSD pair was high and outside the laboratory specified acceptance criteria. Therefore, due to the low recoveries, the non-detect 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol results in sample SSHS-B3300-SUB-2-4 were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier**	Reason Code***
SSHS-B3300-SUB-2-4	2,4-Dinitrophenol	1000	U,F2,F1	1000	UJ	4
SSHS-B3300-SUB-2-4	4,6-Dinitro-2-methylphenol	650	U,F1	650	UJ	4
SSHS-B3300-SUB-2-4	Benzaldehyde	47	U,F1,*	47	R	4

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits
*laboratory flag indicating LCS and/or LCS duplicate (LCSD) recovery was outside the limits
** Validation qualifiers are defined in Attachment 1 at the end of this report
***Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria, with the following exception.

The recovery of benzaldehyde was low and outside the laboratory specified acceptance criteria, less than 10%. Therefore, the non-detect benzaldehyde results in the associated samples were R qualified as rejected.

The recoveries of 4-chloroaniline and 3-nitroaniline in the LCS were low and outside the laboratory specified acceptance criteria. Therefore, the non-detect 4-chloroaniline and 3-nitroaniline results in the associated samples were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3300-SUB-0.17-2	3-Nitroaniline	100	U,*	100	UJ	5
SSHS-B3300-SUB-0.17-2	4-Chloroaniline	13	U,*	13	UJ	5
SSHS-B3300-SUB-0.17-2	Benzaldehyde	49	U,*	49	R	5
SSHS-B3300-SUB-2-4	3-Nitroaniline	96	U,*	96	UJ	5
SSHS-B3300-SUB-2-4	4-Chloroaniline	13	U,*	13	UJ	5
SSHS-B3300-SUB-2-4	Benzaldehyde	47	U,F1,*	47	R	5

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits
*laboratory flag indicating LCS and/or LCSD recovery was outside the limits

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Duplicate

No field duplicate samples were collected in this sample set.

1.11 Internal Standards

The internal standard areas and retention times were within method specified acceptance criteria.

1.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

DRAFT

1.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 DIESEL RANGE ORGANIC

The samples were analyzed for DRO (C10-C28) per USEPA Methods 3546/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The DRO (C10-C28) data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to

DRAFT

the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the DRO (C10-C28) analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Initial Calibration

An appropriate initial calibration was performed for DRO (C10-C28). The laboratory calculated the %RSD of the calibration factors (CFs). The %RSD of DRO (C10-C28) was within the method and laboratory specified acceptance criteria.

2.4 Initial and Continuing Calibration Verifications

The ICV and CCVs were performed at the required frequency. The %Ds between the CFs in the initial calibration and the ICV and CCVs for DRO (C10-C28) were within the method and laboratory specified acceptance criteria.

2.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 416951 and 417097). DRO (C10-C28) were not detected in the method blanks above the MDLs.

2.6 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported, using samples SSHS-B3319-SUB-0.17-2 and SSHS-B3318-SUB-0.17-2. The recovery and RPD results were within the laboratory specified acceptance criteria.

2.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

2.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

DRAFT

2.9 Field Duplicate

No field duplicate samples were collected in this sample set.

2.10 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria were not listed in Table 1 of the QAPP for DRO (C10-C28).

2.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by USEPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
⊗ Compound Quantitation

DRAFT

- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The PCB data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the PCB analysis of a solid sample is 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of PCB 1016 on both gas chromatography (GC) columns and the %D of PCB 1221 on GC column RTX-CLP1 in the CCV in batch 302065 were high and outside the laboratory specified acceptance criteria, with high biases. Since PCB 1016 and PCB 1221 were not detected in the associated samples, no qualifications were applied to the data.

3.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 301959). The PCBs were not detected in the method blank above the MDLs.

DRAFT

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-B3300-SUB-2-4. The recovery and RPD results were within the laboratory specified acceptance criteria.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

One field duplicate sample was collected and analyzed for PCBs, DUP-13; the field duplicate was reported in laboratory report 180-100148-6. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicate and the original sample, SSHS-B3305-SUB-2-4.

3.10 Internal Standards

The internal standard areas and retention times were within the method specified acceptance criteria.

3.11 Target Compound Identification

The target compound identifications were within the validation criteria.

3.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3300-SUB-0.17-2	PCB-1248	110	NA	110	J	13
SSHS-B3300-SUB-0.17-2	PCB-1254	140	NA	140	J	13
SSHS-B3300-SUB-0.17-2	PCB-1260	88	NA	88	J	13
SSHS-B3300-SUB-2-4	PCB-1248	16	J	16	J	13
SSHS-B3300-SUB-2-4	PCB-1254	13	J	13	J	13
SSHS-B3305-SUB-0.17-2	PCB-1248	60	NA	60	J	13
SSHS-B3305-SUB-0.17-2	PCB-1254	51	NA	51	J	13
SSHS-B3305-SUB-0.17-2	PCB-1260	36	NA	36	J	13
SSHS-B3305-SUB-2-4	PCB-1248	170	NA	170	J	13
SSHS-B3305-SUB-2-4	PCB-1254	210	NA	210	J	13
SSHS-B3305-SUB-2-4	PCB-1260	120	NA	120	J	13

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
NA-not applicable

3.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

3.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

4.0 METALS

The samples were analyzed for metals per USEPA methods 3050B/6010C. (Mercury was evaluated separately in Section 5.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank

DRAFT

- ✓ Method Blank
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ✓ Serial Dilution
- ✓ Laboratory Control Sample
- ✓ Internal Standard
- ⊗ Field Duplicate
- ✓ Analyte Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

4.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding time for the total metals analysis of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

4.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

4.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits, with the following exceptions.

The recovery of antimony in a bracketing low level CCV (CCVL) in batch 302831 was low and outside the method specified acceptance criteria. Therefore, based on professional and technical judgment, the non-detect antimony results in the associated samples were UJ qualified as estimated less than the MDL and the estimated antimony result was J qualified as estimated.

The recovery of arsenic in a bracketing CCVL in batch 302873 was high and outside the method specified acceptance criteria. Since the arsenic recoveries in the other bracketing CCVs were within the method specified acceptance criteria, the concentration detected in the associated sample and professional and technical judgment, no qualifications were applied to the data.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3305-SUB-0.17-2	Antimony	0.30	U	0.30	UJ	9
SSHS-B3305-SUB-2-4	Antimony	0.32	U	0.32	UJ	9
SSHS-B3311-SUB-0.17-2	Antimony	0.29	U	0.29	UJ	9
SSHS-B3311-SUB-2-4	Antimony	0.32	U	0.32	UJ	9
SSHS-B3313-SUB-2-4	Antimony	0.31	U	0.31	UJ	9
SSHS-B3313-SUB-4-6	Antimony	0.26	U	0.26	UJ	9
SSHS-B3318-SUB-2-4	Antimony	0.33	U	0.33	UJ	9
SSHS-B3318-SUB-4-6	Antimony	0.26	U	0.26	UJ	9
SSHS-B3319-SUB-2-4	Antimony	0.39	J	0.39	UJ	9
SSHS-B3319-SUB-4-6	Antimony	0.33	U	0.33	UJ	9
SSHS-B3322-SUB-0.17-2	Antimony	0.32	U	0.32	UJ	9
SSHS-B3322-SUB-2-4	Antimony	0.26	U	0.26	UJ	9
SSHS-B3323-SUB-0.17-2	Antimony	0.32	U,F1	0.32	UJ	9
SSHS-B3323-SUB-2-4	Antimony	0.26	U	0.26	UJ	9
SSHS-B3324-SUB-0.17-2	Antimony	0.30	U	0.30	UJ	9
SSHS-B3324-SUB-2-4	Antimony	0.27	U	0.27	UJ	9

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits

4.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria.

4.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 302370). Metals were not detected in the method blank above the MDLs.

4.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-B3323-SUB-0.17-2. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

For sample concentrations greater than four times the spiked concentrations, no qualifications were applied to the data.

DRAFT

The recoveries of antimony, barium and magnesium in the MS/MSD pair were low and outside the laboratory specified acceptance criteria; the post digestion spike (PDS) recoveries were acceptable. Therefore, the non-detect antimony result in sample SSHS-B3323-SUB-0.17-2 was UJ qualified as estimated less than the MDL and the barium and magnesium concentrations in sample SSHS-B3323-SUB-0.17-2 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3323-SUB-0.17-2	Antimony	0.32	U,F1	0.32	UJ	4
SSHS-B3323-SUB-0.17-2	Barium	92	F1	92	J	4
SSHS-B3323-SUB-0.17-2	Magnesium	7300	F1	7300	J	4

mg/kg-milligrams per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits

4.8 Serial Dilution

One sample set specific serial dilution was reported using sample SSHS-B3323-SUB-0.17-2. The %D results were within the method specified acceptance criteria.

4.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria.

4.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

4.11 Field Duplicate

One field duplicate sample was collected and reported for metals, DUP-13; the field duplicate was reported in laboratory report 180-100148-6. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicate and the original sample, SSHS-B3305-SUB-2-4, with the following exception.

Thallium was detected in sample SSHS-B3305-SUB-2-4 at an estimated concentration greater than the MDL and less than the RL and was not detected in sample DUP-13, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the thallium concentration in sample SSHS-B3305-SUB-2-4 was J qualified as estimated and the non-detect thallium result in sample DUP-13 was UJ qualified as estimated less than the MDL.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3305-SUB-2-4	Thallium	0.31	J	NC	0.31	J	7
DUP-13	Thallium	0.23	U		0.23	UJ	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NC-not calculable

4.12 Analyte Quantitation

The analyte quantitations were within the validation criteria.

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported due to dilutions analyzed. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

5.0 MERCURY

The samples were analyzed for mercury per USEPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank
✓ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Field Duplicate
✓ Analyte Quantitation
✓ Sensitivity

DRAFT

✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

5.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks (batches 302482 and 302486) were reported. Mercury was not detected in the method blanks above the MDL.

5.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-B3319-SUB-2-4. The MSD recovery was within the laboratory specified acceptance criteria: however, the MS recovery was low and the RPD was high, both outside the laboratory specified acceptance criteria. Therefore, the mercury concentration in sample SSHS-B3319-SUB-2-4 was J qualified as estimated.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3319-SUB-2-4	Mercury	0.24	F1,F2	0.24	J	4

mg/kg-milligrams per kilogram
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2-laboratory flag indicating MS/MSD RPD was outside the limits

5.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

5.9 Field Duplicate

One field duplicate sample was analyzed for mercury, DUP-13; the field duplicate was reported in laboratory report 180-100148-6. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3305-SUB-2-4.

5.10 Analyte Quantitation

The analyte quantitations were within the validation criteria.

5.11 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

5.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	20 April 2020
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverables – Eurofins TestAmerica Job Numbers 180-101084-2 and 180-101084-3**

SITE: Former Sperry Remington Site-North

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of twenty-nine solid samples, seven field duplicate and one trip blank, collected on 15 January 2020, as part of the Former Sperry Remington Site-North sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C and 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA Methods 3541/8270D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A
- Metals by USEPA Methods 3050B/6010C
- Mercury by USEPA Method 7471B
- Percent Solids by Standard Method (SM) 2540G

Eurofins TestAmerica, Canton, Ohio analyzed the samples for the following analytical test:

- Diesel Range Organics (DRO) by USEPA Methods 3546/8015D

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives, with the following exceptions.

The non-detect results of 1,4-dioxane in the samples for the VOC analysis were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and based on technical and professional judgment.

DRAFT

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-001)
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-101084-21	SSHS-B3107-SUB-12-14
180-101084-22	SSHS-B3109-SUB-0.17-2
180-101084-23	SSHS-B3109-SUB-2-4
180-101084-24	SSHS-B3109-SUB-4-6
180-101084-25	SSHS-B3109-SUB-6-8
180-101084-26	SSHS-B3109-SUB-8-10
180-101084-27	SSHS-B3109-SUB-10-12
180-101084-28	SSHS-B3109-SUB-12-14
180-101084-29	SSHS-B3110-SUB-0.17-2
180-101084-30	SSHS-B3110-SUB-2-4
180-101084-31	SSHS-B3110-SUB-4-6
180-101084-32	SSHS-B3110-SUB-6-8
180-101084-33	SSHS-B3110-SUB-8-10
180-101084-34	SSHS-B3110-SUB-10-12
180-101084-35	SSHS-B3110-SUB-12-14
180-101084-36	SSHS-B3112-SUB-0.5-2
180-101084-37	SSHS-B3112-SUB-2-4
180-101084-38	SSHS-B3112-SUB-4-6
180-101084-39	SSHS-B3112-SUB-6-8

Laboratory ID	Client ID
180-101084-40	SSHS-B3112-SUB-8-10
180-101084-41	SSHS-B3112-SUB-10-12
180-101084-42	SSHS-B3112-SUB-12-14
180-101084-43	SSHS-B3118-SUB-0.17-2
180-101084-44	SSHS-B3118-SUB-2-4
180-101084-45	SSHS-B3118-SUB-4-6
180-101084-46	SSHS-B3118-SUB-6-8
180-101084-47	SSHS-B3118-SUB-8-10
180-101084-48	SSHS-B3118-SUB-10-12
180-101084-49	SSHS-B3118-SUB-12-14
180-101084-50	DUP-15
180-101084-51	DUP-11
180-101084-52	DUP-07
180-101084-53	DUP-09
180-101084-54	DUP-10
180-101084-55	DUP-12
180-101084-56	DUP-16
180-101084-57	TRIP BLANK - 05

DRAFT

The samples were received within the QAPP criteria of ≤ 6ºC.

The relinquished by signature, date and time were documented on page 1 of the chain of custody (COC) and were missing from pages 2 through 6 of the COC.

The narrative noted that two sets of containers were received labeled as sample SSHS-B3110-SUB-10-12, with collections times of 12:25 and 12:30, and no containers labeled as SSHS-B3110-

SUB-8-10. The client was notified and the containers with the collection time of 12:25 were logged in as sample SSHS-B3110-SUB-8-10.

A collection time was not documented for the trip blank. The trip blank was logged in with the collection time of 00:00.

Handwritten notes on the COC, added by the laboratory, indicated that the client cancelled the analyses of three samples for SVOCs.

The solids data, used to report the samples on a dry weight basis, were not validated.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per EPA Methods 5030C/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
⊗ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverables Review

1.1 Overall Assessment

The VOC data reported in these sample delivery groups (SDGs) are considered to be usable for meeting project objectives, with the following exceptions. The non-detect results of 1,4-dioxane in the samples were R qualified as rejected due to low RRFs in the initial calibrations and based on technical and professional judgment.

DRAFT

Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for these SDGs is 98.1%.

1.2 Holding Times

The holding time for the VOC analysis of a preserved water sample is 14 days from collection to analysis. The holding times for the VOC analysis of a solid sample is 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the percent relative standard deviations (%RSDs) of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exception.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C. The current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. The average RRFs for 1,4-dioxane in the initial calibrations were 0.0026 and 0.0010, less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3107-SUB-12-14	1,4-Dioxane	38	U	38	R	9
SSHS-B3109-SUB-0.17-2	1,4-Dioxane	42	U	42	R	9
SSHS-B3109-SUB-12-14	1,4-Dioxane	39	U	39	R	9
SSHS-B3110-SUB-0.17-2	1,4-Dioxane	39	U	39	R	9
SSHS-B3110-SUB-12-14	1,4-Dioxane	39	U	39	R	9

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3112-SUB-0.5-2	1,4-Dioxane	39	U	39	R	9
SSHS-B3112-SUB-12-14	1,4-Dioxane	39	U	39	R	9
SSHS-B3118-SUB-0.17-2	1,4-Dioxane	44	U	44	R	9
SSHS-B3118-SUB-12-14	1,4-Dioxane	39	U	39	R	9
DUP-11	1,4-Dioxane	36	U	36	R	9
DUP-07	1,4-Dioxane	38	U	38	R	9
DUP-09	1,4-Dioxane	42	U	42	R	9
DUP-10	1,4-Dioxane	39	U	39	R	9
DUP-12	1,4-Dioxane	43	U	43	R	9
DUP-16	1,4-Dioxane	38	U	38	R	9

µg/kg-micrograms per kilogram
U-not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
TRIP BLANK – 05	1,4-Dioxane	37	U	37	R	9

µg/L-micrograms per liter
U-not detected at or above the MDL

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRFs and , based on professional and technical judgment, no additional qualifications were applied to the 1,4-dioxane data.

The percent differences or percent drifts (%Ds) between the RRFs in the initial calibrations and the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of 2-butanone (20.5%) and 1,2-dibromo-3-chloropropane (20.9%) in the CCV in batch 304472 were high and outside the laboratory specified acceptance criteria, with low biases. Since the %Ds of 2-butanone and 1,2-dibromo-3-chloropropane were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

DRAFT

The %Ds of bromomethane (53.2%) and chloroethane (115.9%) in the CCV in batch 304472 were high and outside the laboratory specified acceptance criteria, with high biases. Since bromomethane and chloroethane were not detected in the associated samples, no qualifications were applied to the data.

The %D of 2-butanone (25.0%) in the CCV in batch 304608 was high and outside the laboratory specified acceptance criteria, with a low bias. Since the %D of 2-butanone was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of chloromethane (23.9%), vinyl chloride (25.2%), bromomethane (33.8%), chloroethane (26.5%), dichlorodifluoromethane (22.2%) and 1,1,2-trichloro-1,2,2-trifluoroethane (21.4%) in the CCV in batch 304608 were high and outside the laboratory specified acceptance criteria, with high biases. Since these six analytes were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of chloromethane (54.2%) and vinyl chloride (48.2%) in the CCV in batch 304487 were high and outside the laboratory and validation specified acceptance criteria, with low biases. Therefore, the non-detect chloromethane and vinyl chloride results in the associated sample were UJ qualified as estimated less than the MDLs.

The %Ds of 1,2,4-trichlorobenzene (22.0%) and trichlorofluoromethane (40.3%) in the CCV in batch 304487 were high and outside the laboratory specified acceptance criteria, with high biases. Since 1,2,4-trichlorobenzene and trichlorofluoromethane were not detected in the associated sample, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
TRIP BLANK – 05	Chloromethane	3.9	U	3.9	UJ	9
TRIP BLANK – 05	Vinyl chloride	3.7	U	3.7	UJ	9

µg/L-micrograms per liter
U-not detected at or above the MDL

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 304472, 304487 and 304608). VOCs were not detected in the method blanks above the MDLs, with the following exceptions.

Methylene chloride was detected in the method blanks in batches 304472 and 304608 at estimated concentrations greater than the MDL and less than the reporting limit (RL). Therefore, the

DRAFT

estimated methylene chloride concentrations in the associated samples were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3107-SUB-12-14	Methylene Chloride	4.7	J,B	5.1	U	3
SSHS-B3109-SUB-0.17-2	Methylene Chloride	5.4	J,B	5.7	U	3
SSHS-B3109-SUB-12-14	Methylene Chloride	5.0	J,B	5.4	U	3
SSHS-B3110-SUB-0.17-2	Methylene Chloride	4.3	J,B	5.4	U	3
SSHS-B3110-SUB-12-14	Methylene Chloride	4.4	J,B	5.3	U	3
SSHS-B3112-SUB-0.5-2	Methylene Chloride	4.7	J,B	5.4	U	3
SSHS-B3118-SUB-0.17-2	Methylene Chloride	5.5	J,B	6.0	U	3
SSHS-B3118-SUB-12-14	Methylene Chloride	4.4	J,B	5.4	U	3
DUP-11	Methylene Chloride	3.8	J,B	5.0	U	3
DUP-07	Methylene Chloride	4.2	J,B	5.2	U	3
DUP-12	Methylene Chloride	4.7	J,B	5.8	U	3

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating analyte was detected in both the method blank and sample

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were not reported.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs and one LCS/LCS duplicate (LCSD) pair were reported. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exceptions.

The LCS recoveries of bromomethane and chloroethane and RPD of chloroethane in the LCS/LCSD pair in batch 304472 were high and outside the laboratory specified acceptance criteria. Since bromomethane and chloroethane were not detected in the associated samples, no qualifications were applied to the data.

The result for trichlorofluoromethane in the LCSD in batch 304472 was flagged with E to indicate the result exceeded the calibration range. Since the trichlorofluoromethane recovery and RPD

DRAFT

results in the LCS/LCSD pair were within the laboratory specified acceptance criteria and based on professional and technical judgement, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Trip Blank

One trip blank was submitted with the sample set, TRIP BLANK – 05. VOCs were not detected in the trip blank above the MDLs.

1.11 Field Duplicate

Six field duplicate samples were collected with the sample set and analyzed for VOCs, DUP-07, DUP-09, DUP-10, DUP-11, DUP-12 and DUP-16. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3107-SUB-0.17-2, SSHS-B3109-SUB-0.17-2, SSHS-B3110-SUB-0.17-2, SSHS-B3111-SUB-0.17-2, SSHS-B3112-SUB-0.5-2 and SSHS-B3118-SUB-0.17-2, respectively, with the following exceptions.

Methylene chloride was detected in samples SSHS-B3109-SUB-0.17-2 and SSHS-B3118-SUB-0.17-2 at estimated concentrations greater than the MDL and less than the RL and was not detected in samples DUP-09 and DUP-16, resulting in noncalculable RPDs. Since the methylene chloride concentrations in samples SSHS-B3109-SUB-0.17-2 and SSHS-B3118-SUB-0.17-2 were U qualified as not detected at the RL due to the method blank contamination and based on professional and technical judgment, no additional qualifications were applied to the methylene chloride data.

Methylene chloride was detected in sample SSHS-B3110-SUB-0.17-2 at an estimated concentration greater than the MDL and less than the RL and was detected in sample DUP-10 at a concentration greater than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the methylene chloride concentrations in field duplicate pair SSHS-B3110-SUB-0.17-2/DUP-10 were J qualified as estimated.

Acetone was detected in sample SSHS-B3110-SUB-0.17-2 at an estimated concentration greater than the MDL and less than the RL and was not detected in sample DUP-10, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the acetone concentration in sample SSHS-B3110-SUB-0.17-2 was J qualified as estimated and the non-detect acetone result in DUP-10 was UJ qualified as estimated less than the MDL.

DRAFT

Original samples SSHS-B3107-SUB-0.17-2 and SSHS-B3111-SUB-0.17-2 were reported in laboratory report 180-101084-1.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3110-SUB-0.17-2	Acetone	4.7	J	NC	4.7	J	7
DUP-10	Acetone	3.4	U		3.4	UJ	7
SSHS-B3110-SUB-0.17-2	Methylene Chloride	4.3	J,B	NC	4.3	J	7
DUP-10	Methylene Chloride	5.9	B		5.9	J	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
B-laboratory flag indicating analyte was detected in both the method blank and sample
NC-not calculable

1.12 Internal Standards

The internal standard areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.16 Electronic Data Deliverables (EDDs) Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per EPA Methods 3541/8270D.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

2.1 Overall Assessment

2.1.1 Completeness

The SVOC data reported in these SDGs are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for these SDGs is 100%.

2.1.2 Analysis Anomaly

Sample DUP-07 was analyzed at two dilutions, at a 1:2 dilution and a 1:10 dilution. The results of the 1:2 dilution were the results considered for validation, with the following exception. Bis(2-ethylhexyl) phthalate was E flagged by the laboratory in the 1:2 dilution, to indicate the result exceeded the calibration range. Therefore, the bis(2-ethylhexyl) phthalate result in the 1:10 dilution was considered for validation, based on professional and technical judgment. Results not considered for validation were designated as not reportable in the EDD with qualifiers file.

DRAFT

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSDs of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the initial calibration and the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of di-n-octyl phthalate (27.2%) in the CCV in batch 304540 was high and outside the laboratory specified acceptance criteria, with a high bias. The %D of 4-nitrophenol (20.6%) in the CCV in batch 304904 was high and outside the laboratory specified acceptance criteria, with a high bias. The %D of hexachlorocyclopentadiene (24.5%) in the CCV in batch 304745 was high and outside the laboratory specified acceptance criteria, with a high bias. Since di-n-octyl phthalate, 4-nitrophenol and hexachlorocyclopentadiene were not detected in the associated samples, no qualifications were applied to the data.

DRAFT

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 304371 and 304491). SVOCs were not detected in the method blanks above the MDLs, with the following exception.

Butyl benzyl phthalate was detected in the method blank in batch 304371 at an estimated concentration greater than the MDL and less than the RL. Since butyl benzyl phthalate was not detected in the associated samples, no qualifications were applied to the data.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Duplicate

Six field duplicate samples were collected with the sample set and analyzed for SVOCs, DUP-07, DUP-09, DUP-10, DUP-11, DUP-12 and DUP-16. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3107-SUB-0.17-2, SSHS-B3109-SUB-0.17-2, SSHS-B3110-SUB-0.17-2, SSHS-B3111-SUB-0.17-2, SSHS-B3112-SUB-0.5-2 and SSHS-B3118-SUB-0.17-2, respectively, with the following exceptions.

Results with RPDs greater than 50% in the field duplicate pairs were J qualified as estimated, based on professional and technical judgment.

For analytes with a non-detect result in one sample in the field duplicate pair and a concentration reported in the other sample, the RPDs were not calculable. Therefore, based on professional and technical judgment, the non-detect results were UJ qualified as estimated less than the MDLs and the concentrations were J qualified as estimated, with the following exception.

DRAFT

Since the estimated pyrene concentration in sample DUP-07 was less than the MDL for sample SSHS-B3107-SUB-0.17-2 and based on professional and technical judgment, no qualifications were applied to the pyrene data in this field duplicate pair.

For analytes with an estimated concentration greater than the MDL and less than the RL in one sample in the field duplicate pair and a concentration greater than the RL reported in the other sample, the RPDs were not calculable. Therefore, based on professional and technical judgment, these concentrations were J qualified as estimated.

Original samples SSHS-B3107-SUB-0.17-2 and SSHS-B3111-SUB-0.17-2 were reported in laboratory report 180-101084-1.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3107-SUB-0.17-2	Bis(2-ethylhexyl) phthalate	3900	U	NC	3900	UJ	7
DUP-07	Bis(2-ethylhexyl) phthalate	88000	NA		88000	J	7
SSHS-B3109-SUB-0.17-2	1,1'-Biphenyl	19	J	NC	19	J	7
DUP-09	1,1'-Biphenyl	17	U		17	UJ	7
SSHS-B3109-SUB-0.17-2	Acenaphthene	31	J	NC	31	J	7
DUP-09	Acenaphthene	23	U		23	UJ	7
SSHS-B3109-SUB-0.17-2	Anthracene	640	NA	67	640	J	7
DUP-09	Anthracene	320	NA		320	J	7
SSHS-B3109-SUB-0.17-2	Benzo[g,h,i]perylene	590	NA	81	590	J	7
DUP-09	Benzo[g,h,i]perylene	1400	NA		1400	J	7
SSHS-B3109-SUB-0.17-2	Carbazole	100	NA	57	100	J	7
DUP-09	Carbazole	180	NA		180	J	7
SSHS-B3109-SUB-0.17-2	Dibenz(a,h)anthracene	190	NA	57	190	J	7
DUP-09	Dibenz(a,h)anthracene	340	NA		340	J	7
SSHS-B3109-SUB-0.17-2	Indeno[1,2,3-cd]pyrene	560	NA	65	560	J	7
DUP-09	Indeno[1,2,3-cd]pyrene	1100	NA		1100	J	7
SSHS-B3109-SUB-0.17-2	Phenanthrene	2000	NA	86	2000	J	7
DUP-09	Phenanthrene	800	NA		800	J	7
SSHS-B3110-SUB-0.17-2	2-Methylnaphthalene	17	U	NC	17	UJ	7
DUP-10	2-Methylnaphthalene	32	J		32	J	7
SSHS-B3110-SUB-0.17-2	Acenaphthylene	16	U	NC	16	UJ	7
DUP-10	Acenaphthylene	50	J		50	J	7

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3110-SUB-0.17-2	Anthracene	19	U	NC	19	UJ	7
DUP-10	Anthracene	56	J		56	J	7
SSHS-B3110-SUB-0.17-2	Benzo[a]anthracene	14	U	NC	14	UJ	7
DUP-10	Benzo[a]anthracene	160	NA		160	J	7
SSHS-B3110-SUB-0.17-2	Benzo[a]pyrene	16	U	NC	16	UJ	7
DUP-10	Benzo[a]pyrene	150	NA		150	J	7
SSHS-B3110-SUB-0.17-2	Benzo[b]fluoranthene	18	U	NC	18	UJ	7
DUP-10	Benzo[b]fluoranthene	180	NA		180	J	7
SSHS-B3110-SUB-0.17-2	Benzo[g,h,i]perylene	16	U	NC	16	UJ	7
DUP-10	Benzo[g,h,i]perylene	170	NA		170	J	7
SSHS-B3110-SUB-0.17-2	Benzo[k]fluoranthene	22	U	NC	22	UJ	7
DUP-10	Benzo[k]fluoranthene	76	NA		76	J	7
SSHS-B3110-SUB-0.17-2	Carbazole	17	U	NC	17	UJ	7
DUP-10	Carbazole	21	J		21	J	7
SSHS-B3110-SUB-0.17-2	Chrysene	14	U	NC	14	UJ	7
DUP-10	Chrysene	160	NA		160	J	7
SSHS-B3110-SUB-0.17-2	Dibenz(a,h)anthracene	16	U	NC	16	UJ	7
DUP-10	Dibenz(a,h)anthracene	29	J		29	J	7
SSHS-B3110-SUB-0.17-2	Dibenzofuran	16	U	NC	16	UJ	7
DUP-10	Dibenzofuran	20	J		20	J	7
SSHS-B3110-SUB-0.17-2	Fluoranthene	19	U	NC	19	UJ	7
DUP-10	Fluoranthene	230	NA		230	J	7
SSHS-B3110-SUB-0.17-2	Fluorene	14	U	NC	14	UJ	7
DUP-10	Fluorene	16	J		16	J	7
SSHS-B3110-SUB-0.17-2	Indeno[1,2,3-cd]pyrene	15	U	NC	15	UJ	7
DUP-10	Indeno[1,2,3-cd]pyrene	130	NA		130	J	7
SSHS-B3110-SUB-0.17-2	Naphthalene	14	U	NC	14	UJ	7
DUP-10	Naphthalene	76	NA		76	J	7
SSHS-B3110-SUB-0.17-2	Phenanthrene	19	U	NC	19	UJ	7
DUP-10	Phenanthrene	150	NA		150	J	7
SSHS-B3110-SUB-0.17-2	Pyrene	17	U	NC	17	UJ	7
DUP-10	Pyrene	270	NA		270	J	7

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3111-SUB-0.17-2	Anthracene	78	J	NC	78	J	7
DUP-11	Anthracene	110	NA		110	J	7
SSHS-B3111-SUB-0.17-2	Carbazole	18	J	NC	18	J	7
DUP-11	Carbazole	18	U		18	UJ	7
SSHS-B3111-SUB-0.17-2	Fluorene	15	U	NC	15	UJ	7
DUP-11	Fluorene	18	J		18	J	7
SSHS-B3112-SUB-0.5-2	1,1'-Biphenyl	18	J	NC	18	J	7
DUP-12	1,1'-Biphenyl	16	U		16	UJ	7
SSHS-B3112-SUB-0.5-2	Acenaphthene	49	J	NC	49	J	7
DUP-12	Acenaphthene	22	U		22	UJ	7
SSHS-B3112-SUB-0.5-2	Anthracene	200	NA	NC	200	J	7
DUP-12	Anthracene	75	J		75	J	7
SSHS-B3112-SUB-0.5-2	Carbazole	110	NA	NC	110	J	7
DUP-12	Carbazole	25	J		25	J	7
SSHS-B3112-SUB-0.5-2	Chrysene	610	NA	57	610	J	7
DUP-12	Chrysene	340	NA		340	J	7
SSHS-B3112-SUB-0.5-2	Fluoranthene	1100	NA	91	1100	J	7
DUP-12	Fluoranthene	410	NA		410	J	7
SSHS-B3112-SUB-0.5-2	Phenanthrene	850	NA	137	850	J	7
DUP-12	Phenanthrene	160	NA		160	J	7
SSHS-B3112-SUB-0.5-2	Pyrene	920	NA	65	920	J	7
DUP-12	Pyrene	470	NA		470	J	7
SSHS-B3118-SUB-0.17-2	2-Methylnaphthalene	18	U	NC	18	UJ	7
DUP-16	2-Methylnaphthalene	20	J		20	J	7
SSHS-B3118-SUB-0.17-2	Acenaphthylene	51	J	NC	51	J	7
DUP-16	Acenaphthylene	110	NA		110	J	7
SSHS-B3118-SUB-0.17-2	Anthracene	81	NA	71	81	J	7
DUP-16	Anthracene	170	NA		170	J	7
SSHS-B3118-SUB-0.17-2	Benzo[a]anthracene	280	NA	71	280	J	7
DUP-16	Benzo[a]anthracene	590	NA		590	J	7
SSHS-B3118-SUB-0.17-2	Benzo[a]pyrene	270	NA	60	270	J	7
DUP-16	Benzo[a]pyrene	500	NA		500	J	7

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3118-SUB-0.17-2	Benzo[b]fluoranthene	320	NA	58	320	J	7
DUP-16	Benzo[b]fluoranthene	580	NA		580	J	7
SSHS-B3118-SUB-0.17-2	Benzo[g,h,i]perylene	230	NA	65	230	J	7
DUP-16	Benzo[g,h,i]perylene	450	NA		450	J	7
SSHS-B3118-SUB-0.17-2	Benzo[k]fluoranthene	94	NA	91	94	J	7
DUP-16	Benzo[k]fluoranthene	250	NA		250	J	7
SSHS-B3118-SUB-0.17-2	Chrysene	240	NA	63	240	J	7
DUP-16	Chrysene	460	NA		460	J	7
SSHS-B3118-SUB-0.17-2	Dibenz(a,h)anthracene	56	J	NC	56	J	7
DUP-16	Dibenz(a,h)anthracene	100	NA		100	J	7
SSHS-B3118-SUB-0.17-2	Dibenzofuran	17	U	NC	17	UJ	7
DUP-16	Dibenzofuran	28	J		28	J	7
SSHS-B3118-SUB-0.17-2	Fluoranthene	480	NA	78	480	J	7
DUP-16	Fluoranthene	1100	NA		1100	J	7
SSHS-B3118-SUB-0.17-2	Fluorene	15	U	NC	15	UJ	7
DUP-16	Fluorene	25	J		25	J	7
SSHS-B3118-SUB-0.17-2	Indeno[1,2,3-cd]pyrene	200	NA	62	200	J	7
DUP-16	Indeno[1,2,3-cd]pyrene	380	NA		380	J	7
SSHS-B3118-SUB-0.17-2	Phenanthrene	230	NA	90	230	J	7
DUP-16	Phenanthrene	610	NA		610	J	7
SSHS-B3118-SUB-0.17-2	Pyrene	390	NA	85	390	J	7
DUP-16	Pyrene	970	NA		970	J	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating analyte was detected in both the method blank and sample
NA-not applicable
NC-not calculable

2.11 Internal Standards

The internal standard areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

DRAFT

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported for samples SSHS-B3112-SUB-2-4 and DUP-07 due to dilutions analyzed. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverables Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

3.0 DIESEL RANGE ORGANIC

The samples were analyzed for DRO (C10-C28) per EPA Methods 3546/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ⊗ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

3.1 Overall Assessment

The DRO (C10-C28) data reported in these SDGs are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the

DRAFT

number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for these SDGs is 100%.

3.2 Holding Times

The holding times for the DRO (C10-C28) analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for DRO (C10-C28). The laboratory calculated %RSDs of the calibration factors (CFs). The %RSDs of DRO (C10-C28) were within the method and laboratory specified acceptance criteria.

3.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The %Ds between the CFs in the initial calibration and the ICVs and CCVs for DRO (C10-C28) were within the method and laboratory specified acceptance criteria, with the following exceptions.

The %Ds of surrogate o-terphenyl were high and outside the laboratory specified acceptance criteria, with high biases, in the bracketing CCVs in batch 420354. Since the surrogate recoveries in the associate samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

3.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 419829 and 419852). DRO (C10-C28) was not detected in the method blanks above the MDL.

3.6 Matrix Spike/Matrix Spike Duplicate

One batch MS/MSD pair was reported. Since these were batch QC, the results do not affect the samples in this data set and qualifications were not applied to the data.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

DRAFT

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

Six field duplicate samples were collected with the sample set and analyzed for DRO (C10-C28), DUP-07, DUP-09, DUP-10, DUP-11, DUP-12 and DUP-16. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3107-SUB-0.17-2, SSHS-B3109-SUB-0.17-2, SSHS-B3110-SUB-0.17-2, SSHS-B3111-SUB-0.17-2, SSHS-B3112-SUB-0.5-2 and SSHS-B3118-SUB-0.17-2, respectively, with the following exceptions.

Results with RPDs greater than 50% in the field duplicate pairs were J qualified as estimated, based on professional and technical judgment.

DRO (C10-C28) was detected in sample SSHS-B3110-SUB-0.17-2 at a concentration greater than the RL and was not detected in sample DUP-10, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the DRO (C10-C28) concentration in sample SSHS-B3110-SUB-0.17-2 was J qualified as estimated and the non-detect DRO (C10-C28) result in sample SSHS-B3110-SUB-0.17-2 was UJ qualified as estimated less than the MDL.

DRO (C10-C28) was not detected in sample SSHS-B3118-SUB-0.17-2 and was detected in sample DUP-16 at a concentration greater than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the non-detect DRO (C10-C28) result in sample SSHS-B3118-SUB-0.17-2 was UJ qualified as estimated less than the MDL and the DRO (C10-C28) concentration in DUP-16 was J qualified as estimated.

Original samples SSHS-B3107-SUB-0.17-2 and SSHS-B3111-SUB-0.17-2 were reported in laboratory report 180-101084-1.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3109-SUB-0.17-2	DRO [C10 – C28]	130	NA	56	130	J	7
DUP-09	DRO [C10 – C28]	230	NA		230	J	7
SSHS-B3110-SUB-0.17-2	DRO [C10 – C28]	57	NA	NC	57	J	7
DUP-10	DRO [C10 – C28]	38	U		38	UJ	7
SSHS-B3112-SUB-0.5-2	DRO [C10 – C28]	500	NA	103	500	J	7

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
DUP-12	DRO [C10 – C28]	160	NA		160	J	7
SSHS-B3118-SUB-0.17-2	DRO [C10 – C28]	41	U	NC	41	UJ	7
DUP-16	DRO [C10 – C28]	220	NA		220	J	7

mg/kg-milligrams per kilogram
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

3.10 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

3.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.12 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria were not listed in Table 1 of the QAPP for DRO (C10-C28).

3.13 Electronic Data Deliverables Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

4.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by EPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration

DRAFT

- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ⊗ Field Duplicate
- ⊗ Internal Standards
- ✓ Target Compound Identification
- ⊗ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

4.1 Overall Assessment

The PCBs data reported in these SDGs are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for these SDGs is 100%.

4.2 Holding Times

The holding times for the PCB analysis of a solid sample is 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

4.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria.

4.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 304542 and 305037). The PCBs were not detected in the method blanks above the MDLs.

DRAFT

4.6 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-B3107-SUB-12-14. The recovery and RPD results were within the laboratory specified acceptance criteria.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of tetrachloro-m-xylene on one or both GC columns for samples SSHS-B3112-SUB-6-8, SSHS-B3112-SUB-8-10, SSHS-B3118-SUB-0.17-2, SSHS-B3118-SUB-4-6, SSHS-B3118-SUB-6-8, SSHS-B3118-SUB-12-14, DUP-07 and DUP-09 were high and outside the laboratory specified acceptance criteria. Since the recoveries of the remaining surrogate, decachlorobiphenyl, on both GC columns were within the laboratory specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

The recovery of decachlorobiphenyl on one GC column for sample SSHS-B3118-SUB-2-4 was low and outside the laboratory specified acceptance criteria. Since the recoveries of the remaining surrogate, tetrachloro-m-xylene, on both GC columns were within the laboratory specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

4.9 Field Duplicate

Seven field duplicate samples were collected with the sample set and analyzed for PCBs, DUP-07, DUP-09, DUP-10, DUP-11, DUP-12, DUP-15 and DUP-16. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3107-SUB-0.17-2, SSHS-B3109-SUB-0.17-2, SSHS-B3110-SUB-0.17-2, SSHS-B3111-SUB-0.17-2, SSHS-B3112-SUB-0.5-2, SSHS-B3116-SUB-4-6 and SSHS-B3118-SUB-0.17-2, respectively, with the following exceptions.

Results with RPDs greater than 50% in the field duplicate pairs were J qualified as estimated, based on professional and technical judgment.

DRAFT

PCB 1221 was not detected in sample SSHS-B3111-SUB-0.17-2 and was detected in sample DUP-11 at a concentration greater than the RL. Therefore, based on professional and technical judgment, the non-detect PCB 1221 result in sample SSHS-B3111-SUB-0.17-2 was UJ qualified as estimated less than the MDL and the PCB 1221 concentration in sample DUP-11 was J qualified as estimated.

Original samples SSHS-B3107-SUB-0.17-2, SSHS-B3111-SUB-0.17-2 and SSHS-B3116-SUB-4-6 were reported in laboratory report 180-101084-1.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3109-SUB-0.17-2	PCB-1248	86	NA	117	86	J	7
DUP-09	PCB-1248	330	NA		330	J	7
SSHS-B3109-SUB-0.17-2	PCB-1254	110	NA	71	110	J	7
DUP-09	PCB-1254	230	NA		230	J	7
SSHS-B3111-SUB-0.17-2	PCB-1221	6.8	U	NC	6.8	UJ	7
DUP-11	PCB-1221	59	NA		59	J	7
SSHS-B3112-SUB-0.5-2	PCB-1248	72	NA	57	72	J	7
DUP-12	PCB-1248	130	NA		130	J	7

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

4.10 Internal Standards

The internal standard areas and retention times were within the laboratory specified acceptance criteria, with the following exceptions.

The responses of internal standard PCB-205 on both gas chromatography (GC) columns in sample SSHS-B3118-SUB-2-4 were high and outside the laboratory specified acceptance criteria. Since the associated PCBs were not detected in sample SSHS-B3118-SUB-2-4, no qualifications were applied to the data.

4.11 Target Compound Identification

The target compound identifications were within the validation criteria.

4.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

DRAFT

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

The PCB 1221 concentration in sample SSHS-B3118-SUB-10-12 was flagged by the laboratory with p, to indicate the %RPD between the two GC columns was greater than 40%; the lower value was reported. Therefore, based on professional and technical judgement, the PCB 1221 concentration in sample SSHS-B3118-SUB-10-12 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3109-SUB-0.17-2	PCB-1248	86	NA	86	J	13
SSHS-B3109-SUB-0.17-2	PCB-1254	110	NA	110	J	13
SSHS-B3109-SUB-0.17-2	PCB-1260	69	NA	69	J	13
SSHS-B3109-SUB-2-4	PCB-1248	43	NA	43	J	13
SSHS-B3109-SUB-2-4	PCB-1254	88	NA	88	J	13
SSHS-B3109-SUB-2-4	PCB-1260	66	NA	66	J	13
SSHS-B3109-SUB-4-6	PCB-1248	51	NA	51	J	13
SSHS-B3109-SUB-4-6	PCB-1254	77	NA	77	J	13
SSHS-B3109-SUB-4-6	PCB-1260	54	NA	54	J	13
SSHS-B3109-SUB-6-8	PCB-1254	30	NA	30	J	13
SSHS-B3109-SUB-6-8	PCB-1260	20	NA	20	J	13
SSHS-B3112-SUB-0.5-2	PCB-1248	72	NA	72	J	13
SSHS-B3112-SUB-0.5-2	PCB-1254	90	NA	90	J	13
SSHS-B3112-SUB-0.5-2	PCB-1260	59	NA	59	J	13
SSHS-B3112-SUB-2-4	PCB-1248	25	NA	25	J	13
SSHS-B3112-SUB-2-4	PCB-1254	52	NA	52	J	13
SSHS-B3112-SUB-2-4	PCB-1260	39	NA	39	J	13
SSHS-B3112-SUB-4-6	PCB-1248	180	NA	180	J	13
SSHS-B3112-SUB-4-6	PCB-1254	88	NA	88	J	13
SSHS-B3112-SUB-4-6	PCB-1260	23	NA	23	J	13
DUP-09	PCB-1248	330	NA	330	J	13
DUP-09	PCB-1254	230	NA	230	J	13
DUP-09	PCB-1260	97	NA	97	J	13
DUP-12	PCB-1248	130	NA	130	J	13
DUP-12	PCB-1254	90	NA	90	J	13
DUP-12	PCB-1260	62	NA	62	J	13
DUP-16	PCB-1248	320	NA	320	J	13
DUP-16	PCB-1254	180	NA	180	J	13
DUP-16	PCB-1260	86	NA	86	J	13
SSHS-B3118-SUB-0.17-2	PCB-1248	320	NA	320	J	13

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3118-SUB-0.17-2	PCB-1254	230	NA	230	J	13
SSHS-B3118-SUB-0.17-2	PCB-1260	66	NA	66	J	13
SSHS-B3118-SUB-10-12	PCB-1221	30	p	30	J	13
SSHS-B3118-SUB-2-4	PCB-1248	22	NA	22	J	13
SSHS-B3118-SUB-2-4	PCB-1254	15	J	15	J	13
SSHS-B3118-SUB-4-6	PCB-1248	24	NA	24	J	13
SSHS-B3118-SUB-4-6	PCB-1254	16	J	16	J	13
SSHS-B3118-SUB-6-8	PCB-1248	32	NA	32	J	13
SSHS-B3118-SUB-6-8	PCB-1254	22	NA	22	J	13
SSHS-B3118-SUB-8-10	PCB-1248	18	NA	18	J	13
SSHS-B3118-SUB-8-10	PCB-1254	12	J	12	J	13

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
p-laboratory flag indicating the RPD between the two GC columns was greater than 40%
NA-not applicable

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.14 Electronic Data Deliverables Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

5.0 METALS

The samples were analyzed for metals per EPA methods 3050B/6010C. (Mercury was evaluated separately in Section 6.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank

DRAFT

✓ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
⊗ Serial Dilution
✓ Laboratory Control Sample
⊗ Field Duplicate
✓ Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The metals data reported in these SDGs are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for these SDGs is 100%.

5.2 Holding Times

The holding time for the total metals analysis of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

5.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four method blanks (batches 305157, 305172, 305280 and 305281) were reported. Metals were not detected in the method blanks above the MDLs.

5.7 Matrix Spike/Matrix Spike Duplicate

DRAFT

One sample set specific MS/MSD pair was reported using sample SSHS-B3110-SUB-8-10. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exceptions.

For recoveries or RPDs outside the laboratory specified acceptance criteria and the original sample concentration was greater than four times the spiked concentrations, no qualifications were applied to the data.

The recoveries of antimony in the MS/MSD pair were low and outside the laboratory specified acceptance criteria; the post digestion spike (PDS) recovery was acceptable. Therefore, the non-detect antimony result in sample SSHS-B3110-SUB-8-10 was UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3110-SUB-8-10	Antimony	0.33	U,F1	0.33	UJ	4

mg/kg-milligrams per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS/MSD recovery was outside the limits

5.8 Serial Dilution

One sample set specific serial dilution was reported using sample SSHS-B3110-SUB-8-10. The %D results were within the method specified acceptance criteria, with the following exceptions.

The %Ds of calcium, iron and manganese in the serial dilution were high and outside the method specified acceptance criteria. Therefore, the calcium, iron and manganese concentrations in sample SSHS-B3110-SUB-8-10 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3110-SUB-8-10	Calcium	39000	NA	39000	J	8
SSHS-B3110-SUB-8-10	Iron	13000	NA	13000	J	8
SSHS-B3110-SUB-8-10	Manganese	500	NA	500	J	8

mg/kg-milligrams per kilogram
NA-not applicable

5.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

DRAFT

5.10 Field Duplicate

Seven field duplicate samples were collected with the sample set and analyzed for metals, DUP-07, DUP-09, DUP-10, DUP-11, DUP-12, DUP-15 and DUP-16. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3107-SUB-0.17-2, SSHS-B3109-SUB-0.17-2, SSHS-B3110-SUB-0.17-2, SSHS-B3111-SUB-0.17-2, SSHS-B3112-SUB-0.5-2, SSHS-B3116-SUB-4-6 and SSHS-B3118-SUB-0.17-2, respectively, with the following exceptions.

Results with RPDs greater than 50% in the field duplicate pairs were J qualified as estimated, based on professional and technical judgment.

For analytes with a non-detect result in one sample in the field duplicate pair and a concentration reported in the other sample, the RPDs were not calculable. Therefore, based on professional and technical judgment, the non-detect results were UJ qualified as estimated less than the MDLs and the concentrations were J qualified as estimated.

For analytes with an estimated concentration greater than the MDL and less than the RL in one sample in the field duplicate pair and a concentration greater than the RL reported in the other sample, the RPDs were not calculable. Therefore, based on professional and technical judgment, the concentrations were J qualified as estimated.

Original samples SSHS-B3107-SUB-0.17-2, SSHS-B3111-SUB-0.17-2 and SSHS-B3116-SUB-4-6 were reported in laboratory report 180-101084-1.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3107-SUB-0.17-2	Aluminum	1300	NA	70	1300	J	7
DUP-07	Aluminum	2700	NA		2700	J	7
SSHS-B3107-SUB-0.17-2	Arsenic	1.6	NA	51	1.6	J	7
DUP-07	Arsenic	2.7	NA		2.7	J	7
SSHS-B3107-SUB-0.17-2	Barium	50	NA	63	50	J	7
DUP-07	Barium	26	NA		26	J	7
SSHS-B3107-SUB-0.17-2	Calcium	11000	NA	70	11000	J	7
DUP-07	Calcium	5300	NA		5300	J	7
SSHS-B3107-SUB-0.17-2	Chromium	2.4	NA	57	2.4	J	7
DUP-07	Chromium	4.3	NA		4.3	J	7
SSHS-B3107-SUB-0.17-2	Copper	5.7	NA	63	5.7	J	7

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
DUP-07	Copper	11	NA		11	J	7
SSHS-B3107-SUB-0.17-2	Lead	5.0	NA	82	5.0	J	7
DUP-07	Lead	12	NA		12	J	7
SSHS-B3107-SUB-0.17-2	Manganese	80	NA	55	80	J	7
DUP-07	Manganese	140	NA		140	J	7
SSHS-B3107-SUB-0.17-2	Nickel	3.6	J	NC	3.6	J	7
DUP-07	Nickel	5.5	NA		5.5	J	7
SSHS-B3107-SUB-0.17-2	Zinc	16	NA	55	16	J	7
DUP-07	Zinc	28	NA		28	J	7
SSHS-B3109-SUB-0.17-2	Beryllium	0.47	NA	NC	0.47	J	7
DUP-09	Beryllium	0.43	J		0.43	J	7
SSHS-B3109-SUB-0.17-2	Calcium	5800	NA	147	5800	J	7
DUP-09	Calcium	38000	NA		38000	J	7
SSHS-B3109-SUB-0.17-2	Selenium	0.58	U	NC	0.58	UJ	7
DUP-09	Selenium	0.69	J		0.69	J	7
SSHS-B3110-SUB-0.17-2	Calcium	26000	NA	121	26000	J	7
DUP-10	Calcium	6400	NA		6400	J	7
SSHS-B3110-SUB-0.17-2	Lead	7.1	NA	59	7.1	J	7
DUP-10	Lead	13	NA		13	J	7
SSHS-B3110-SUB-0.17-2	Magnesium	4600	NA	88	4600	J	7
DUP-10	Magnesium	1800	NA		1800	J	7
SSHS-B3111-SUB-0.17-2	Beryllium	0.33	NA	NC	0.33	J	7
DUP-11	Beryllium	0.26	J		0.26	J	7
SSHS-B3111-SUB-0.17-2	Cobalt	6.1	NA	NC	6.1	J	7
DUP-11	Cobalt	4.5	J		4.5	J	7
SSHS-B3112-SUB-0.5-2	Barium	210	NA	71	210	J	7
DUP-12	Barium	100	NA		100	J	7
SSHS-B3112-SUB-0.5-2	Cobalt	5.3	J	NC	5.3	J	7
DUP-12	Cobalt	5.4	NA		5.4	J	7
SSHS-B3112-SUB-0.5-2	Lead	54	NA	54	54	J	7
DUP-12	Lead	31	NA		31	J	7

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3112-SUB-0.5-2	Zinc	120	NA	57	120	J	7
DUP-12	Zinc	67	NA		67	J	7
SSHS-B3116-SUB-4-6	Calcium	1000	NA	176	1000	J	7
DUP-15	Calcium	16000	NA		16000	J	7
SSHS-B3116-SUB-4-6	Cobalt	5.5	NA	NC	5.5	J	7
DUP-15	Cobalt	5.2	J		5.2	J	7
SSHS-B3116-SUB-4-6	Magnesium	1800	NA	88	1800	J	7
DUP-15	Magnesium	4600	NA		4600	J	7
SSHS-B3118-SUB-0.17-2	Sodium	65	U	NC	65	UJ	7
DUP-16	Sodium	97	J		97	J	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

5.11 Compound Quantitation

The compound quantitations were within the validation criteria.

5.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported for sample SSHS-B3118-SUB-6-8 due to the dilution analyzed. The MDLs met the screening criteria listed in Table 1 of the QAPP.

5.13 Electronic Data Deliverables Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

6.0 MERCURY

The samples were analyzed for mercury per EPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues

DRAFT

were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ⊗ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

6.1 Overall Assessment

The mercury data reported in these SDGs are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for these SDGs is 100%.

6.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

6.3 Initial Calibration

The method specified initial calibration requirements were met.

6.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

6.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

DRAFT

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four method blanks (batches 304326, 304327, 304903 and 304907) were reported. Mercury was not detected in the method blanks above the MDL.

6.7 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported, using samples SSHS-B3118-SUB-12-14 and DUP-15. The recovery and RPD results were within the laboratory specified acceptance criteria.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

6.9 Field Duplicate

Seven field duplicate samples were collected with the sample set and analyzed for mercury, DUP-07, DUP-09, DUP-10, DUP-11, DUP-12, DUP-15 and DUP-16. Acceptable precision (RPD <50% for results greater than five times the quantitation limit) was demonstrated between the field duplicates and the original samples, SSHS-B3107-SUB-0.17-2, SSHS-B3109-SUB-0.17-2, SSHS-B3110-SUB-0.17-2, SSHS-B3111-SUB-0.17-2, SSHS-B3112-SUB-0.5-2, SSHS-B3116-SUB-4-6 and SSHS-B3118-SUB-0.17-2, respectively, with the following exceptions.

The RPD of mercury in field duplicate pair SSHS-B3112-SUB-0.5-2/DUP-12 was greater than 50%; therefore, based on professional and technical judgment, the mercury concentrations in field duplicate pair SSHS-B3112-SUB-0.5-2/DUP-12 were J qualified as estimated, based on professional and technical judgment.

Mercury was not detected in sample SSHS-B3110-SUB-0.17-2 and was detected in sample DUP-10 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the non-detect mercury result in sample SSHS-B3110-SUB-0.17-2 was UJ qualified as estimated less than the MDL and the mercury concentration in sample DUP-10 was J qualified as estimated.

Original samples SSHS-B3107-SUB-0.17-2, SSHS-B3111-SUB-0.17-2 and SSHS-B3116-SUB-4-6 were reported in laboratory report 180-101084-1.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3110-SUB-0.17-2	Mercury	0.021	U	NC	0.021	UJ	7
DUP-10	Mercury	0.029	J		0.029	J	7
SSHS-B3112-SUB-0.5-2	Mercury	0.97	NA	140	0.97	J	7
DUP-12	Mercury	0.17	NA		0.17	J	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

6.10 Compound Quantitation

The compound quantitations were within the validation criteria.

6.11 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

6.12 Electronic Data Deliverables Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	9 June 2020
To:	Ron Arcuri
From:	Mary Tyler
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level 4 Data Deliverable – Eurofins TestAmerica Work Order Number 180-105660-1**

SITE: Former Sperry Remington-HR Samples

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of six solid samples, including one sample for matrix spike/matrix spike duplicate (MS/MSD) analyses, one field duplicate sample and one equipment blank, collected 11 May 2020, as part of the Former Sperry Remington-HR Samples sampling event. The following analyses were performed at Eurofins TestAmerica, West Sacramento, California:

- Per- and Polyfluroalkyl Substances (PFAS) by United States Environmental Protection Agency (USEPA) Methods 537 (modified) and 3535/537 (modified)

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below and the information provided, the data as qualified are usable for supporting project objectives. The qualified data should be used within the limitations of the qualifications.

The data were reviewed based on the pertinent methods referenced by the data package, professional and technical judgment and following:

- Quality Assurance Project Plan (QAPP)/Field Sampling Plan (FSP), Remedial Investigation Work Plan, Former Sperry Remington Site – North Portion, NYSDEC Project 808022;
- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, January 2017 (EPA 540-R-2017-002); and
- USEPA Contract Laboratory Program National Functional Guidelines for High Resolution Superfund Organic Methods Data Review, April 2016 (USEPA-542-B-2016-001).

The following samples were analyzed and validated at a Stage 4 level:

DRAFT

Laboratory ID	Client ID
180-105660-13	SSHS-HR-1-SUB-0.17-1
180-105660-13 MS	SSHS-HR-1-SUB-0.17-1 MS
180-105660-13 MSD	SSHS-HR-1-SUB-0.17-1 MSD
180-105660-15	SSHS-HR-3-SUB-0.17-1
180-105660-17	SSHS-HR-5-SUB-0.17-1

Laboratory ID	Client ID
180-105660-19	SSHS-HR-7-SUB-0.17-1
180-105660-21	SSHS-HR-9-SUB-0.17-1
180-105660-23	SSHS-HR-11-SUB-0.17-1
180-105660-25	DUP-01
180-105660-30	EB-01

The samples were received at the laboratories within the QAPP/FSP acceptance criteria of <6ºC. No sample preservation issues were noted by the laboratory.

The samples were initially sent to Eurofins TestAmerica Pittsburgh, Pennsylvania. The chain of custody (COC) documenting the transfer of the samples to Eurofins TestAmerica, West Sacramento, California was not included in the laboratory report. This COC was sent by the laboratory to the data users on 4 June 2020.

1.0 PFAS

The samples were analyzed for PFAS per USEPA methods 537.1 (modified) and 3535/537 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA

DRAFT

Analyte	Acronym
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

✓ Overall Assessment
✓ Holding Time
✓ Initial Calibration
✓ Initial and Continuing Calibration Verification
⊗ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Equipment Blank
⊗ Field Duplicate
⊗ Isotope Dilution Standards
✓ Internal Standards
⊗ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

The PFAS data reported in this package are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this sample set is 100%.

1.2 Holding Time

The method-specified holding times for the PFAS analysis of a preserved water samples are 14 days from collection to extraction and 28 days from extraction to analysis. The laboratory-

specified holding times for the for the PFAS analyses of a solid sample are 14 days from collection to extraction and 40 days from extraction to analysis The holding times were met for the sample analyses.

1.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average relative response factors (RRFs) or linear curves to calculate the target compounds' concentrations. The RRFs' relative standard deviations (RSDs) were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

1.4 Initial Calibration Verification and Continuing Calibration Verification (ICV and CCV)

The ICVs and CCVs were performed at the required frequencies. The percent differences (%Ds) between the calculated concentrations in the initial calibration and the ICVs and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

1.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 378734 and 378738). PFAS were not detected in the method blanks above the method detection limits (MDLs), with the following exceptions.

PFBA was detected in the method blank in batch 378734 at an estimated concentration greater than the MDL and less than the reporting limit (RL). Therefore, the estimated PFBA concentrations in the associated samples were U qualified as not detected at the RL. PFOS was also detected in this method blank at a concentration greater than the RL, 0.571 µg/kg. Therefore, based on professional and technical judgment, the PFOS concentrations in samples SSHS-HR-1-SUB-0.17-1 and SSHS-HR-7-SUB-0.17-1 were U qualified as not detected at the reported concentrations and the concentrations in samples DUP-01 and SSHS-HR-3-SUB-0.17-1 were J+ qualified as estimated with high biases.

PFHxS and FOSA were detected in the method blank in batch 378738 at estimated concentrations greater than the MDLs and less than the RLs. Since FOSA was not detected in the associated sample, no qualifications were applied to the FOSA data. However, the estimated PFHxS concentration in the associated sample was U qualified as not detected at the RL.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-HR-5-SUB-0.17-1	Perfluorobutanoic acid (PFBA)	1.9	J,B	2.7	U	3
SSHS-HR-9-SUB-0.17-1	Perfluorobutanoic acid (PFBA)	1.0	J,B	2.3	U	3
SSHS-HR-1-SUB-0.17-1	Perfluorobutanoic acid (PFBA)	0.53	B	0.53	U	3
DUP-01	Perfluorobutanoic acid (PFBA)	0.81	B	0.81	J+	3
SSHS-HR-3-SUB-0.17-1	Perfluorobutanoic acid (PFBA)	0.77	B	0.77	J+	3
SSHS-HR-7-SUB-0.17-1	Perfluorobutanoic acid (PFBA)	0.50	B	0.50	U	3

µg/kg-micrograms per kilogram
J-the result is less than the RL but greater than the MDL and the concentration is an approximate value
B-laboratory flag indicating the analyte was found in the blank and the sample
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

Sample	Analyte	Laboratory Result (ng/L)	Laboratory Flag	Validation Result (ng/L)	Validation Qualifier	Reason Code
EB-01	Perfluorohexane-sulfonic acid (PFHxS)	0.22	J,B	1.6	U	3

ng/L-nanograms per liter
J-the result is less than the RL but greater than the MDL and the concentration is an approximate value
B-laboratory flag indicating the analyte was found in the blank and the sample

1.6 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-HR-1-SUB-0.17-1. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exception.

The MSD recovery of PFUnA was high and outside the laboratory specified acceptance criteria. Therefore, the PFUnA concentration in sample SSHS-HR-1-SUB-0.17-1 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-HR-1-SUB-0.17-1	Perfluoroundecanoic acid (PFUnA)	0.11	J,F1	0.11	J	4

µg/kg-micrograms per kilogram
J-the result is less than the RL but greater than the MDL and the concentration is an approximate value
F1- laboratory flag indicating the MS and/or MSD was outside acceptance criteria

DRAFT

1.7 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCS duplicate (LCSD) pair were reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

1.8 Equipment Blank

One equipment blank was collected with the sample set, EB-01. PFAS were not detected in the equipment blank above the MDLs, with the following exceptions.

PFPeA, PFTeA and PFHxS were detected in the equipment blank at an estimated concentrations greater than the MDLs and less than the RLs. Since the concentration of PFHxS in the equipment blank was U qualified as not detected at the RL due to the method blank contamination, no additional qualifications were applied to the PFHxS data. Additionally, the soil equivalent concentrations of PFPeA and PFTeA in the equipment blank were less than the soil MDLs; therefore, no qualifications were applied to the PFPeA and PFTeA data.

1.9 Field Duplicate

One field duplicate sample was collected with the sample set, DUP-01. Acceptable precision (RPD ≤50% for solid samples if both results are greater than five times the quantitation limit) was demonstrated between the field duplicate sample and the original sample, SSHS-HR-3-SUB-0.17-1, with the following exceptions.

PFHpA was detected in the in the field duplicate sample at concentration greater than the RL and in sample SSHS-HR-3-SUB-0.17-1 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD between the results. Therefore, based on professional and technical judgment, the PFHpA concentrations in the field duplicate pair were J qualified as estimated.

PFHxS and PFUnA were detected in one sample in the field duplicate pair at estimate concentrations greater than the MDLs and less than the RLs and not detected in the other sample, resulting in a noncalculable RPD between the results. Therefore, based on professional and technical judgment, the PFHxS and PFUnA concentrations in the field duplicate pair were J qualified as estimated and the non-detect results were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-01	Perfluoroheptanoic acid (PFHpA)	0.23	NA	NC	0.23	J	7

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-HR-3-SUB-0.17-1	Perfluoroheptanoic acid (PFHpA)	0.24	J		0.24	J	7
DUP-01	Perfluorohexane-sulfonic acid (PFHxS)	0.036	U	NC	0.036	UJ	7
SSHS-HR-3-SUB-0.17-1	Perfluorohexane-sulfonic acid (PFHxS)	0.041	J		0.041	J	7
DUP-01	Perfluoroun-decanoic acid (PFUnA)	0.10	J	NC	0.10	J	7
SSHS-HR-3-SUB-0.17-1	Perfluoroun-decanoic acid (PFUnA)	0.044	U		0.044	UJ	7

µg/kg-micrograms per kilogram
J-the result is less than the RL but greater than the MDL and the concentration is an approximate value -
U-analyte was not detected at the value indicated
NA-not applicable
NC-not calculable

1.10 Isotope Dilution Standards

The isotope dilution standard recoveries in the samples were within the laboratory specified acceptance criteria, with the following exceptions.

	Sample ID	Isotope Dilution Compound	Result (%)	Lower Control Limit (%)	Upper Control Limit (%)
13	SSHS-HR-1-SUB-0.17-1	M2-6:2 FTS	169	25	150
13	SSHS-HR-1-SUB-0.17-1	M2-8:2 FTS	236	25	150
15	SSHS-HR-3-SUB-0.17-1	M2-6:2 FTS	169	25	150
15	SSHS-HR-3-SUB-0.17-1	M2-8:2 FTS	226	25	150
17	SSHS-HR-5-SUB-0.17-1	M2-8:2 FTS	151	25	150
19	SSHS-HR-7-SUB-0.17-1	M2-6:2 FTS	242	25	150
19	SSHS-HR-7-SUB-0.17-1	M2-8:2 FTS	301	25	150
21	SSHS-HR-9-SUB-0.17-1	M2-6:2 FTS	153	25	150
21	SSHS-HR-9-SUB-0.17-1	M2-8:2 FTS	180	25	150
23	SSHS-HR-11-SUB-0.17-1	M2-6:2 FTS	197	25	150
23	SSHS-HR-11-SUB-0.17-1	M2-8:2 FTS	233	25	150
25	DUP-01	M2-6:2 FTS	286	25	150
25	DUP-01	M2-8:2 FTS	335	25	150

%-percent

DRAFT

Therefore, the non-detect 6:2-FTS and/or 8:2-FTS results in the affected samples were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Qualifier	Reason Code
SSHS-HR-11-SUB-0.17-1	6:2 FTS	3.7	U	3.7	UJ	11
SSHS-HR-11-SUB-0.17-1	8:2 FTS	6.2	U	6.2	UJ	11
SSHS-HR-1-SUB-0.17-1	6:2 FTS	0.18	U	0.18	UJ	11
SSHS-HR-1-SUB-0.17-1	8:2 FTS	0.30	U	0.30	UJ	11
DUP-01	6:2 FTS	0.17	U	0.17	UJ	11
SSHS-HR-3-SUB-0.17-1	6:2 FTS	0.19	U	0.19	UJ	11
DUP-01	8:2 FTS	0.29	U	0.29	UJ	11
SSHS-HR-3-SUB-0.17-1	8:2 FTS	0.31	U	0.31	UJ	11
SSHS-HR-5-SUB-0.17-1	8:2 FTS	3.4	U	3.4	UJ	11
SSHS-HR-7-SUB-0.17-1	6:2 FTS	0.17	U	0.17	UJ	11
SSHS-HR-7-SUB-0.17-1	8:2 FTS	0.28	U	0.28	UJ	11
SSHS-HR-9-SUB-0.17-1	6:2 FTS	1.7	U	1.7	UJ	11
SSHS-HR-9-SUB-0.17-1	8:2 FTS	2.9	U	2.9	UJ	11

µg/kg-micrograms per kilogram
U-analyte was not detected at the value indicated

1.11 Internal Standards

The internal standard areas were within the method specified acceptance criteria.

1.12 Target Compound Identifications

The compound identifications were within the validation guidance, with the following exceptions.

The narrative indicated that there were chromatographic interferences for PFPeA in samples SSHS-HR-1-SUB-0.17-1, SSHS-HR-3-SUB-0.17-1, SSHS-HR-7-SUB-0.17-1 and DUP-01 that could have adversely affected the identification and quantification of PFPeA. Review of the sample chromatograms confirmed the chromatographic interferences. Therefore, based on professional and technical judgment, the PFPeA concentrations in these four samples were J qualified as estimated.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-HR-1-SUB-0.17-1	Perfluoropentanoic acid (PFPeA)	0.16	J,CI	0.16	J	13
DUP-01	Perfluoropentanoic acid (PFPeA)	0.22	J,CI	0.22	J	13
SSHS-HR-3-SUB-0.17-1	Perfluoropentanoic acid (PFPeA)	0.2	J,CI	0.2	J	13
SSHS-HR-7-SUB-0.17-1	Perfluoropentanoic acid (PFPeA)	0.14	J,CI	0.14	J	13

µg/kg-micrograms per kilogram
J-the result is less than the RL but greater than the MDL and the concentration is an approximate value
C1- laboratory flag indicating the peak identified by the data system exhibited chromatographic interference that could not be resolved; there is reason to suspect there may be a high bias

1.13 Target Compound Quantitation

The compound quantitations were within the validation guidance.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were due to sample dilutions.

1.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date: 29 October 2020

To: Ron Arcuri

From: Mary Tyler

CC: J. Caprio

Subject: Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-108931-1

SITE: Former Sperry Remington Site-North

INTRODUCTION

This report summarizes the findings of the Stage 4 data validations of twenty-eight solid samples, including one sample for matrix spike/matrix spike duplicate (MS/MSD) analyses, and three field duplicate samples, collected July 29-30, 2020, as part of the Former Sperry Remington Site-North sampling event. The samples were submitted to Eurofins TestAmerica (ETA), Pittsburgh, Pennsylvania for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA Methods 3541/8270D
- Diesel Range Organics (DRO) by USEPA Methods 3546/8015D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A
- Metals by USEPA Methods 3050B/6010C
- Mercury by USEPA Method 7471B
- (PFAS) by USEPA Modified Method 537
- Percent Solids by Standard Method (SM) 2540G

The DRO analyses were performed at ETA, Canton, Ohio and the PFAS analyses were performed at ETA, West Sacramento, California. The remaining analyses were performed at ETA Pittsburgh, Pennsylvania.

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives, with the following exceptions.

DRAFT

The non-detect results of 1,4-dioxane in the samples for the VOC analysis were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and based on technical and professional judgment.

The non-detect results of 2,4-dinitrophenol and 3,3'-dichlorobenzidine results in sample SSHS-B3134-SUB-0.17-2 were R qualified as rejected due to no MS/MSD recoveries (0%).

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-001)
- US EPA Contract Laboratory Program National Functional Guidelines for High Resolution Superfund Organic Methods Data Review, April 2016 (USEPA-542-B-2016-001)
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-108931-1	SSHS-B3154-SUB-2-4
180-108931-2	SSHS-B3143-SUB-4-6
180-108931-3	SSHS-B3143-SUB-6-8
180-108931-4	SSHS-B3143-SUB-8-10
180-108931-5	SSHS-B3143-SUB-10-12
180-108931-6	SSHS-B3144-SUB-0.17-2
180-108931-7	SSHS-B3135-SUB-8-10
180-108931-8	SSHS-B3135-SUB-10-12
180-108931-9	SSHS-B3134-SUB-0.17-2
180-108931-9 MS	SSHS-B3134-SUB-0.17-2 MS
180-108931-9 MSD	SSHS-B3134-SUB-0.17-2 MSD
180-108931-10	SSHS-B3134-SUB-2-4
180-108931-11	SSHS-B3134-SUB-4-6
180-108931-12	SSHS-B3134-SUB-6-8
180-108931-13	SSHS-B3134-SUB-8-10
180-108931-14	SSHS-B3134-SUB-10-12

Laboratory ID	Client ID
180-108931-15	SSHS-B3134-SUB-12-14
180-108931-16	SSHS-B3134-SUB-14-16
180-108931-17	SSHS-B3134-SUB-16-18
180-108931-18	SSHS-B3134-SUB-18-20
180-108931-19	SSHS-B3133-SUB-0.17-2
180-108931-20	SSHS-B3133-SUB-2-4
180-108931-21	SSHS-B3133-SUB-4-6
180-108931-22	SSHS-B3133-SUB-6-8
180-108931-23	SSHS-B3133-SUB-8-10
180-108931-24	SSHS-B3133-SUB-10-12
180-108931-25	SSHS-B3133-SUB-12-14
180-108931-26	SSHS-B3133-SUB-14-16
180-108931-27	SSHS-B3133-SUB-16-18
180-108931-28	DUP01
180-108931-29	DUP06
180-108931-30	DUP17
180-108931-31	SSHS-B3473-SUB-0.17-2

DRAFT

The samples were received at the laboratories within the QAPP criteria of ≤ 6ºC.

Incorrect error correction was observed on the chain of custody (COC), instead of the proper procedure of a single strike through, correction, and initials and date of person making the correction.

The receiving dates documented on the original COC did not include the year.

The COCs from ETA, Canton, Ohio and ETA, West Sacramento, California were not included in the laboratory report; they were sent by email from the laboratory to the data validator.

The narrative noted the following changes made by the client after laboratory receipt:

- Sample SSHS-B3134-0.17-2: Remove metals analyses
- Sample SSHS-B3134-0.17-2 MS/MSD: Analyze the MS/MSD for PFAS
- Samples SSHS-B3134-18-20 and SSHS-B3133-16-18: Report 1,4-dioxane only from the SVOC analysis

The solids data, used to report the samples on a dry weight basis, were not validated.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per EPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation

DRAFT

- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this laboratory report are considered to be usable for meeting project objectives, with the following exceptions. The non-detect results of 1,4-dioxane in the samples were R qualified as rejected due to low RRFs in the initial calibrations and based on technical and professional judgment.

Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this laboratory report is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample is 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the percent relative standard deviations (%RSDs) of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exception.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C. The current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. The average RRFs for 1,4-dioxane in the initial calibration was 0.0027, less than 0.010. Therefore, based on professional and technical judgment and average RRF less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
DUP06	1,4-Dioxane	44	U	44	R	9
DUP17	1,4-Dioxane	41	U	41	R	9
SSHS-B3133-SUB-0.17-2	1,4-Dioxane	39	U	39	R	9
SSHS-B3133-SUB-10-12	1,4-Dioxane	43	U	43	R	9
SSHS-B3133-SUB-12-14	1,4-Dioxane	42	U	42	R	9
SSHS-B3133-SUB-14-16	1,4-Dioxane	41	U	41	R	9
SSHS-B3133-SUB-16-18	1,4-Dioxane	54	U	54	R	9
SSHS-B3133-SUB-2-4	1,4-Dioxane	37	U	37	R	9
SSHS-B3133-SUB-4-6	1,4-Dioxane	38	U	38	R	9
SSHS-B3133-SUB-6-8	1,4-Dioxane	40	U	40	R	9
SSHS-B3133-SUB-8-10	1,4-Dioxane	41	U	41	R	9
SSHS-B3134-SUB-0.17-2	1,4-Dioxane	38	U	38	R	9
SSHS-B3134-SUB-10-12	1,4-Dioxane	39	U	39	R	9
SSHS-B3134-SUB-12-14	1,4-Dioxane	54	U	54	R	9
SSHS-B3134-SUB-14-16	1,4-Dioxane	44	U	44	R	9
SSHS-B3134-SUB-16-18	1,4-Dioxane	43	U	43	R	9
SSHS-B3134-SUB-18-20	1,4-Dioxane	44	U	44	R	9
SSHS-B3134-SUB-2-4	1,4-Dioxane	38	U	38	R	9
SSHS-B3134-SUB-4-6	1,4-Dioxane	41	U	41	R	9
SSHS-B3134-SUB-6-8	1,4-Dioxane	40	U	40	R	9
SSHS-B3134-SUB-8-10	1,4-Dioxane	37	U	37	R	9
SSHS-B3135-SUB-10-12	1,4-Dioxane	41	U	41	R	9
SSHS-B3143-SUB-10-12	1,4-Dioxane	42	U	42	R	9
SSHS-B3144-SUB-0.17-2	1,4-Dioxane	40	U	40	R	9
SSHS-B3473-SUB-0.17-2	1,4-Dioxane	42	U	42	R	9

µg/kg-micrograms per kilogram
U-not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were R qualified as rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent difference (%D) of dichlorodifluoromethane (32.3%) in the CCV in batch 324077 was high and outside the laboratory specified acceptance criteria, with a high bias. Since

dichlorodifluoromethane was not detected in the associated samples, no qualifications were applied to the data

The %Ds of dichlorodifluoromethane (31.8%), trichlorofluoromethane (24.2%), acetone (24.9%) and 1,2-dibromo-3-chloropropane (22.4%) in the CCV in batch 324236 were high and outside the laboratory specified acceptance criteria, with low biases. Since the %Ds were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

1.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 323975, 324077 and 324236). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-B3473-SUB-0.17-2. The recovery and relative percent difference (RPD) results were within the QAPP/FSP specified acceptance criteria.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and two LCS/LCS duplicate (LCSD) pairs were reported. The recovery and relative percent difference (RPD) results were within the QAPP/FSP specified acceptance criteria, with the following exceptions.

The batch 324077 RPD of trichlorofluoromethane and the batch 324236 RPD of carbon disulfide were high and outside the laboratory specified acceptance criteria. Since trichlorofluoromethane and carbon disulfide were not detected in the associated samples, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Trip Blank

A trip blank was not submitted with the sample set.

DRAFT

1.11 Field Duplicate

Two field duplicate samples were collected with the sample set and analyzed for VOCs, DUP06 and DUP17. Information from the client indicated that a field sample was not associated with field duplicate DUP17. Acceptable precision (RPD ≤50% for results greater than five times the quantitation limit) was demonstrated between field duplicate DUP06 and the original sample, SSHS-B3473-SUB-0.17-2.

1.12 Internal Standards

The internal standard areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per EPA Methods 3541/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check

DRAFT

- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ⊗ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC data reported in this laboratory report are considered to be usable for meeting project objectives, with the following exceptions. Due to no MS/MSD recoveries (0%) of 2,4-dinitrophenol and 3,3'-dichlorobenzidine, the non-detect 2,4-dinitrophenol and 3,3'-dichlorobenzidine results in sample SSHS-B3134-SUB-0.17-2 were R qualified as rejected.

Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this laboratory report is 99.4%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSDs of the RRFs or used curve fits.

DRAFT

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method specified acceptance criteria, with the following exceptions.

The %D for pentachlorophenol in batch 324943 was high and outside the method specified acceptance criteria, with a high bias. Since pentachlorophenol was not detected in the associated sample, no qualifications were applied to the data.

The %Ds for di-n-octyl phthalate in batches 324246 and 324256 were high and outside the method specified acceptance criteria, with high biases. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 323970 and 324805). SVOCs were not detected in the method blanks above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-B3134-SUB-0.17-2. The recovery and RPD results were within the QAPP/FSP specified acceptance criteria, with the following exceptions.

One or both of the recoveries of 4-chloroaniline, 2,4-dimethylphenol, 4,6-dinitro-2-methylphenol, hexachlorocyclopentadiene and pentachlorophenol were low and outside the laboratory specified acceptance criteria. Therefore, the non-detect 4-chloroaniline, 2,4-dimethylphenol, 4,6-dinitro-2-methylphenol, hexachlorocyclopentadiene and pentachlorophenol results in sample SSHS-B3134-SUB-0.17-2 were UJ qualified as estimated less than the MDLs.

In addition, there were no recoveries (0%) of 2,4-dinitrophenol and 3,3'-dichlorobenzidine. Therefore, the non-detect 2,4-dinitrophenol and 3,3'-dichlorobenzidine results in sample SSHS-B3134-SUB-0.17-2 were R qualified as rejected.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3134-SUB-0.17-2	2,4-Dimethylphenol	6.7	U,F1	6.7	UJ	4
SSHS-B3134-SUB-0.17-2	2,4-Dinitrophenol	600	U,F1	600	R	4
SSHS-B3134-SUB-0.17-2	3,3'-Dichlorobenzidine	100	U,F1	100	UJ	4
SSHS-B3134-SUB-0.17-2	4,6-Dinitro-2-methylphenol	190	U,F1	190	UJ	4
SSHS-B3134-SUB-0.17-2	4-Chloroaniline	7.3	U,F1	7.3	UJ	4
SSHS-B3134-SUB-0.17-2	Hexachlorocyclo-pentadiene	11	U,F1	11	R	4
SSHS-B3134-SUB-0.17-2	Pentachlorophenol	170	U,F1	170	UJ	4

µg/kg-micrograms per kilogram
U-not detected at or above the MDL

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP/FSP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

The surrogates were diluted out of samples SSHS-B3133-SUB-0.17-2 and SSHS-B3133-SUB-14-16. Based on professional and technical judgment and the dilutions analyzed, no qualifications were applied to the data.

2.10 Field Duplicate

Field duplicate samples were collected with the sample set, but not analyzed for SVOCs.

2.11 Internal Standards

The internal standard areas and retention times were within the method specified acceptance criteria, with the following exceptions.

The recoveries of perylene-d12 in samples SSHS-B3154-SUB-2-4 and SSHS-B3133-SUB-14-16 were high and outside the method specified acceptance criteria. Therefore, the associated SVOC

DRAFT

concentrations in these two samples were J- qualified as estimated with low biases and the estimated benzo[k]fluoranthene concentration in sample SSHS-B3154-SUB-2-4 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3154-SUB-2-4	Benzo[a]pyrene	86	*3	86	J-	11
SSHS-B3154-SUB-2-4	Benzo[b]fluoranthene	120	*3	120	J-	11
SSHS-B3154-SUB-2-4	Benzo[g,h,i]perylene	100	*3	100	J-	11
SSHS-B3154-SUB-2-4	Benzo[k]fluoranthene	35	J,*3	35	J	11
SSHS-B3154-SUB-2-4	Indeno[1,2,3-cd]pyrene	68	*3	68	J-	11

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
*3- laboratory flag indicating the internal standard response was outside acceptable limits

2.12 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported for the samples due to dilutions analyzed. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 DIESEL RANGE ORGANIC

The samples were analyzed for DRO (C10-C28) per EPA Methods 3546/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues

DRAFT

were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ⊗ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The DRO data reported in this laboratory report are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this laboratory report is 100%.

3.2 Holding Times

The holding times for the DRO analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for DRO. The laboratory calculated %RSDs of the calibration factors (CFs). The %RSDs of DRO were within the method and laboratory specified acceptance criteria.

3.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The %Ds between the CFs in the initial calibration and the ICVs and CCVs for DRO were within the method and laboratory specified acceptance criteria, with the following exceptions.

DRAFT

The %D of surrogate o-terphenyl was high and outside the laboratory specified acceptance criteria, with a high bias, in the opening CCV in batch 446138; the blank and LCS from extraction batch 445700 were analyzed in this analytical batch. Since the surrogate recoveries in these two QC samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

3.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 445700, 445990 and 446528). DRO were not detected in the method blanks above the MDL.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the QAPP/FSP specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

Field duplicate samples were collected with the sample set, but not analyzed for DRO.

3.10 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

3.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.12 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria were not listed in Table 1 of the QAPP for DRO.

DRAFT

3.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by EPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
⊗ Surrogates
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
⊗ Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

4.1 Overall Assessment

The PCBs data reported in this laboratory report are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this laboratory report is 100%.

4.2 Holding Times

The holding times for the PCB analysis of a solid sample is 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

4.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method specified acceptance criteria, with the following exceptions.

The %D for PCB 1221 was high and outside the method specified acceptance criteria in the CCV analyzed on GC CHGC8, column RTX-CLP-1, 8/14/2020, 4:43, with a low bias. Since the %D on the other GC column was withing the method specified acceptance criteria, no qualifications were applied to the data.

4.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Five method blanks were reported (batches 324149, 324623, 324663, 324668 and 325470). PCBs were not detected in the method blanks above the MDLs.

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Five LCSs were reported. The recovery results were within the QAPP/FSP specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of surrogate decachlorobiphenyl on both gas chromatography (GC) columns and tetrachloro-m-xylene on GC column RTX-CLP1 were high and outside the laboratory specified acceptance criteria in sample SSHS-B3143-SUB-4-6. Therefore, based on professional and

DRAFT

technical judgment, the PCB 1248, 1254 and 1260 concentrations in sample SSHS-B3143-SUB-4-6 were J+ qualified as estimated with high biases.

The recovery of decachlorobiphenyl on GC column RTX-CLP2 was high and outside the outside the laboratory specified acceptance criteria in sample SSHS-B3134-SUB-4-6. Based on professional and technical judgment and because the other surrogate recoveries were acceptable, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3143-SUB-4-6	PCB-1248	560	NA	560	J+	6
SSHS-B3143-SUB-4-6	PCB-1254	200	NA	200	J+	6
SSHS-B3143-SUB-4-6	PCB-1260	66	NA	66	J+	6

µg/kg-micrograms per kilogram
NA-not applicable

4.9 Field Duplicate

Field duplicate samples were collected with the sample set, but not analyzed for PCBs

4.10 Internal Standards

The internal standard areas and retention times were within the laboratory specified acceptance criteria.

4.11 Target Compound Identification

The target compound identifications were within the validation criteria.

4.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

The PCB 1260 concentration in sample SSHS-B3134-SUB-6-8 was flagged by the laboratory with p, to indicate the %RPD between the two GC columns was greater than 40%; the lower value was reported. Therefore, based on professional and technical judgement, the PCB 1260 concentration in this sample was J qualified as estimated.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3133-SUB-10-12	PCB-1248	870	NA	870	J	13
SSHS-B3133-SUB-10-12	PCB-1254	770	NA	770	J	13
SSHS-B3133-SUB-10-12	PCB-1260	140	NA	140	J	13
SSHS-B3133-SUB-12-14	PCB-1248	1200	NA	1200	J	13
SSHS-B3133-SUB-12-14	PCB-1254	1000	NA	1000	J	13
SSHS-B3133-SUB-12-14	PCB-1260	190	NA	190	J	13
SSHS-B3133-SUB-14-16	PCB-1248	44	NA	44	J	13
SSHS-B3133-SUB-14-16	PCB-1254	30	NA	30	J	13
SSHS-B3133-SUB-14-16	PCB-1260	13	J	13	J	13
SSHS-B3133-SUB-16-18	PCB-1248	350	NA	350	J	13
SSHS-B3133-SUB-16-18	PCB-1254	360	NA	360	J	13
SSHS-B3133-SUB-16-18	PCB-1260	57	NA	57	J	13
SSHS-B3133-SUB-2-4	PCB-1248	3000	NA	3000	J	13
SSHS-B3133-SUB-2-4	PCB-1254	2600	NA	2600	J	13
SSHS-B3133-SUB-2-4	PCB-1260	460	NA	460	J	13
SSHS-B3133-SUB-4-6	PCB-1248	1600	NA	1600	J	13
SSHS-B3133-SUB-4-6	PCB-1254	990	NA	990	J	13
SSHS-B3133-SUB-4-6	PCB-1260	190	NA	190	J	13
SSHS-B3133-SUB-6-8	PCB-1248	170	NA	170	J	13
SSHS-B3133-SUB-6-8	PCB-1254	140	NA	140	J	13
SSHS-B3133-SUB-6-8	PCB-1260	26	NA	26	J	13
SSHS-B3133-SUB-8-10	PCB-1248	19000	NA	19000	J	13
SSHS-B3133-SUB-8-10	PCB-1254	13000	NA	13000	J	13
SSHS-B3133-SUB-8-10	PCB-1260	3300	NA	3300	J	13
SSHS-B3134-SUB-10-12	PCB-1248	8100	NA	8100	J	13
SSHS-B3134-SUB-10-12	PCB-1254	4400	NA	4400	J	13
SSHS-B3134-SUB-10-12	PCB-1260	680	NA	680	J	13
SSHS-B3134-SUB-14-16	PCB-1248	5400	NA	5400	J	13
SSHS-B3134-SUB-14-16	PCB-1254	4200	NA	4200	J	13
SSHS-B3134-SUB-14-16	PCB-1260	650	NA	650	J	13
SSHS-B3134-SUB-16-18	PCB-1248	3500	NA	3500	J	13
SSHS-B3134-SUB-16-18	PCB-1254	2500	NA	2500	J	13
SSHS-B3134-SUB-16-18	PCB-1260	410	NA	410	J	13
SSHS-B3134-SUB-18-20	PCB-1248	2300	NA	2300	J	13
SSHS-B3134-SUB-18-20	PCB-1254	1700	NA	1700	J	13
SSHS-B3134-SUB-18-20	PCB-1260	270	NA	270	J	13
SSHS-B3134-SUB-2-4	PCB-1248	5900	NA	5900	J	13
SSHS-B3134-SUB-2-4	PCB-1254	3600	NA	3600	J	13
SSHS-B3134-SUB-2-4	PCB-1260	520	NA	520	J	13
SSHS-B3134-SUB-4-6	PCB-1248	2600	NA	2600	J	13
SSHS-B3134-SUB-4-6	PCB-1254	1400	NA	1400	J	13
SSHS-B3134-SUB-4-6	PCB-1260	250	NA	250	J	13

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3134-SUB-6-8	PCB-1248	3000	NA	3000	J	13
SSHS-B3134-SUB-6-8	PCB-1254	1600	NA	1600	J	13
SSHS-B3134-SUB-6-8	PCB-1260	210	p	210	J	13
SSHS-B3134-SUB-8-10	PCB-1248	3100	NA	3100	J	13
SSHS-B3134-SUB-8-10	PCB-1254	1600	NA	1600	J	13
SSHS-B3134-SUB-8-10	PCB-1260	230	NA	230	J	13
SSHS-B3143-SUB-10-12	PCB-1248	280	NA	280	J	13
SSHS-B3143-SUB-10-12	PCB-1254	140	NA	140	J	13
SSHS-B3143-SUB-10-12	PCB-1260	62	NA	62	J	13
SSHS-B3143-SUB-4-6	PCB-1248	560	NA	560	J	13
SSHS-B3143-SUB-4-6	PCB-1254	200	NA	200	J	13
SSHS-B3143-SUB-4-6	PCB-1260	66	NA	66	J	13
SSHS-B3143-SUB-6-8	PCB-1248	710	NA	710	J	13
SSHS-B3143-SUB-6-8	PCB-1254	280	NA	280	J	13
SSHS-B3143-SUB-6-8	PCB-1260	84	NA	84	J	13
SSHS-B3143-SUB-8-10	PCB-1248	30	NA	30	J	13
SSHS-B3143-SUB-8-10	PCB-1254	100	NA	100	J	13

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
p-laboratory flag indicating the RPD between the two GC columns was greater than 40%
NA-not applicable

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported due to the dilutions analyzed. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

5.0 METALS

The samples were analyzed for metals per EPA methods 3050B/6010C. (Mercury was evaluated separately in Section 6.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ✓ Serial Dilution
- ✓ Laboratory Control Sample
- ✓ Internal Standard
- ✓ Field Duplicate
- ✓ Analyte Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

5.1 Overall Assessment

The metals data reported in this laboratory report are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this laboratory report is 100%.

5.2 Holding Times

The holding time for the total metals analysis of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

5.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria, with the following exception.

DRAFT

Vanadium was detected in the CCB analyzed on 8/10/20, 17:30, at an estimated concentration greater than the MDL and less than the RL. Since the vanadium concentrations in the associated samples were greater than the RL, no qualifications were applied to the data.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 324132 and 324141). Metals were not detected in the method blanks above the MDLs.

5.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs and post digestion spikes (PDSs) were reported, using samples SSHS-B3135-SUB-10-12 and SSHS-B3134-SUB-8-10. The recovery and RPD results were within the QAPP/FSP specified acceptance criteria, with the following exceptions.

One or both of the recoveries of antimony, barium, chromium, magnesium, nickel and vanadium in the MS/MSD pair using sample SSHS-B3135-SUB-10-12 were low and outside the QAPP specified acceptance criteria. In addition, the barium RPD was high and outside the QAPP specified acceptance criteria. Therefore, the non-detect antimony result in sample SSHS-B3135-SUB-10-12 was UJ qualified as estimated less than the MDL and the barium, chromium, magnesium, nickel and vanadium concentrations were J qualified as estimated. In addition, the MS recovery and RPD of silver were high and outside the QAPP specified acceptance criteria. Therefore, the silver concentration in sample SSHS-B3135-SUB-10-12 was J qualified as estimated.

The recoveries of aluminum, calcium, iron and manganese in the MS/MSD using sample SSHS-B3135-SUB-10-12 were flagged with 4, to indicate the concentrations in the unspiked sample exceeded the spike concentrations by factors of four or greater; therefore, the spike recovery acceptance criteria do not apply and qualification of the data was not required.

One or both of the recoveries of antimony, copper, magnesium and nickel in the MS/MSD pair using sample SSHS-B3134-SUB-8-10 were low and outside the QAPP specified acceptance criteria. Therefore, the antimony, copper, magnesium and nickel concentrations in sample SSHS-B3134-SUB-8-10 were J qualified as estimated. In addition, the MSD recovery of barium was high and outside the QAPP specified acceptance criteria. Therefore, the barium concentration in sample SSHS-B3134-SUB-8-10 was J qualified as estimated.

The recoveries of aluminum, calcium, iron, zinc, lead and manganese in the MS/MSD using sample SSHS-B3134-SUB-8-10 were flagged with 4, to indicate the concentrations in the unspiked

DRAFT

sample exceeded the spike concentrations by factors of four or greater; therefore, the spike recovery acceptance criteria do not apply and qualification of the data was not required.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3135-SUB-10-12	Antimony	0.32	U,F1	0.32	UJ	4
SSHS-B3135-SUB-10-12	Barium	140	F1,F2	140	J	4
SSHS-B3135-SUB-10-12	Chromium	22	F1	22	J	4
SSHS-B3135-SUB-10-12	Magnesium	4000	F1	4000	J	4
SSHS-B3135-SUB-10-12	Nickel	35	F1	35	J	4
SSHS-B3135-SUB-10-12	Sodium	510	F1,F2	510	J	4
SSHS-B3135-SUB-10-12	Vanadium	15	F1	15	J	4
SSHS-B3134-SUB-8-10	Barium	370	F1	370	J	4
SSHS-B3134-SUB-8-10	Copper	120	F1	120	J	4
SSHS-B3134-SUB-8-10	Magnesium	3100	F1	3100	J	4
SSHS-B3134-SUB-8-10	Nickel	47	F1	47	J	4
SSHS-B3134-SUB-8-10	Antimony	0.94	J,F1	0.94	J	4

mg/kg-milligrams per kilogram
U-not detected at or above the MDL
J-estimated concentration greater than the MDL and less than the RL
F1-laboratory flag indicating MS/MSD recovery was outside the limits
F2- laboratory flag indicating MS/MSD RPD was outside the limits

5.8 Serial Dilution

Two sample set specific serial dilutions were reported using samples SSHS-B3135-SUB-10-12 and SSHS-B3134-SUB-8-10. The %D results were within the method specified acceptance criteria.

5.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP/FSP specified acceptance criteria.

5.10 Internal Standard

The internal standard recoveries were within the laboratory specified acceptance criteria.

DRAFT

5.11 Field Duplicate

Field duplicate samples were collected with the sample set, but not analyzed for metals.

5.12 Analyte Quantitation

The analyte quantitations were within the validation criteria.

5.13 Sensitivity

The samples were reported to the MDLs. No elevated non-detect results were reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

5.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

6.0 MERCURY

The samples were analyzed for mercury per EPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Analyte Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

6.1 Overall Assessment

The mercury data reported in this laboratory report are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this laboratory report is 100%.

6.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

6.3 Initial Calibration

The method specified initial calibration requirements were met.

6.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

6.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 325099 and 325105). Mercury was not detected in the method blanks above the MDL.

6.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-B3473-SUB-0.17-2. The recovery and RPD results were within the QAPP/FSP specified acceptance criteria.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP/FSP specified acceptance criteria.

DRAFT

6.9 Field Duplicate

Field duplicate samples were collected with the sample set, but not analyzed for mercury.

6.10 Analyte Quantitation

The analyte quantitations were within the validation criteria.

6.11 Sensitivity

The samples were reported to the MDLs. No elevated non-detect results were reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

6.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

7.0 PFAS

The samples were analyzed for PFAS per USEPA methods 537.1 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA

DRAFT

Analyte	Acronym
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

✓ Overall Assessment
✓ Holding Time
✓ Initial Calibration
✓ Initial and Continuing Calibration Verification
⊗ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
⊗ Field Duplicate
⊗ Isotope Dilution Standards
✓ Internal Standards
✓ Target Compound Identifications
⊗ Target Compound Quantitations
⊗ Sensitivity
✓ Electronic Data Deliverable Review

7.1 Overall Assessment

The PFAS data reported in this laboratory report are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this laboratory report is 100%.

DRAFT

7.2 Holding Time

The laboratory-specified holding times for the for the PFAS analyses of a solid sample are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

7.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The RRFs' relative standard deviations (RSDs) were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

7.4 Initial Calibration Verification and Continuing Calibration Verification

The ICVs and CCVs were performed at the required frequencies. The percent differences (%Ds) between the calculated concentrations in the initial calibration and the ICVs and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

7.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 400499). PFAS were not detected in the method blank above the method detection limits (MDLs), with the following exception.

PFOS was detected in the method blank at an estimated concentration greater than the MDL and less than the reporting limit (RL). Therefore, the estimated PFOS concentration in sample SSHS-B3134-SUB-18-20 was U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3134-SUB-18-20	Perfluorooctanesulfonic acid (PFOS)	0.23	J,B	0.56	U	3

µg/kg-micrograms per kilogram
J-the result is less than the RL but greater than the MDL and the concentration is an approximate value
B-laboratory flag indicating the analyte was found in the blank and the sample

7.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using

engineers | scientists | innovators

DRAFT

sample SSHS-B3134-SUB-0.17-2. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exceptions.

The MSD recovery of PFOS and the MS/MSD recoveries of PFUnA were high and outside the laboratory specified acceptance criteria. Since PFUnA were not detected in sample SSHS-B3134-SUB-0.17-2, no qualifications were applied to the data. However, the PFOS concentration in sample SSHS-B3134-SUB-0.17-2 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3134-SUB-0.17-2	Perfluorooctanesulfonic acid (PFOS)	1.1	B,F1	1.1	J	4

µg/kg-micrograms per kilogram
F1- laboratory flag indicating MS/MSD recovery was outside the limits
B-laboratory flag indicating the analyte was found in the blank and the sample

7.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria.

7.8 Field Duplicate

One field duplicate sample was collected with the sample set and analyzed for PFAS, DUP01. Acceptable precision (RPD $\leq$50% for solid samples if both results are greater than five times the quantitation limit) was demonstrated between the field duplicate sample and the original sample, SSHS-B3133-SUB-0.17-2, with the following exceptions.

PFBA was detected in the field duplicate sample and not detected in the original sample, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the PFBA concentration in field duplicate DUP01 was J qualified as estimated and the non-detect PFBA result in sample SSHS-B3133-SUB-0.17-2 was UJ qualified as estimated less than the MDL.

PFDoA, PFOS, PFTriA and PRUnA were detected in sample SSHS-B3133-SUB-0.17-2 and not detected in field duplicate DUP01, resulting in noncalculable RPDs. However, due to the differences in the dilutions analyzed and the resulting differences in the MDLs, no qualifications were applied to the PFDoA, PFOS, PFTriA and PRUnA data.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP01	Perfluorobutanoic acid (PFBA)	6.6	NA	NC	6.6	J	7
SSHS-B3133-SUB-0.17-2	Perfluorobutanoic acid (PFBA)	0.62	U		0.62	UJ	7

µg/kg-micrograms per kilogram
U-analyte was not detected at the value indicated
NA-not applicable
NC-not calculable

7.9 Isotope Dilution Standards

The isotope dilution standard recoveries in the samples were within the laboratory specified acceptance criteria, with the following exceptions.

The M2-6:2 FTS recovery in sample SSHS-B3133-SUB-0.17-2 was high and outside the laboratory specified acceptance criteria. In addition, the 13C4 PFBA and 13C2 PFTeDA recoveries in sample SSHS-B3133-SUB-0.17-2 were low and outside the laboratory specified acceptance criteria. Therefore, based on professional and technical judgment, the non-detect 6:2-FTS , PFTeA and PFBA results in sample SSHS-B3133-SUB-0.17-2 were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3133-SUB-0.17-2	6:2 FTS	0.17	U	0.17	UJ	11
SSHS-B3133-SUB-0.17-2	Perfluorotetra-decanoic acid (PFTeA)	0.06	U	0.06	UJ	11
SSHS-B3133-SUB-0.17-2	Perfluorobutanoic acid (PFBA)	0.62	U	0.62	UJ	11

µg/kg-micrograms per kilogram
U-analyte was not detected at the value indicated

7.10 Internal Standards

The internal standard areas were within the laboratory specified acceptance criteria.

7.11 Target Compound Identifications

The compound identifications were within the validation guidance, with the following exceptions.

DRAFT

The PFDoA concentration in sample SSHS-B3133-SUB-0.17-2 and PFHxS concentration in sample SSHS-B3134-SUB-0.17-2 were flagged by the laboratory with I, to indicate the transition mass ratio for the indicated analyte was outside of the established ratio limits and the qualitative identification of the analytes has some degree of uncertainty. Therefore, based on professional and technical judgment, the PFDoA concentration in sample SSHS-B3133-SUB-0.17-2 and PFHxS concentration in sample SSHS-B3134-SUB-0.17-2 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3133-SUB-0.17-2	Perfluorododecanoic acid (PFDoA)	0.10	J,I	0.10	J	13
SSHS-B3134-SUB-0.17-2	Perfluorohexanesulfonic acid (PFHxS)	0.034	J,I	0.034	J	13

µg/kg-micrograms per kilogram
J-the result is less than the RL but greater than the MDL and the concentration is an approximate value
I- laboratory flag indicating the

7.12 Target Compound Quantitation

The compound quantitations were within the validation guidance.

7.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported due to sample dilutions. In addition, the narrative indicated that the non-detect PFDA result in sample SSHS-B3134-SUB-0.17-2 and the non-detect PFBS and PFDS results in sample SSHS-B3134-SUB-0.17-2 exhibited elevated noise or matrix interferences, causing elevation of the MDLs to the same concentrations as the RLs. These non-detect results were G-flagged by the laboratory. Based on professional and technical judgment, no qualifications were applied to the data.

7.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other

RPD-relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	March 31, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-115861-2**

SITE: Former Sperry Remington Site-Slide Rail

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of seven solid samples including one sample for matrix spike/matrix spike duplicate (MS/MSD) analyses as well as two field duplicates and a trip blank, collected on 12 January 2021, as part of the Former Sperry Remington Site-Slide Rail sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C and 5035/8260C
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A
- Metals by USEPA Methods 3050B/6010C
- Mercury by USEPA Method 7471B
- Percent Solids by Standard Method (SM) 2540G

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives, with the following exceptions.

The non-detect results of 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factors (RRFs) in the initial calibration and based on technical and professional judgment.

The non-detect 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene results in sample SSHS-B3565-SUB-16-18 were R qualified as rejected due to MS/MSD recoveries less than 20%.

DRAFT

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-001)
- USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

DRAFT

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-115861-21	SSHS-B3566-SUB-16-18
180-115861-22	SSHS-B3566-SUB-18-20
180-115861-23	SSHS-B3566-SUB-20-22
180-115861-24	SSHS-B3566-SUB-22-24
180-115861-25	SSHS-B3565-SUB-16-18
180-115861-25 MS	SSHS-B3565-SUB-16-18 MS

Laboratory ID	Client ID
180-115861-25 MSD	SSHS-B3565-SUB-16-18 MSD
180-115861-26	SSHS-B3565-SUB-18-20
180-115861-27	SSHS-B3565-SUB-20-22
180-115861-28	DUP-24
180-115861-29	DUP-25
180-115861-30	TRIP BLANK 2

The samples were received within the QAPP criteria of ≤ 6ºC.

Samples listed on the chain of custody (COC) that were not reported in laboratory report 180-115861-2 were reported in laboratory report 180-115861-1.

Collection times were not listed for the field duplicates or trip blank. The field duplicates and trip blank were logged in with the collection time of 00:00.

engineers | scientists | innovators

The solids data, used to report the sample on a dry weight basis, were not validated.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per USEPA Methods 5030C/8260C and 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for meeting project objectives, with the following exceptions. The non-detect results of 1,4-dioxane were R qualified as rejected due to low RRFs in the initial calibration and based on technical and professional judgment. The non-detect 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene results in sample SSHS-B3565-SUB-16-18 were R qualified as rejected due to MS/MSD recoveries less than 20%.

Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 97.2%.

DRAFT

1.2 Holding Times

The holding times for the VOC analysis of a solid sample are 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance (NFG, June 2008) had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRFs for 1,4-dioxane in the initial calibrations were 0.0014, 0.0022 and 0.0021, less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

The percent error of dichlorodifluoromethane for the level 7 standard in the initial calibration analyzed on CHHP4 in batch 298171 was high and outside of the method specified acceptance criteria. Since dichlorodifluoromethane was not detected in the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3565-SUB-16-18	1,4-Dioxane	39	U	39	R	9

engineers | scientists | innovators

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3565-SUB-18-20	1,4-Dioxane	1900	U	1900	R	9
SSHS-B3566-SUB-18-20	1,4-Dioxane	1600	U	1600	R	9

µg/kg-micrograms per kilogram
U-not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
TRIP BLANK 2	1,4-Dioxane	210	U	210	R	9

µg/L-micrograms per liter
U-not detected at or above the MDL

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of dichlorodifluoromethane (30.5%), vinyl chloride (23.0%), trichlorofluoromethane (40.8%), methyl tert-butyl ether (29.6%), carbon tetrachloride (21.2%) and 4-methyl-2-pentanone (32.1%) in the CCV in batch 343262 were outside of the laboratory specified acceptance criteria, with low biases. Since the %Ds of dichlorodifluoromethane, vinyl chloride, methyl tert-butyl ether and carbon tetrachloride were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the dichlorodifluoromethane, vinyl chloride, methyl tert-butyl ether and carbon tetrachloride data. However, the non-detect trichlorofluoromethane and 4-methyl-2-pentanone results in the associated sample were UJ qualified as estimated less than the MDLs.

The %D of chloroethane (31.0%) in the CCV in batch 343262 was outside of the laboratory specified acceptance criteria, with high bias. Since chloroethane was not detected in the associated sample, no qualifications were applied to the data.

DRAFT

The %Ds of bromomethane (21.3%), chloroethane (25.4%), acetone (21.2%), 1,2-dibromo-3-chloropropane (21.8%), 1,2,4-trichlorobenzene (24.3%) and 1,2,3-trichlorobenzene (40.1%) in the CCV in batch 343257 were outside of the laboratory specified acceptance criteria, with low biases. Since the %Ds of bromomethane, chloroethane, acetone, 1,2-dibromo-3-chloropropane and 1,2,4-trichlorobenzene were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the bromomethane, chloroethane, acetone, 1,2-dibromo-3-chloropropane and 1,2,4-trichlorobenzene data. However, the non-detect 1,2,3-trichlorobenzene results in the associated samples were UJ qualified as estimated less than the MDL.

The %Ds of chlorobenzene (22.7%), styrene (23.8%) and bromoform (26.4%) in the CCV in batch 343257 were outside of the laboratory specified acceptance criteria, with high biases. Since chlorobenzene, styrene and bromoform were not detected in the associated sample, no qualifications were applied to the data.

The %Ds of 1,1,2,2-tetrachloroethane (89.9%) and 2-butanone (21.2%) in the CCV in batch 343413 were outside of the laboratory specified acceptance criteria, with high biases. Since 1,1,2,2-tetrachloroethane and 2-butanone were not detected in the associated sample, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3565-SUB-18-20	1,2,3-Trichlorobenzene	140	U	140	UJ	9
SSHS-B3566-SUB-18-20	1,2,3-Trichlorobenzene	130	U	130	UJ	9

µg/kg-micrograms per kilogram
U-not detected at or above the MDL

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
TRIP BLANK 2	4-Methyl-2-pentanone (MIBK)	1.9	U	1.9	UJ	9
TRIP BLANK 2	Trichlorofluoromethane	1.5	U	1.5	UJ	9

µg/L-micrograms per liter
U-not detected at or above the MDL

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 343262, 343320 and 343413). VOCs were not detected in the method blanks above the MDLs.

DRAFT

1.7 Matrix Spike/Matrix Spike Duplicate

Matrix spike/matrix spike duplicates were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-B3565-SUB-16-18. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of isopropylbenzene and methylcyclohexane in the MS/MSD pair were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect isopropylbenzene result in sample SSHS-B3565-SUB-16-18 was UJ qualified as estimated less than the MDL and the methylcyclohexane concentration was J qualified as estimated.

The recoveries of 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene in the MS/MSD pair were less than 20% and outside of the QAPP specified acceptance criteria. Therefore, the non-detect 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene results in sample SSHS-B3565-SUB-16-18 were R qualified as rejected.

The recoveries of 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane in the MS/MSD pair were high and outside of the QAPP specified acceptance criteria. Since 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane were not detected in sample SSHS-B3565-SUB-16-18, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3565-SUB-16-18	1,2,3-Trichlorobenzene	3.0	U,F1	3.0	R	4
SSHS-B3565-SUB-16-18	1,2,4-Trichlorobenzene	2.8	U,F1	2.8	R	4
SSHS-B3565-SUB-16-18	Isopropylbenzene	2.9	U,F1	2.9	UJ	4
SSHS-B3565-SUB-16-18	Methylcyclohexane	3.4	J,F1	3.4	J	4

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the reporting limit (RL)
U-not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recovery was outside of the limits

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and two LCS/LCS duplicate (LCSD) pairs were reported. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exception.

DRAFT

The recovery of 1,1,2,2-tetrachloroethane in the LCS in batch 343413 was high and outside of the QAPP specified acceptance criteria. Since 1,1,2,2-tetrachloroethane was not detected in the associated sample, no qualifications were applied to the data.

The recoveries of trichlorofluoromethane in the LCS/LCSD pair in batch 343262 were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect trichlorofluoromethane result in the associate sample was UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
TRIP BLANK 2	Trichlorofluoromethane	1.5	U	1.5	UJ	5

µg/L-micrograms per liter
U-not detected at or above the MDL

1.9 Surrogates

Acceptable surrogate recoveries were reported for the sample analyses.

1.10 Trip Blank

One trip blank, TRIP BLANK 2, was submitted with the sample set. VOCs were not detected in the trip blank above the MDLs.

1.11 Field Duplicate

Two field duplicates were collected with the sample set, DUP-24 and DUP-225; however, the field duplicates were not analyzed for VOCs per the COC.

1.12 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

DRAFT

1.15 Sensitivity

The samples were reported to the MDLs. Samples SSHS-B3565-SUB-18-20 and SSHS-B3566-SUB-18-20 were analyzed from methanol preserved vials; therefore, elevated non-detect results were reported for these samples. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by USEPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
⊗ Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total

DRAFT

number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the PCB analysis of a solid sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

2.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria.

2.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 343338). The PCBs were not detected in the method blank above the MDLs.

2.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-B3565-SUB-16-18. The recovery and RPD results were within the QAPP specified acceptance criteria.

2.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

2.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

DRAFT

2.9 Field Duplicate

Two field duplicates were collected with the sample set, DUP-24 and DUP-225. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples, SSHS-B3129-SUB-6-8 and SSHS-B3132-SUB-2-4, respectively, with the following exception.

PCB-1260 was not detected in sample SSHS-B3558-SUB-16-18 and was detected at a concentration greater than the RL in sample DUP-24, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the non-detect PCB-1260 result in sample SSHS-B3558-SUB-16-18 was UJ qualified as estimated less than the MDL and the PCB-1260 concentration in sample DUP-24 was J qualified as estimated.

Samples SSHS-B3129-SUB-6-8 and SSHS-B3132-SUB-2-4 were reported in laboratory report 180-115861-1.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3558-SUB-16-18	PCB-1260	5.1	U	NC	5.1	UJ	7
DUP-24	PCB-1260	8.7	NA		8.7	J	7

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

2.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

2.11 Target Compound Identification

The target compound identifications were within the validation criteria.

2.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on

DRAFT

professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-24	PCB-1248	270	NA	270	J	13
DUP-24	PCB-1254	62	NA	62	J	13
DUP-24	PCB-1260	8.7	J	8.7	J	13
DUP-25	PCB-1248	870	NA	870	J	13
DUP-25	PCB-1254	240	NA	240	J	13
DUP-25	PCB-1260	32	NA	32	J	13
SSHS-B3565-SUB-16-18	PCB-1248	45	NA	45	J	13
SSHS-B3565-SUB-16-18	PCB-1254	12	J	12	J	13
SSHS-B3565-SUB-18-20	PCB-1248	3400	NA	3400	J	13
SSHS-B3565-SUB-18-20	PCB-1254	890	NA	890	J	13
SSHS-B3565-SUB-18-20	PCB-1260	140	NA	140	J	13
SSHS-B3565-SUB-20-22	PCB-1248	270	NA	270	J	13
SSHS-B3565-SUB-20-22	PCB-1254	67	NA	67	J	13
SSHS-B3565-SUB-20-22	PCB-1260	10	J	10	J	13
SSHS-B3566-SUB-16-18	PCB-1248	3900	NA	3900	J	13
SSHS-B3566-SUB-16-18	PCB-1254	1600	NA	1600	J	13
SSHS-B3566-SUB-16-18	PCB-1260	240	NA	240	J	13
SSHS-B3566-SUB-18-20	PCB-1248	91	NA	91	J	13
SSHS-B3566-SUB-18-20	PCB-1254	37	NA	37	J	13
SSHS-B3566-SUB-20-22	PCB-1248	150	NA	150	J	13
SSHS-B3566-SUB-20-22	PCB-1254	38	NA	38	J	13
SSHS-B3566-SUB-22-24	PCB-1248	170	NA	170	J	13
SSHS-B3566-SUB-22-24	PCB-1254	43	NA	43	J	13

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
NA-not applicable

DRAFT

2.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

3.0 METALS

The samples were analyzed for metals per USEPA methods 3050B/6010C. (Mercury was evaluated separately in Section 4.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank
✓ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Duplicate
✓ Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverables Review

DRAFT

3.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding time for the total metals analysis of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

3.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

3.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

3.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria.

3.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 343339) was reported. Metals were not detected in the method blank above the MDLs.

3.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-B3565-SUB-16-18. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The MSD recovery of antimony was low and outside of the QAPP specified acceptance criteria and the recovery of antimony in the post digestion spike (PDS) was within the QAPP specified acceptance criteria. Therefore, the non-detect antimony result in sample SSHS-B3565-SUB-16-18 was UJ qualified as estimated less than the MDL.

The RPD of calcium was high and outside of the QAPP specified acceptance criteria. Therefore, the calcium concentration in sample SSHS-B3565-SUB-16-18 was J qualified as estimated.

The aluminum, calcium, iron, magnesium and manganese concentrations in sample SSHS-B3565-SUB-16-18 were greater than four times the spiked concentrations; therefore, no qualifications were applied to these metals based on the MS/MSD recovery results.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3565-SUB-16-18	Antimony	0.37	U,F1	0.37	UJ	4
SSHS-B3565-SUB-16-18	Calcium	35000	F2	35000	J	4

mg/kg-milligrams per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recovery was outside of the limits
F2-laboratory flag indicating MS/MSD RPD was outside of the limits

DRAFT

3.8 Serial Dilution

One sample set specific serial dilution was reported using sample SSHS-B3565-SUB-16-18. The %D results were within the method specified acceptance criteria.

3.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

3.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

3.11 Field Duplicate

Two field duplicates were collected with the sample set, DUP-24 and DUP-225. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples, SSHS-B3129-SUB-6-8 and SSHS-B3132-SUB-2-4, respectively, with the following exceptions.

The metals concentrations with an RPD greater than 50% were J qualified as estimated.

Beryllium, cadmium and sodium were detected in SSHS-B3558-SUB-16-18 at estimated concentrations greater than the MDLs and less than the RLs and were detected in DUP-24 at concentrations greater than the RLs, resulting in noncalculable RPDs. Therefore, the beryllium cadmium and sodium concentrations in field duplicate pair SSHS-B3558-SUB-16-18/DUP-24 were J qualified as estimated, based on professional and technical judgment.

Selenium was detected in SSHS-B3558-SUB-16-18 at an estimated concentration greater than the MDL and less than the RL and was not detected in DUP-24, resulting in a noncalculable RPD. Therefore, the selenium concentration in SSHS-B3558-SUB-16-18 was J qualified as estimated and the non-detect selenium result in DUP-24 was UJ qualified as estimated less than the MDL.

Samples SSHS-B3129-SUB-6-8 and SSHS-B3132-SUB-2-4 were reported in laboratory report 180-115861-1.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3558-SUB-16-18	Beryllium	0.17	J	NC	0.17	J	7
DUP-24	Beryllium	0.16	NA		0.16	J	7

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3558-SUB-16-18	Cadmium	0.11	J	NC	0.11	J	7
DUP-24	Cadmium	0.11	NA		0.11	J	7
SSHS-B3558-SUB-16-18	Selenium	0.57	J	NC	0.57	J	7
DUP-24	Selenium	0.52	U		0.52	UJ	7
SSHS-B3558-SUB-16-18	Sodium	82	J	NC	82	J	7
DUP-24	Sodium	86	NA		86	J	7
SSHS-B3559-SUB-16-18	Barium	43	NA	54	43	J	7
DUP-25	Barium	75	NA		75	J	7
SSHS-B3559-SUB-16-18	Copper	20	NA	60	20	J	7
DUP-25	Copper	37	NA		37	J	7
SSHS-B3559-SUB-16-18	Lead	85	NA	99	85	J	7
DUP-25	Lead	250	NA		250	J	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

3.12 Compound Quantitation

The compound quantitations were within the validation criteria.

3.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

3.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

4.0 MERCURY

The samples were analyzed for mercury per USEPA method 7471B.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

4.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for meeting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

4.3 Initial Calibration

The method specified initial calibration requirements were met.

4.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

4.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

DRAFT

4.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks (batches 343325 and 343330) were reported. Mercury was not detected in the method blanks above the MDL.

4.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-B3565-SUB-16-18. The recovery and RPD results were within the QAPP specified acceptance criteria.

4.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

4.9 Field Duplicate

Two field duplicates were collected with the sample set, DUP-24 and DUP-225. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples, SSHS-B3129-SUB-6-8 and SSHS-B3132-SUB-2-4, respectively.

Samples SSHS-B3129-SUB-6-8 and SSHS-B3132-SUB-2-4 were reported in laboratory report 180-115861-1.

4.10 Compound Quantitation

The compound quantitations were within the validation criteria.

4.11 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

4.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	March 25, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-116665-4 Revision 1**

SITE: Former Sperry Remington Site-IRM6 PDI

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of one solid sample collected on 29 January 2021, as part of the Former Sperry Remington Site-IRM6 PDI sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the sample for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA 3541/8270D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A
- Metals by USEPA Methods 3050B/6010C
- Mercury by USEPA Method 7471B
- Percent Solids by Standard Method (SM) 2540G

Eurofins TestAmerica, Canton, Ohio analyzed the sample for the following analytical test:

- Diesel Range Organics (DRO) by USEPA Methods 3546/8015D

Eurofins TestAmerica, West Sacramento, California analyzed the sample for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by United States Environmental Protection Agency (USEPA) Methods 537 (modified)

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exception.

DRAFT

The non-detect result for 1,4-dioxane in the VOC analyses was R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-001)
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016 (EPA-542-B-16-001)
- USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following sample was analyzed in the data set.

Laboratory ID	Client ID
180-116665-26	SSHS-B3644-SUB-2-4

The sample was received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

The solids data, used to report the sample on a dry weight basis, were not validated.

DRAFT

The laboratory report was revised on March 24, 2021 to add the initial calibration verifications (ICVs) for the VOCs and DRO data. The revised report was identified as 180-116665-4 Revision 1.

1.0 VOLATILE ORGANIC COMPOUNDS

The sample was analyzed for VOCs per USEPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exception. The non-detect result of 1,4-dioxane was R qualified as rejected due to low RRF in the initial calibration and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

DRAFT

1.2 Holding Times

The holding times for the VOC analysis of a solid sample are 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The sample was analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

The %RSDs of bromomethane (24.9%), chloroethane (23.1%) and 1,2,4-trichlorobenzene (27.4%) for the initial calibration performed on instrument CHHP11 in batch 344527 were high and outside of the method specified acceptance criteria. Since the %RSDs of bromomethane, chloroethane and 1,2,4-trichlorobenzene were within the validation specified acceptance criteria, no qualifications were applied to the data.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance (NFG, June 2008) had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was 0.0045, less than 0.010. Therefore, based on professional and technical judgment and average RRF less than 0.010, the non-detect result of 1,4-dioxane in the sample was R qualified as rejected.

The percent errors of calibration levels 2 and 7 for bromomethane and level 7 for chloroethane in the initial calibration analyzed on CHHP11 in batch 344527 were high and outside of the method

DRAFT

specified acceptance criteria. Since bromomethane and chloroethane were not detected in the associated sample and based on professional and technical judgment, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3644-SUB-2-4	1,4-Dioxane	37	U	37	R	9

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane result in the sample was rejected based on the initial calibration average RRF, no additional qualification was applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICV and CCV were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of acetone (23.0%), chloroethane (23.7%), 1,2-dibromo-3-chloropropane (39.6%) and 1,2,3-trichlorobenzene (40.0%) in the CCV in batch 345645 were outside of the laboratory specified acceptance criteria, with low biases. Since the %Ds of acetone, chloroethane, 1,2-dibromo-3-chloropropane and 1,2,3-trichlorobenzene were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 345645). VOCs were not detected in the method blank above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were not reported.

DRAFT

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Trip Blank

A trip blank was not collected with the sample set; this did not result in qualifications but should be noted by the data user.

1.11 Field Duplicate

A field duplicate was not collected with the sample set.

1.12 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The sample was reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The sample was analyzed for SVOCs per USEPA Methods 3541/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

2.1 Overall Assessment

The SVOC data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The sample was analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exception.

The %D of 4-nitrophenol (25.8%) in the CCV in batch 345633 was outside of the laboratory specified acceptance criteria with high bias. Since 4-nitrophenol was not detected in the associated sample, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 345499). SVOCs were not detected in the method blank above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

DRAFT

2.10 Field Duplicate

A field duplicate was not collected with the sample set.

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The sample was reported to the MDLs. Elevated non-detect results were reported for sample SSHS-B3644-SUB-2-4 due to sample dilution analyzed. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 DIESEL RANGE ORGANIC

The sample was analyzed for DRO (C10-C28) per USEPA Methods 3546/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample

DRAFT

- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The DRO (C10-C28) data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the DRO (C10-C28) analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

An appropriate initial calibration was performed for DRO (C10-C28). The laboratory calculated the %RSD of the calibration factors (CFs). The %RSDs were within the method and laboratory specified acceptance criteria.

3.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The %Ds between the CFs in the ICV and CCV were within the method and laboratory specified acceptance criteria.

3.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 471772). DRO (C10-C28) was not detected in the method blank above the MDL.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

DRAFT

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the laboratory specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

A field duplicate was not collected with the sample set.

3.10 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

3.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.12 Sensitivity

The sample was reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in Table 1 of the QAPP for DRO (C10-C28).

3.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 POLYCHLORINATED BIPHENYLS

The sample was analyzed for PCBs by USEPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times

DRAFT

- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ⊗ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

4.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding times for the PCB analysis of a solid sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

4.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of PCBs 1221 and 1254 on GC column RTX-CLP1 in the CCV in batch 345654 were outside of the laboratory specified acceptance criteria with high biases. Since PCB 1221 was not detected in the associated sample and PCB 1254 was reported from GC column RTX-CLP2 with

DRAFT

the %D of PCB 1254 within the method and validation specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

4.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 345585). The PCBs were not detected in the method blank above the MDLs.

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-B3644-SUB-2-4. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

A field duplicate was not collected with the sample set.

4.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

4.11 Target Compound Identification

The target compound identifications were within the validation criteria.

4.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

Sample SSHS-B3644-SUB-2-4 contained PCBs 1248 and 1254. There are peaks in 1248 and 1254 that are in both of these PCBs; therefore, there is contribution between PCBs when PCBs 1248

DRAFT

and 1254 are detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248 and 1254 in sample SSHS-B3644-SUB-2-4 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3644-SUB-2-4	PCB-1248	40	NA	40	J	13
SSHS-B3644-SUB-2-4	PCB-1254	31	NA	31	J	13

µg/kg-micrograms per kilogram
NA-not applicable

4.13 Sensitivity

The sample was reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

5.0 METALS

The sample was analyzed for metals per USEPA methods 3050B/6010C. (Mercury was evaluated separately in Section 6.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Serial Dilution
- ✓ Laboratory Control Sample
- ✓ Internal Standard
- ✓ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding time for the total metals analysis of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

5.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria.

DRAFT

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 343339) was reported. Metals were not detected in the method blank above the MDLs.

5.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

5.8 Serial Dilution

Serial dilutions were not reported.

5.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

5.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

5.11 Field Duplicate

A field duplicate was not collected with the sample set.

5.12 Compound Quantitation

The compound quantitations were within the validation criteria.

5.13 Sensitivity

The sample was reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

5.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

DRAFT

6.0 MERCURY

The sample was analyzed for mercury per USEPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

6.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

6.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

6.3 Initial Calibration

The method specified initial calibration requirements were met.

6.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

DRAFT

6.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 345933) was reported. Mercury was not detected in the method blank above the MDL.

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the QAPP specified acceptance criteria.

6.9 Field Duplicate

A field duplicate was not collected with the sample set.

6.10 Compound Quantitation

The compound quantitations were within the validation criteria.

6.11 Sensitivity

The sample was reported to the MDLs. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

6.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

7.0 PFAS

The sample was analyzed for PFAS per USEPA methods 537.1 (modified). The following PFAS were reported:

DRAFT

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Isotope Dilution Standards

- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

7.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this sample set is 100%.

7.2 Holding Time

The laboratory-specified holding times for the for the PFAS analysis of a solid sample are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

7.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The RRFs' relative standard deviations (RSDs) of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

7.4 Initial Calibration Verification and Continuing Calibration Verification (ICV and CCV)

The ICVs and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICVs and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

7.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 459608). PFAS were not detected in the method blank above the MDLs, with the following exception.

PFBA was detected in the method blank at an estimated concentration greater than the MDL and less than the reporting limit (RL). Since PFBA was not detected in the associated sample, no qualifications were applied to the data. .

DRAFT

7.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

7.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria.

7.8 Field Duplicate

A field duplicate was not collected with the sample set.

7.9 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria.

7.10 Target Compound Identifications

The compound identifications were within the validation guidance.

7.11 Target Compound Quantitation

The compound quantitations were within the validation guidance.

7.12 Sensitivity

The sample was reported to the MDLs. Elevated non-detect results were not reported

7.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	March 31, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-116723-1**

SITE: Former Sperry Remington Site-IRM6 PDI

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of thirteen solid samples and one field duplicate sample collected on 02 February 2021, as part of the Former Sperry Remington Site-IRM6 PDI sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA 3541/8270D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A
- Metals by USEPA Methods 3050B/6010C
- Mercury by USEPA Method 7471B
- Percent Solids by Standard Method (SM) 2540G

Eurofins TestAmerica, Canton, Ohio analyzed the samples for the following analytical test:

- Diesel Range Organics (DRO) by USEPA Methods 3546/8015D

Eurofins TestAmerica, West Sacramento, California analyzed the samples for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by United States Environmental Protection Agency (USEPA) Methods 537 (modified)

DRAFT

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect 1,4-dioxane results in the VOC analyses were R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

The non-detect benzaldehyde result in sample SSHS-B3640-SUB-0.17-2 was R qualified as rejected due to matrix spike/matrix spike duplicate (MS/MSD) recoveries less than 10%.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-001)
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016 (EPA-542-B-16-001)
- USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

DRAFT

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-116723-1	SSHS-B3670-SUB-10-12
180-116723-2	SSHS-B3670-SUB-12-14
180-116723-3	SSHS-B3670-SUB-14-16
180-116723-4	SSHS-B3274A-SUB-0.17-2
180-116723-5	SSHS-B3274A-SUB-2-4
180-116723-6	SSHS-B3640-SUB-0.17-2
180-116723-7	SSHS-B3640-SUB-2-4

Laboratory ID	Client ID
180-116723-9	SSHS-B3629-SUB-2-4
180-116723-10	SSHS-B3664-SUB-10-12
180-116723-11	SSHS-B3664-SUB-12-14
180-116723-12	SSHS-B3664-SUB-14-16
180-116723-13	SSHS-B3645-SUB-0.17-2
180-116723-14	SSHS-B3645-SUB-2-4
180-116723-15	DUP-1

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

The solids data, used to report the samples on a dry weight basis, were not validated.

Sample SSHS-B3629-SUB-2-4 was logged in with the collection time of 21:40 and the collection time was listed as 1400 on the chain of custody (COC). This did not impact the data and no qualifications were applied.

A collection time was not documented for the field duplicate. The field duplicate was logged in with the collection time of 00:00.

Sample SSHS-B3629-SUB-0.17-2 was listed on the COC for analysis and for analysis as an MS/MSD pair. The sample and MS/MSD analyses were canceled per the client's request.

The VOC analyses requested on the COC for samples SSHS-B3670-SUB-10-12, SSHS-B3670-SUB-10-12 and SSHS-B3670-SUB-10-12 were canceled and the samples were analyzed for SVOCs, PCBs, metals and mercury per the client's request.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per USEPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications

DRAFT

- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Trip Blank
- ⊗ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect 1,4-dioxane results were R qualified as rejected due to low RRF in the initial calibration and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample are 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to

DRAFT

0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

The %RSDs of bromomethane (24.9%), chloroethane (23.1%) and 1,2,4-trichlorobenzene (27.4%) for the initial calibration performed on instrument CHHP11 in batch 344527 were high and outside of the method specified acceptance criteria. Since the %RSDs of bromomethane, chloroethane and 1,2,4-trichlorobenzene were within the validation specified acceptance criteria, no qualifications were applied to the data.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance (NFG, June 2008) had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was 0.0045, less than 0.010. Therefore, based on professional and technical judgment and average RRF less than 0.010, the non-detect 1,4-dioxane results in the samples were R qualified as rejected.

The percent errors of calibration levels 2 and 7 for bromomethane and level 7 for chloroethane in the initial calibration analyzed on CHHP11 in batch 344527 were high and outside of the method specified acceptance criteria. Since bromomethane and chloroethane were not detected in the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3645-SUB-0.17-2	1,4-Dioxane	37	U	37	R	9
DUP-1	1,4-Dioxane	36	U	36	R	9

µg/kg-micrograms per kilogram
U- laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

DRAFT

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICV and CCV were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of acetone (23.0%), chloroethane (23.7%), 1,2-dibromo-3-chloropropane (39.6%) and 1,2,3-trichlorobenzene (40.0%) in the CCV in batch 345645 were outside of the laboratory specified acceptance criteria, with low biases. Since the %Ds of acetone, chloroethane, 1,2-dibromo-3-chloropropane and 1,2,3-trichlorobenzene were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of bromomethane (20.5%), chloroethane (43.8%), 1,4-dioxane (22.9%), 1,2-dibromo-3-chloropropane (45.9%), 1,2,4-trichlorobenzene (32.4%) and 1,2,3-trichlorobenzene (51.2%) in the CCV in batch 345790 were outside of the laboratory specified acceptance criteria, with low biases. Since the %D of bromomethane was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the bromomethane data. Since the 1,4-dioxane result in the associated sample was rejected based on the initial calibration average RRF, no additional qualifications were applied to the 1,4-dioxane data, based on professional and technical judgment. However, the non-detect chloroethane, 1,2-dibromo-3-chloropropane, 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene results in the associated sample were UJ qualified as estimated less than the MDLs.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3645-SUB-0.17-2	1,2,3-Trichlorobenzene	2.9	U,*1	2.9	UJ	9
SSHS-B3645-SUB-0.17-2	1,2,4-Trichlorobenzene	2.7	U,*+,*1	2.7	UJ	9
SSHS-B3645-SUB-0.17-2	1,2-Dibromo-3-Chloropropane	3.4	U,*1	3.4	UJ	9
SSHS-B3645-SUB-0.17-2	Chloroethane	3.1	U,*1	3.1	UJ	9

µg/kg-micrograms per kilogram
U- laboratory flag indicating not detected at or above the MDL
*1-laboratory flag indicating laboratory control sample/laboratory controls sample duplicate (LCS/LCSD) relative percent difference (RPD) was outside of the laboratory specified acceptance criteria
*+-laboratory flag indicating LCS and or LCSD recovery was outside of the laboratory specified acceptance criteria with high bias

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 345645 and 345790). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

1.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCSD pair were reported. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The LCS recovery of 1,2,4-trichlorobenzene and the RPDs of 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dibromo-3-chloropropane and chloroethane in the LCS/LCSD pair in batch 345790 were high and outside of the QAPP specified acceptance criteria. Since these compounds were not detected in the associated sample, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recovery of surrogate 1,2-dichloroethane-d4 in sample DUP-1 was high and outside of the laboratory specified acceptance criteria. Since the recoveries of the remaining three surrogates were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

1.10 Trip Blank

A trip blank was not collected with the sample set; this did not result in qualification of the data but should be noted by the data user.

1.11 Field Duplicate

One field duplicate was collected with the sample set, DUP-1. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3645-SUB-0.17-2, with the following exception.

DRAFT

Methylene chloride was not detected in SSHS-B3645-SUB-0.17-2 and was detected in DUP-1 at a concentration greater than the RL, resulting in a noncalculable RPD. Therefore, the non-detect methylene chloride result in SSHS-B3645-SUB-0.17-2 was UJ qualified as estimated less than the MDL and the methylene chloride concentration in DUP-1 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3645-SUB-0.17-2	Methylene Chloride	4.8	U	NC	4.8	UJ	7
DUP-1	Methylene Chloride	15	NA		15	J	7

µg/kg-micrograms per kilogram
U- laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable

1.12 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per USEPA Methods 3541/8270D.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC data reported in this SDG are considered usable for supporting project objectives with the following exception. The non-detect benzaldehyde result in sample SSHS-B3640-SUB-0.17-2 was R qualified as rejected due to MS/MSD recoveries less than 10%. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 99.8%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

DRAFT

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exception.

The %D of 4-nitrophenol (25.8%) in the CCV in batch 345633 was outside of the laboratory specified acceptance criteria with high bias. Since 4-nitrophenol was not detected in the associated samples, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 345575). SVOCs were not detected in the method blank above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-B3640-SUB-0.17-2. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of benzaldehyde in the MS/MSD pair were less than 10% and outside of the QAPP specified acceptance criteria. Therefore, the non-detect benzaldehyde result in sample SSHS-B3640-SUB-0.17-2 was R qualified as rejected.

The recoveries of 4-chloroaniline and 3,3'-dichlorobenzidine in the MS/MSD pair were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect 4-chloroaniline and

DRAFT

3,3'-dichlorobenzidine results in sample SSHS-B3640-SUB-0.17-2 were UJ qualified as estimated less than the MDLs.

The recovery of 2,4-dinitrophenol in the MSD was low and outside of the laboratory specified acceptance criteria. Since the MSD recovery was within the QAPP specified acceptance criteria, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3640-SUB-0.17-2	3,3'-Dichlorobenzidine	370	U,F1	370	UJ	4
SSHS-B3640-SUB-0.17-2	4-Chloroaniline	27	U,F1	27	UJ	4
SSHS-B3640-SUB-0.17-2	Benzaldehyde	49	U,F1	49	R	4

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1- laboratory flag indicating laboratory flag indicating MS and/or MS/MSD recovery was outside of the laboratory specified acceptance criteria

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Duplicate

One field duplicate was collected with the sample set, DUP-1. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3645-SUB-0.17-2, with the following exceptions.

Acenaphthylene was detected in SSHS-B3645-SUB-0.17-2 at an estimated concentration greater than the MDL and less than the RL and not detected in DUP-1, resulting in a noncalculable RPD. Therefore, the acenaphthylene concentration in SSHS-B3645-SUB-0.17-2 was J qualified as estimated and the non-detect acenaphthylene result in DUP-1 was UJ qualified as estimated less than the MDL.

Benzo[a]pyrene was not detected in SSHS-B3645-SUB-0.17-2 and was detected in DUP-1 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable

DRAFT

RPD. Therefore, the non-detect benzo[a]pyrene result in SSHS-B3645-SUB-0.17-2 was UJ qualified as estimated less than the MDL and the benzo[a]pyrene concentration in DUP-1 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3645-SUB-0.17-2	Acenaphthylene	17	J	NC	17	J	7
DUP-1	Acenaphthylene	15	U		15	UJ	7
SSHS-B3645-SUB-0.17-2	Benzo[a]pyrene	30	U	NC	30	UJ	7
DUP-1	Benzo[a]pyrene	37	J		37	J	7

µg/kg-micrograms per kilogram
J- laboratory flag indicating estimated concentration greater than the MDL and less than the RL
U- laboratory flag indicating not detected at or above the MDL
NC-not calculable

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported for sample SSHS-B3644-SUB-2-4 due to sample dilution analyzed. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 DIESEL RANGE ORGANICS

The samples were analyzed for DRO (C10-C28) per USEPA Methods 3546/8015D.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The DRO (C10-C28) data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the DRO (C10-C28) analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

An appropriate initial calibration was performed for DRO (C10-C28). The laboratory calculated the %RSDs of the calibration factors (CFs). The %RSDs were within the method and laboratory specified acceptance criteria.

DRAFT

3.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The %Ds between the CFs in the ICV and CCV were within the method and laboratory specified acceptance criteria, with the following exception.

The %D of surrogate o-terphenyl in CCV 472226/17 was outside of the laboratory specified acceptance criteria with high bias. Since the surrogate recoveries in the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

3.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 472104 and 472302). DRO (C10-C28) was not detected in the method blanks above the MDL.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-1; however, the field duplicate was not analyzed for DRO per the COC.

3.10 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

3.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

DRAFT

3.12 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in Table 1 of the QAPP for DRO (C10-C28).

3.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by USEPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ⊗ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

4.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

4.2 Holding Times

The holding times for the PCB analysis of a solid sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

4.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria.

4.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 345585 and 345598). The PCBs were not detected in the method blanks above the MDLs.

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-1. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3645-SUB-0.17-2.

DRAFT

4.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

4.11 Target Compound Identification

The target compound identifications were within the validation criteria.

4.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-1	PCB-1248	130	NA	130	J	13
DUP-1	PCB-1254	97	NA	97	J	13
DUP-1	PCB-1260	24	NA	24	J	13
SSHS-B3645-SUB-0.17-2	PCB-1248	150	NA	150	J	13
SSHS-B3645-SUB-0.17-2	PCB-1254	110	NA	110	J	13
SSHS-B3645-SUB-0.17-2	PCB-1260	27	NA	27	J	13
SSHS-B3670-SUB-10-12	PCB-1248	110	NA	110	J	13
SSHS-B3670-SUB-10-12	PCB-1254	43	NA	43	J	13
SSHS-B3670-SUB-12-14	PCB-1248	180	NA	180	J	13
SSHS-B3670-SUB-12-14	PCB-1254	68	NA	68	J	13
SSHS-B3670-SUB-14-16	PCB-1248	59	NA	59	J	13
SSHS-B3670-SUB-14-16	PCB-1254	23	NA	23	J	13

µg/kg-micrograms per kilogram
NA-not applicable

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

DRAFT

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

5.0 METALS

The samples were analyzed for metals per USEPA methods 3050B/6010C. (Mercury was evaluated separately in Section 6.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank
✓ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
⊗ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Duplicate
✓ Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding time for the total metals analysis of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

DRAFT

5.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

5.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks (batches 345711 and 345848) were reported. Metals were not detected in the method blanks above the MDLs.

5.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported using sample SSHS-B3670-SUB-10-12. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

One or both the recoveries of antimony, arsenic, beryllium, cadmium, calcium, chromium, magnesium, potassium, selenium, silver and vanadium in the MS/MSD were low and outside of the QAPP specified acceptance criteria. The post digestion spike recoveries of these metals were within the QAPP specified acceptance criteria. Therefore, the arsenic, beryllium, cadmium, calcium, chromium, magnesium, potassium and vanadium concentrations in sample SSHS-B3670-SUB-10-12 were J qualified as estimated and the non-detect antimony, selenium and silver results were UJ qualified as estimated less than the MDLs.

The aluminum, iron and manganese concentrations in sample SSHS-B3670-SUB-10-12 were greater than four times the spiked concentrations; therefore, no qualifications were applied to the aluminum, iron and manganese results based on the MS/MSD recovery results.

The RPD of manganese in the MS/MSD pair was high and outside of the QAPP specified acceptance criteria. Therefore, the manganese concentration in sample SSHS-B3670-SUB-10-12 was J qualified as estimated.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3670-SUB-10-12	Antimony	0.34	U,F1	0.34	UJ	4
SSHS-B3670-SUB-10-12	Arsenic	4.5	F1	4.5	J	4
SSHS-B3670-SUB-10-12	Beryllium	0.29	J,F1	0.29	J	4
SSHS-B3670-SUB-10-12	Cadmium	0.10	J,F1	0.10	J	4
SSHS-B3670-SUB-10-12	Calcium	1500	F1	1500	J	4
SSHS-B3670-SUB-10-12	Chromium	10	F1	10	J	4
SSHS-B3670-SUB-10-12	Magnesium	1700	F1	1700	J	4
SSHS-B3670-SUB-10-12	Manganese	590	F2	590	J	4
SSHS-B3670-SUB-10-12	Potassium	600	F1	600	J	4
SSHS-B3670-SUB-10-12	Selenium	0.51	U,F1	0.51	UJ	4
SSHS-B3670-SUB-10-12	Silver	0.10	U,F1	0.10	UJ	4
SSHS-B3670-SUB-10-12	Vanadium	9.8	F1	9.8	J	4

mg/kg-milligrams per kilogram
J-laboratory flag indicating estimated concentration greater than the MDL and less than the reporting limit (RL)
U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MS/MSD recovery was outside of the laboratory specified acceptance criteria
F2-laboratory flag indicating MS/MSD RPD was outside of the laboratory specified acceptance criteria

5.8 Serial Dilution

One sample set specific serial dilution was reported using sample SSHS-B3670-SUB-10-12. The %D results were within the method specified acceptance criteria, with the following exceptions.

The %Ds of aluminum, barium, calcium, iron, magnesium and manganese were high and outside of the method specified acceptance criteria. Therefore, the aluminum, barium, calcium, iron, magnesium and manganese concentrations in sample SSHS-B3670-SUB-10-12 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3670-SUB-10-12	Aluminum	6000	NA	6000	J	8
SSHS-B3670-SUB-10-12	Barium	60	NA	60	J	8
SSHS-B3670-SUB-10-12	Calcium	1500	F1	1500	J	8
SSHS-B3670-SUB-10-12	Iron	14000	NA	14000	J	8
SSHS-B3670-SUB-10-12	Magnesium	1700	F1	1700	J	8
SSHS-B3670-SUB-10-12	Manganese	590	F2	590	J	8

mg/kg-milligrams per kilogram
F1-laboratory flag indicating MS and/or MS/MSD recovery was outside of the laboratory specified acceptance criteria
F2-laboratory flag indicating MS/MSD RPD was outside of the laboratory specified acceptance criteria
NA-not applicable

5.9 Laboratory Control Sample

DRAFT

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

5.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

5.11 Field Duplicate

One field duplicate was collected with the sample set, DUP-1. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3645-SUB-0.17-2, with the following exceptions.

Cobalt was detected in SSHS-B3645-SUB-0.17-2 at an estimated concentration greater than the MDL and less than the RL and was detected in DUP-1 at a concentration greater than the RL, resulting in a noncalculable RPD. Since the cobalt concentration in DUP-1 was less than the RL for SSHS-B3645-SUB-0.17-2 and based on professional and technical judgment, no qualifications were applied to the data.

Selenium was not detected in SSHS-B3645-SUB-0.17-2 and was detected in DUP-1 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD. Therefore, the non-detect selenium result in SSHS-B3645-SUB-0.17-2 was UJ qualified as estimated less than the MDL and the selenium concentration in DUP-1 was J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3645-SUB-0.17-2	Cobalt	4.4	J	NC*	NA	NA	NA
DUP-1	Cobalt	4.8	NA		NA	NA	NA
SSHS-B3645-SUB-0.17-2	Selenium	0.51	U	NC	0.51	UJ	7
DUP-1	Selenium	0.53	J		0.53	J	7

mg/kg-milligrams per kilogram
J- laboratory flag indicating estimated concentration greater than the MDL and less than the RL
U- laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable
*no qualification see explanation above

5.12 Compound Quantitation

DRAFT

The compound quantitations were within the validation criteria.

5.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

5.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

6.0 MERCURY

The samples were analyzed for mercury per USEPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

6.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

6.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

6.3 Initial Calibration

The method specified initial calibration requirements were met.

6.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

6.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 345754) was reported. Mercury was not detected in the method blank above the MDL.

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-B3645-SUB-2-4. The recovery and RPD results were within the QAPP specified acceptance criteria.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the QAPP specified acceptance criteria.

6.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-1. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3645-SUB-0.17-2.

6.10 Compound Quantitation

DRAFT

The compound quantitations were within the validation criteria.

6.11 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

6.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

7.0 PFAS

The samples were analyzed for PFAS per USEPA methods 537.1 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA

DRAFT

Analyte	Acronym
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

✓ Overall Assessment
✓ Holding Time
✓ Initial Calibration
✓ Initial and Continuing Calibration Verification
⊗ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Field Duplicate
✓ Isotope Dilution Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

7.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this sample set is 100%.

7.2 Holding Time

The laboratory-specified holding times for the for the PFAS analyses of a solid sample are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

7.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The RRFs' relative

standard deviations (RSDs) of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

7.4 Initial Calibration Verification and Continuing Calibration Verification

The ICVs and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICVs and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

7.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 458985). PFAS were not detected in the method blank above the MDLs, with the following exception.

PFBA was detected in the method blank at an estimated concentration greater than the MDL and less than the RL. Therefore, the estimated concentrations of PFBA in the associated samples were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-1	PFBA	0.082	J,B	0.21	U	3
SSHS-B3645-SUB-0.17-2	PFBA	0.073	J,B	0.21	U	3

µg/kg-micrograms per kilogram
J-laboratory flag indicating estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating analyte was detected in both the method blank and sample

7.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-B3645-SUB-0.17-2. The recovery and RPD results were within the laboratory specified acceptance criteria.

7.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria.

DRAFT

7.8 Field Duplicate

One field duplicate was collected with the sample set, DUP-1. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3645-SUB-0.17-2.

7.9 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria.

7.10 Target Compound Identifications

The compound identifications were within the validation guidance.

7.11 Target Compound Quantitation

The compound quantitations were within the validation guidance.

7.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported

7.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	March 30, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-116724-1**

SITE: Former Sperry Remington Site- FFC TCE Delineation

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of seven solid samples collected on 02 February 2021, as part of the Former Sperry Remington Site - FFC TCE Delineation sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Percent Solids by Standard Method (SM) 2540G

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for meeting project objectives, with the following exceptions.

The non-detect 1,4-dioxane results in the VOC analyses were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and based on technical and professional judgment.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, January 2017 (EPA 540-R-2017-002)

DRAFT

- USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-116724-2	SSHS-B3575-SUB-2-4
180-116724-3	SSHS-B3575-SUB-4-6
180-116724-4	SSHS-B3575-SUB-6-8
180-116724-5	SSHS-B3575-SUB-8-10

Laboratory ID	Client ID
180-116724-6	SSHS-B3575-SUB-10-12
180-116724-7	SSHS-B3575-SUB-12-14
180-116724-8	SSHS-B3575-SUB-14-16

The samples were received within the QAPP criteria of ≤ 6 degree Celsius (ºC).

The solids data, used to report the samples on a dry weight basis, were not validated.

Sample SSHS-B3575-SUB-0-2 was listed on the COC for analysis; however, the sample was canceled per the client's request.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per USEPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Duplicate

DRAFT

- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for meeting project objectives, with the following exceptions. The non-detect 1,4-dioxane results were R qualified as rejected due to low RRFs in the initial calibrations and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample are 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

The %RSDs of bromomethane (24.9%), chloroethane (23.1%) and 1,2,4-trichlorobenzene (27.4%) for the initial calibration performed on instrument CHHP11 in batch 344527 were high and outside of the method specified acceptance criteria. Since the %RSDs of bromomethane, chloroethane and

DRAFT

1,2,4-trichlorobenzene were within the validation specified acceptance criteria, no qualifications were applied to the data.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance (NFG, June 2008) had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. A more current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRFs for 1,4-dioxane in the initial calibrations were 0.0045, 0.0023 and 0.0021, less than 0.010. Therefore, based on professional and technical judgment and average RRF less than 0.010, the non-detect 1,4-dioxane results in the samples were R qualified as rejected.

The percent errors of calibration levels 2 and 7 for bromomethane and level 7 for chloroethane in the initial calibration analyzed on CHHP11 in batch 344527 were high and outside of the method specified acceptance criteria. Since bromomethane and chloroethane were not detected in the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3575-SUB-2-4	1,4-Dioxane	42	U	42	R	9
SSHS-B3575-SUB-4-6	1,4-Dioxane	44	U	44	R	9
SSHS-B3575-SUB-6-8	1,4-Dioxane	40	U	40	R	9
SSHS-B3575-SUB-8-10	1,4-Dioxane	2100	U	2100	R	9
SSHS-B3575-SUB-10-12	1,4-Dioxane	38	U	38	R	9
SSHS-B3575-SUB-12-14	1,4-Dioxane	39	U	39	R	9
SSHS-B3575-SUB-14-16	1,4-Dioxane	40	U	40	R	9

µg/kg-micrograms per kilogram
U-not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

DRAFT

The percent differences or percent drifts (%Ds) of the ICV and CCV were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of bromomethane (20.5%), chloroethane (43.8%), 1,4-dioxane (22.9%), 1,2-dibromo-3-chloropropane (45.9%), 1,2,3-trichlorobenzene (32.4%) and 1,2,4-trichlorobenzene (51.2%), in the CCV in batch 345790 were outside of the laboratory specified acceptance criteria, with low biases. Since the %D of bromomethane was within the validation specified acceptance criteria and the 1,4-dioxane results were rejected due to low RRFs in the initial calibration and based on professional and technical judgment, no qualifications were applied to the bromomethane and 1,4-dioxane data. However, the non-detect chloroethane, 1,2-dibromo-3-chloropropane, 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene results in the associated sample were UJ qualified as estimated less than the MDLs.

The %Ds of chloromethane (38.7%), dichlorodifluoromethane (75.1%), trichlorofluoromethane (26.4%) and vinyl chloride (27.6%), in the CCV in batch 345641 were outside of the laboratory specified acceptance criteria, with low biases. Since the %Ds of trichlorofluoromethane and vinyl chloride were within the validation specified acceptance criteria, no qualifications were applied to the trichlorofluoromethane and vinyl chloride data. However, the non-detect chloromethane and dichlorodifluoromethane results in the associated samples were UJ qualified as estimated less than the MDLs.

The %Ds of 1,2-dibromo-3-chloropropane (20.1%), methyl acetate (24.6%), trichlorofluoromethane (20.9%) and 1,4-dioxane (21.6%), in the CCV in batch 345784 were outside of the laboratory specified acceptance criteria, with low biases. Since the %Ds of 1,2-dibromo-3-chloropropane, methyl acetate and trichlorofluoromethane were within the validation specified acceptance criteria and the 1,4-dioxane results were rejected due to low RRFs in the initial calibration and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of 1,2,3-trichlorobenzene (37.3%), 1,2,4-trichlorobenzene (28.8%), 1,2-dibromo-3-chloropropane (27.2%) and chloroethane (21.5%), in the CCV in batch 345793 were outside of the laboratory specified acceptance criteria, with low biases. Since the %Ds of 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dibromo-3-chloropropane and chloroethane were within the validation specified acceptance criteria, no qualifications were applied to the of data.

The %D of cyclohexane (27.0%), in the CCV in batch 345793 was outside of the laboratory specified acceptance criteria, with high bias. Since the samples were not analyzed in batch 345793, no qualifications were applied to the data.

The %Ds of 1,2,3-trichlorobenzene (43.5%), 1,2,4-trichlorobenzene (28.9%) and 1,2-dibromo-3-chloropropane (28.6%), in the CCV in batch 345912 were outside of the laboratory specified

DRAFT

acceptance criteria, with low biases. Since the %Ds of 1,2,4-trichlorobenzene and 1,2-dibromo-3-chloropropane were within the validation specified acceptance criteria, no qualifications were applied to the of 1,2,4-trichlorobenzene and 1,2-dibromo-3-chloropropane data. However, the non-detect 1,2,3-trichlorobenzene result in the associated sample was UJ qualified as estimated less than the MDL.

The %Ds of 4-methyl-2-pentanone (22.3%) and cyclohexane (28.5%), in the CCV in batch 345912 were outside of the laboratory specified acceptance criteria, with high biases. Since 4-methyl-2-pentanone and cyclohexane were not detected in the associated sample, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3575-SUB-2-4	Chloromethane	2.4	U	2.4	UJ	9
SSHS-B3575-SUB-2-4	Dichlorodifluoromethane	3.0	U,*-	3.0	UJ	9
SSHS-B3575-SUB-4-6	Chloromethane	2.4	U	2.4	UJ	9
SSHS-B3575-SUB-4-6	Dichlorodifluoromethane	3.1	U,*-	3.1	UJ	9
SSHS-B3575-SUB-6-8	Chloromethane	2.2	U	2.2	UJ	9
SSHS-B3575-SUB-6-8	Dichlorodifluoromethane	2.8	U,*-	2.8	UJ	9
SSHS-B3575-SUB-8-10	1,2,3-Trichlorobenzene	160	U	160	UJ	9
SSHS-B3575-SUB-12-14	Chloromethane	2.2	U	2.2	UJ	9
SSHS-B3575-SUB-12-14	Dichlorodifluoromethane	2.7	U,*-	2.7	UJ	9
SSHS-B3575-SUB-14-16	Chloroethane	3.3	U,*1	3.3	UJ	9
SSHS-B3575-SUB-14-16	1,2-Dibromo-3-Chloropropane	3.7	U,*1	3.7	UJ	9
SSHS-B3575-SUB-14-16	1,2,3-Trichlorobenzene	3.1	U,*1	3.1	UJ	9
SSHS-B3575-SUB-14-16	1,2,4-Trichlorobenzene	2.9	U,*+,*1	2.9	UJ	9

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
*1-laboratory flag indicating laboratory control sample/laboratory controls sample duplicate (LCS/LCSD) relative percent difference (RPD) was outside of the laboratory specified acceptance criteria
*--laboratory flag indicating LCS and or LCSD recovery was outside of the laboratory specified acceptance criteria with low bias
*+-laboratory flag indicating LCS and or LCSD recovery was outside of the laboratory specified acceptance criteria with high bias

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four method blanks were reported (batches 345641, 345784, 345790 and 345821). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

DRAFT

1.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four LCS/LCSD pairs were reported. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of dichlorodifluoromethane in the LCS/LCSD pair in batch 345641 were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect dichlorodifluoromethane results in the associated samples were UJ qualified as estimated less than the MDL.

The LCSD recoveries of 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene and RPDs of chloroethane, 1,2-dibromo-3-chloropropane, 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene in the LCS/LCSD pair in batch 345790 were high and outside of the QAPP specified acceptance criteria. Since these compounds were not detected in the associated sample, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3575-SUB-2-4	Dichlorodifluoromethane	3.0	U,*-	3.0	UJ	5
SSHS-B3575-SUB-4-6	Dichlorodifluoromethane	3.1	U,*-	3.1	UJ	5
SSHS-B3575-SUB-6-8	Dichlorodifluoromethane	2.8	U,*-	2.8	UJ	5
SSHS-B3575-SUB-12-14	Dichlorodifluoromethane	2.7	U,*-	2.7	UJ	5

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
*--laboratory flag indicating LCS and or LCSD recovery was outside of the laboratory specified acceptance criteria with low bias

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Trip Blank

A trip blank was not collected with the sample set; this did not result in qualifications but should be noted by the data user.

1.11 Field Duplicate

Field duplicates were not collected with the sample set.

DRAFT

1.12 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The samples were reported to the MDLs. Sample SSHS-B3575-SUB-8-10 was analyzed from a methanol preserved Terracore; therefore, elevated non-detect results were reported for sample SSHS-B3575-SUB-8-10. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	May 6, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-117387-1 Revision 1**

SITE: Former Sperry Remington Site-Groundwater

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of eight groundwater samples including one sample for matrix spike/matrix spike duplicate (MS/MSD) analysis, as well as one field duplicate and one trip blank collected on 17 February 2021, as part of the Former Sperry Remington Site-Groundwater sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the sample for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA 3520C/8270D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3510C/8082A
- Metals by USEPA Methods 3005A/6010C
- Mercury by USEPA Method 7470A

Eurofins TestAmerica, Edison, New Jersey analyzed the sample for the following analytical test:

- 1,4-Dioxane by USEPA Methods 3510C/8270E using Selected Ion Monitoring (SIM)

Eurofins TestAmerica, Canton, Ohio analyzed the sample for the following analytical test:

- Diesel Range Organics (DRO) by USEPA Methods 3510C/8015D

Eurofins TestAmerica, West Sacramento, California analyzed the sample for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by USEPA Methods 3535/537 (modified)

DRAFT

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

DRAFT

Laboratory ID	Client ID
180-117387-1	MW-1
180-117387-2	MW-2
180-117387-3	MW-3
180-117387-4	MW-26
180-117387-5	MW-48
180-117387-6	MW-49

Laboratory ID	Client ID
180-117387-7	MW-53
180-117387-7 MS	MW-53 MS
180-117387-7 MSD	MW-53 MSD
180-117387-8	MW-56
180-117387-9	DUP-04
180-117387-10	TB-20210218

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

The laboratory report was revised on May 6, 2021 to add missing initial calibration data for the PCBs. The revised report was identified as 180-117387-1 Revision 1.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per USEPA Methods 5030C/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
⊗ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exception. The non-detect results for 1,4-dioxane were R qualified as rejected due to low RRF in the initial calibration and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding time for the VOC analysis of a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations, with the following exceptions.

The %RSDs of 1,2-dibromo-3-chloropropane (44.5%), 1,2,4-trichlorobenzene (27.9%) and 1,2,3-trichlorobenzene (30.9%) were high and outside of the laboratory specified acceptance criteria. Since 1,2-dibromo-3-chloropropane, 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene were not detected in the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

The average RRFs of methyl acetate (0.0816) and 1,2-dibromo-3-chloropropane (0.0310) in the initial calibration analyzed on CHHP11 in batch 346648 was low and outside of the laboratory

DRAFT

specified acceptance criteria. Since the average RRFs of methyl acetate and 1,2-dibromo-3-chloropropane were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance (NFG, June 2008) had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2017) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was 0.0009, less than 0.010. Therefore, based on professional and technical judgment and average RRF less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
DUP-04	1,4-Dioxane	43	U	43	R	9
MW-1	1,4-Dioxane	43	U	43	R	9
MW-2	1,4-Dioxane	43	U	43	R	9
MW-26	1,4-Dioxane	43	U	43	R	9
MW-3	1,4-Dioxane	43	U	43	R	9
MW-48	1,4-Dioxane	43	U	43	R	9
MW-49	1,4-Dioxane	43	U	43	R	9
MW-53	1,4-Dioxane	43	U,F2	43	R	9
MW-56	1,4-Dioxane	43	U	43	R	9
TB-20210218	1,4-Dioxane	43	U	43	R	9

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
F2-laboratory flag indicating MS/MSD relative percent difference (RPD) was outside the laboratory specified acceptance criteria
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

DRAFT

The percent differences or percent drifts (%Ds) of the ICV and CCV were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of 1,2-dibromo-3-chloropropane (31.2%) in the ICV in batch 346648 was outside of the laboratory specified acceptance criteria, with low bias. Therefore, based on professional and technical judgment the non-detect 1,2-dibromo-3-chloropropane results in the associated samples were UJ qualified as estimated less than the MDL.

The %D of 1,2,3-trichlorobenzene (58.6%) in the ICV in batch 346648 was outside of the laboratory specified acceptance criteria, with high bias. Since 1,2,3-trichlorobenzene was not detected in the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

The %D of acetone (21.8%) in the CCV in batch 347591 was outside of the laboratory specified acceptance criteria, with high bias. Since acetone was not detected in the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of 1,4-dioxane (36.4%), 1,2,4-trichlorobenzene (34.9%) and 1,2,3-trichlorobenzene (24.6%) in the CCV in batch 347591 were outside of the laboratory specified acceptance criteria, with low biases. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualification was applied to the 1,4-dioxane data, based on professional and technical judgment. However, the non-detect results of 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene in the associated samples were UJ qualified as estimated less than the MDLs.

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-04	1,2,3-Trichlorobenzene	1.1	U,*+	1.1	UJ	9
DUP-04	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
DUP-04	1,2-Dibromo-3-Chloropropane	0.89	U	0.89	UJ	9
MW-1	1,2,3-Trichlorobenzene	1.1	U,*+	1.1	UJ	9
MW-1	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
MW-1	1,2-Dibromo-3-Chloropropane	0.89	U	0.89	UJ	9
MW-2	1,2,3-Trichlorobenzene	1.1	U,*+	1.1	UJ	9
MW-2	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
MW-2	1,2-Dibromo-3-Chloropropane	0.89	U	0.89	UJ	9
MW-26	1,2,3-Trichlorobenzene	1.1	U,*+	1.1	UJ	9
MW-26	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
MW-26	1,2-Dibromo-3-Chloropropane	0.89	U	0.89	UJ	9
MW-3	1,2,3-Trichlorobenzene	1.1	U,*+	1.1	UJ	9

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-3	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
MW-3	1,2-Dibromo-3-Chloropropane	0.89	U	0.89	UJ	9
MW-48	1,2,3-Trichlorobenzene	1.1	U,*+	1.1	UJ	9
MW-48	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
MW-48	1,2-Dibromo-3-Chloropropane	0.89	U	0.89	UJ	9
MW-49	1,2,3-Trichlorobenzene	1.1	U,*+	1.1	UJ	9
MW-49	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
MW-49	1,2-Dibromo-3-Chloropropane	0.89	U	0.89	UJ	9
MW-53	1,2,3-Trichlorobenzene	1.1	U,F2,F1,*+	1.1	UJ	9
MW-53	1,2,4-Trichlorobenzene	0.77	U,F2	0.77	UJ	9
MW-53	1,2-Dibromo-3-Chloropropane	0.89	U,F2,F1	0.89	UJ	9
MW-56	1,2,3-Trichlorobenzene	1.1	U,*+	1.1	UJ	9
MW-56	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
MW-56	1,2-Dibromo-3-Chloropropane	0.89	U	0.89	UJ	9
TB-20210218	1,2,3-Trichlorobenzene	1.1	U,*+	1.1	UJ	9
TB-20210218	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
TB-20210218	1,2-Dibromo-3-Chloropropane	0.89	U	0.89	UJ	9

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recovery was outside the laboratory specified acceptance criteria
F2-laboratory flag indicating MS/MSD RPD was outside the laboratory specified acceptance criteria
*+-laboratory flag indicating LCS recovery was high and outside the laboratory specified acceptance criteria

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 347591). VOCs were not detected in the method blank above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample MW-53. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The MSD recoveries of 1,2-dibromo-3-chloropropane and 1,2,3-trichlorobenzene and the RPDs of 1,2-dibromo-3-chloropropane, 1,4-dioxane, 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene

DRAFT

in the MS/MSD pair were high and outside of the QAPP specified acceptance criteria. Since 1,2-dibromo-3-chloropropane, 1,4-dioxane, 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene were not detected in sample MW-53, no qualifications were applied to the data.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of 1,2-dibromo-3-chloropropane and 1,2,3-trichlorobenzene in the LCS were high and outside of the QAPP specified acceptance criteria. Since 1,2-dibromo-3-chloropropane and 1,2,3-trichlorobenzene were not detected in the associated samples, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Trip Blank

One trip blank was collected with the sample set, TB-20210218. VOCs were not detected in the trip blank above the MDLs.

1.11 Field Duplicate

One field duplicate was collected with the sample set, DUP-04. Acceptable precision [RPD <30% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicate and the original sample, MW-49.

1.12 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

DRAFT

1.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

The MDLs of the following compounds did not meet the screening criteria listed in Table 2 of the QAPP.

Analyte	Method Detection Limit (MDL) (µg/L)	Screening Criteria (µg/L)
cis-1,3-Dichloropropene	0.59	0.4
1,2-Dibromo-3-Chloropropane	0.89	0.04
1,2-Dibromoethane	0.50	0.0006
trans-1,3-Dichloropropene	0.58	0.4

µg/L-micrograms per liter

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 1,4-DIOXANE

The samples were analyzed for 1,4-dioxane per USEPA Methods 3510C/8270E using SIM.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

2.1 Overall Assessment

The 1,4-dioxane data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the 1,4-dioxane analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria.

2.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 760662). 1,4-Dioxane was not detected in the method blank above the MDLs.

2.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

DRAFT

2.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCS duplicate pair was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

2.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-04 but was not reported for 1,4-dioxane per the COC.

2.10 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.11 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.12 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.13 Sensitivity

The sample was reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for 1,4-dioxane.

2.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per USEPA Methods 3520C/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues

DRAFT

were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The SVOC data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the SVOC analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the GC column performance and injection port inertness resulted in acceptable results.

DRAFT

3.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

3.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exception.

The %D of surrogate nitrobenzene-d5 (20.2%) in the CCV in batch 347944 was outside of the laboratory specified acceptance criteria with high bias. Since recoveries of surrogate nitrobenzene-d5 in the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of 2,2'-oxybis[1-chloropropane] (26.0%) in the CCV in batch 348046 was outside of the laboratory specified acceptance criteria with high bias. Since 2,2'-oxybis[1-chloropropane] was not detected in the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

3.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 347504 and 347510). SVOCs were not detected in the method blanks above the MDLs.

3.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample MW-53. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

One or both the recoveries of the following SVOCs in the MS/MSD pair were low and outside of the QAPP specified acceptance criteria. Therefore, the concentrations were J qualified as estimated and the non-detect results were UJ qualified as estimated less than the MDLs for these SVOCs in sample MW-53.

DRAFT

See Attachment 3 at the end of this report for the qualifications.

Acenaphthene	Dibenzofuran	Isophorone
Acenaphthylene	3,3'-Dichlorobenzidine	2-Methylnaphthalene
Acetophenone	2,4-Dichlorophenol	2-Methylphenol
Anthracene	Diethyl phthalate	Methylphenol, 3 & 4
Benzo[a]anthracene	2,4-Dimethylphenol	Naphthalene
Benzo[a]pyrene	Dimethyl phthalate	3-Nitroaniline
Benzo[b]fluoranthene	Di-n-butyl phthalate	4-Nitroaniline
Benzo[g,h,i]perylene	4,6-Dinitro-2-methylphenol	Nitrobenzene
Benzo[k]fluoranthene	2,4-Dinitrophenol	2-Nitrophenol
1,1'-Biphenyl	2,4-Dinitrotoluene	N-Nitrosodi-n-propylamine
Bis(2-chloroethoxy)methane	2,6-Dinitrotoluene	N-Nitrosodiphenylamine
Bis(2-chloroethyl)ether	Di-n-octyl phthalate	2,2'-oxybis[1-chloropropane]
4-Bromophenyl phenyl ether	1,4-Dioxane	Pentachlorophenol
Carbazole	Fluoranthene	Phenanthrene
4-Chloroaniline	Fluorene	Phenol
4-Chloro-3-methylphenol	Hexachlorobenzene	Pyrene
2-Chloronaphthalene	Hexachlorobutadiene	1,2,4,5-Tetrachlorobenzene
2-Chlorophenol	Hexachlorocyclopentadiene	2,3,4,6-Tetrachlorophenol
4-Chlorophenyl phenyl ether	Hexachloroethane	2,4,5-Trichlorophenol
Dibenz(a,h)anthracene	Indeno[1,2,3-cd]pyrene	2,4,6-Trichlorophenol

DRAFT

3.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

3.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.10 Field Duplicate

One field duplicate was collected with the sample set, DUP-04. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, MW-49.

3.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

3.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

3.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

The MDLs of the following compounds did not meet the screening criteria listed in Table 2 of the QAPP.

Analyte	Method Detection Limit (MDL) (µg/L)	Screening Criteria (µg/L)
Bis(2-ethylhexyl) phthalate	6.2	5.0
Hexachlorobenzene	0.056	0.04

µg/L-micrograms per liter

3.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 DIESEL RANGE ORGANIC

The samples were analyzed for DRO (C10-C28) per USEPA Methods 3510C/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications

DRAFT

- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

4.1 Overall Assessment

The DRO (C10-C28) data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding times for the DRO (C10-C28) analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

An appropriate initial calibration was performed for DRO (C10-C28). The laboratory calculated the %RSD of the calibration factors (CFs). The %RSDs were within the method and laboratory specified acceptance criteria.

4.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The %Ds between the CFs in the ICV and CCV were within the method and laboratory specified acceptance criteria.

4.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 474252). DRO (C10-C28) was not detected in the method blank above the MDL.

DRAFT

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample MW-53. The recovery and RPD results were within the laboratory specified acceptance criteria.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the laboratory specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-04. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, MW-49.

4.10 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

4.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

4.12 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for DRO (C10-C28).

4.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

5.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by USEPA methods 3510C/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
⊗ Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

5.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding times for the PCB analysis of a water sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

5.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and

validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

5.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria.

5.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 347534). The PCBs were not detected in the method blank above the MDLs, with the following exception.

PCB-1248 was detected in the method blank in batch 347534 at an estimated concentration greater than the MDL and less than the RL. Since PCB-1248 was detected at concentrations greater than the RL in the associated samples, no qualifications were applied to the data.

5.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample MW-53. The recovery and RPD results were within the QAPP specified acceptance criteria.

5.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

5.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

5.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-04. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, MW-49 with the following exception.

PCB-1254 was not detected in MW-49 and was detected at an estimated concentration greater than the MDL and less than the RL in DUP-04, resulting in a noncalculable RPD. Therefore, based on

DRAFT

professional and technical judgment the non-detect PCB-1254 result in MW-49 was UJ qualified as estimated less than the MDL and the PCB-1254 concentration in DUP-04 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-49	PCB-1254	0.0043	U	NC	0.0043	UJ	7
DUP-04	PCB-1254	0.0059	J		0.0059	J	7

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NC-not calculable

5.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

5.11 Target Compound Identification

The target compound identifications were within the validation criteria.

5.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-04	PCB-1248	0.019	B	0.019	J	13
DUP-04	PCB-1254	0.0059	J	0.0059	J	13
MW-1	PCB-1248	0.15	B	0.15	J	13
MW-1	PCB-1254	0.058	NA	0.058	J	13
MW-1	PCB-1260	0.017	NA	0.017	J	13
MW-56	PCB-1248	0.43	B	0.43	J	13
MW-56	PCB-1254	0.16	NA	0.16	J	13

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating analyte was detected in both the sample and method blank

DRAFT

NA-not applicable

5.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. A screening criterion was listed in Table 2 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 2 of the QAPP.

5.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

6.0 PFAS

The sample was analyzed for PFAS per USEPA methods 3535/537 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA

DRAFT

Analyte	Acronym
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

✓ Overall Assessment
✓ Holding Time
✓ Initial Calibration
✓ Initial and Continuing Calibration Verification
⊗ Initial and Continuing Calibration Blank
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Field Duplicate
✓ Isotope Dilution Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

6.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this sample set is 100%.

6.2 Holding Time

The laboratory-specified holding times for the for the PFAS analysis of a water sample are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

DRAFT

6.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The RRFs' relative standard deviations (RSDs) of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

6.4 Initial Calibration Verification and Continuing Calibration Verification

The ICVs and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICVs and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

6.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria, with the following exception.

PFHxS was detected in CCB in batch 465052 at an estimated concentration greater than the MDL and less than the RL. Therefore, the estimated PFHxS concentration in the associated sample was U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (ng/L)	Laboratory Flag	Validation Result (ng/L)	Validation Qualifier	Reason Code
MW-48	PFHxS	1.8	J	1.9	U	3

ng/L-nanograms per liter
J-estimated concentration greater than the MDL and less than the RL

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 464918). PFAS were not detected in the method blank above the MDLs.

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCS duplicate (LCSD) pair was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

DRAFT

6.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-04 but was not reported for PFAS per the COC.

6.10 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria.

6.11 Target Compound Identifications

The compound identifications were within the validation guidance.

6.12 Target Compound Quantitation

The compound quantitations were within the validation guidance.

6.13 Sensitivity

The sample was reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for PFAS.

6.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

7.0 METALS

The samples were analyzed for metals per USEPA methods 3005A/6010C. (Mercury was evaluated separately in Section 8.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Serial Dilution
- ✓ Laboratory Control Sample
- ✓ Internal Standard
- ⊗ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

7.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

7.2 Holding Times

The holding time for the total metals analysis of a water sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

7.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

7.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

7.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

DRAFT

7.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 347630) was reported. Metals were not detected in the method blank above the MDLs.

7.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample MW-53. The recovery and RPD results were within the QAPP specified acceptance criteria.

7.8 Serial Dilution

One sample set specific serial dilution was reported, using sample MW-53. The %D results were within the laboratory specified acceptance criteria.

7.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

7.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

7.11 Field Duplicate

One field duplicate was collected with the sample set, DUP-04. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, MW-49, with the following exceptions.

Aluminum and iron were detected in MW-49 at concentrations greater than the MDLs and were not detected in DUP-04, resulting in noncalculable RPDs. Therefore, based on professional and technical judgment the aluminum and iron concentrations in MW-49 were J qualified as estimated and the non-detect results of aluminum and iron in DUP-04 were UJ qualified as estimated less than the MDLs.

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-49	Aluminum	120	J	NC	120	J	7
DUP-04	Aluminum	53	U		53	UJ	7
MW-49	Iron	210	NA	NC	210	J	7
DUP-04	Iron	89	U		89	UJ	7

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

7.12 Compound Quantitation

The compound quantitations were within the validation criteria.

7.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP.

7.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

8.0 MERCURY

The samples were analyzed for mercury per USEPA method 7470A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

8.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

8.2 Holding Times

The holding time for the mercury analysis of a water sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

8.3 Initial Calibration

The method specified initial calibration requirements were met.

8.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

8.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

8.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 347822) was reported. Mercury was not detected in the method blank above the MDL.

DRAFT

8.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample MW-53. The recovery and RPD results were within the QAPP specified acceptance criteria.

8.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the QAPP specified acceptance criteria.

8.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-04. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, MW-49.

8.10 Compound Quantitation

The compound quantitations were within the validation criteria.

8.11 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 2 of the QAPP.

8.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

ATTACHMENT 3
ADDITIONAL QUALIFICATIONS

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-53	1,1'-Biphenyl	0.049	U,F1	0.049	UJ	4
MW-53	1,2,4,5-Tetrachlorobenzene	0.043	U,F1	0.043	UJ	4
MW-53	1,4-Dioxane	0.16	U	0.16	UJ	4
MW-53	2,2'-oxybis[1-chloropropane]	0.048	U,F1	0.048	UJ	4
MW-53	2,3,4,6-Tetrachlorophenol	0.038	U,F1	0.038	UJ	4
MW-53	2,4,5-Trichlorophenol	0.051	U,F1	0.051	UJ	4
MW-53	2,4,6-Trichlorophenol	0.057	U,F1	0.057	UJ	4
MW-53	2,4-Dichlorophenol	0.043	U,F1	0.043	UJ	4
MW-53	2,4-Dimethylphenol	0.034	U,F1	0.034	UJ	4
MW-53	2,4-Dinitrophenol	1.3	U,F1	1.3	UJ	4
MW-53	2,4-Dinitrotoluene	0.043	U,F1	0.043	UJ	4
MW-53	2,6-Dinitrotoluene	0.05	U,F1	0.05	UJ	4
MW-53	2-Chloronaphthalene	0.049	U,F1	0.049	UJ	4
MW-53	2-Chlorophenol	0.053	U,F1	0.053	UJ	4
MW-53	2-Methylnaphthalene	0.052	U,F1	0.052	UJ	4
MW-53	2-Methylphenol	0.25	U,F1	0.25	UJ	4
MW-53	2-Nitrophenol	0.051	U,F1	0.051	UJ	4
MW-53	3,3'-Dichlorobenzidine	0.49	U,F1	0.49	UJ	4
MW-53	3-Nitroaniline	0.056	U,F1	0.056	UJ	4
MW-53	4,6-Dinitro-2-methylphenol	1.2	U,F1	1.2	UJ	4
MW-53	4-Bromophenyl phenyl ether	0.053	U,F1	0.053	UJ	4
MW-53	4-Chloro-3-methylphenol	0.051	U,F1	0.051	UJ	4
MW-53	4-Chloroaniline	0.037	U,F1	0.037	UJ	4
MW-53	4-Chlorophenyl phenyl ether	0.051	U,F1	0.051	UJ	4
MW-53	4-Nitroaniline	0.048	U,F1	0.048	UJ	4
MW-53	Acenaphthene	0.054	U,F1	0.054	UJ	4
MW-53	Acenaphthylene	0.054	U,F1	0.054	UJ	4
MW-53	Acetophenone	0.052	U,F1	0.052	UJ	4
MW-53	Anthracene	0.041	U,F1	0.041	UJ	4
MW-53	Benzo[a]anthracene	0.063	U,F1	0.063	UJ	4
MW-53	Benzo[a]pyrene	0.044	U,F1	0.044	UJ	4
MW-53	Benzo[b]fluoranthene	0.081	U,F1	0.081	UJ	4
MW-53	Benzo[g,h,i]perylene	0.058	U,F1	0.058	UJ	4
MW-53	Benzo[k]fluoranthene	0.073	U,F1	0.073	UJ	4
MW-53	Bis(2-chloroethoxy)methane	0.056	U,F1	0.056	UJ	4
MW-53	Bis(2-chloroethyl)ether	0.033	U,F1	0.033	UJ	4
MW-53	Carbazole	0.043	U,F1	0.043	UJ	4
MW-53	Dibenz(a,h)anthracene	0.06	U,F1	0.06	UJ	4
MW-53	Dibenzofuran	0.061	U,F1	0.061	UJ	4
MW-53	Diethyl phthalate	0.47	U,F1	0.47	UJ	4

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-53	Dimethyl phthalate	0.047	U,F1	0.047	UJ	4
MW-53	Di-n-butyl phthalate	1.4	F1	1.4	J	4
MW-53	Di-n-octyl phthalate	0.57	U	0.57	UJ	4
MW-53	Fluoranthene	0.059	J,F1	0.059	J	4
MW-53	Fluorene	0.058	U,F1	0.058	UJ	4
MW-53	Hexachlorobenzene	0.047	U,F1	0.047	UJ	4
MW-53	Hexachlorobutadiene	0.058	U,F1	0.058	UJ	4
MW-53	Hexachlorocyclopentadiene	0.41	U,F1	0.41	UJ	4
MW-53	Hexachloroethane	0.052	U,F1	0.052	UJ	4
MW-53	Indeno[1,2,3-cd]pyrene	0.071	U,F1	0.071	UJ	4
MW-53	Isophorone	0.045	U,F1	0.045	UJ	4
MW-53	Methylphenol, 3 & 4	0.31	U,F1	0.31	UJ	4
MW-53	Naphthalene	0.049	U,F1	0.049	UJ	4
MW-53	Nitrobenzene	0.42	U,F1	0.42	UJ	4
MW-53	N-Nitrosodi-n-propylamine	0.059	U,F1	0.059	UJ	4
MW-53	N-Nitrosodiphenylamine	0.099	U,F1	0.099	UJ	4
MW-53	Pentachlorophenol	0.71	U,F1	0.71	UJ	4
MW-53	Phenanthrene	0.046	U,F1	0.046	UJ	4
MW-53	Phenol	0.41	U,F1	0.41	UJ	4
MW-53	Pyrene	0.045	U,F1	0.045	UJ	4

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recovery was outside the laboratory specified acceptance criteria

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	June 2, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-119815-1**

SITE: Former Sperry Remington Site-Deep Soil Investigation

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of nineteen solid samples including two samples for matrix spike/matrix spike duplicate (MS/MSD) analysis and five field duplicate samples collected on 9 April 2021, as part of the Former Sperry Remington Site- Deep Soil Investigation sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA 3541/8270D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3541/8082A
- Metals by USEPA Methods 3050B/6010C
- Mercury by USEPA Method 7471B
- Percent Solids by Standard Method (SM) 2540G

Eurofins TestAmerica, West Sacramento, California analyzed the samples for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by United States Environmental Protection Agency (USEPA) Methods 537 (modified)

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

DRAFT

The non-detect 1,4-dioxane results in the VOC analyses were R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 542-R-20-005)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 542-R-20-0061)
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-R-20-007)
- USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-119815-1	SSHS-B3864-SUB-16-18
180-119815-2	SSHS-B3864-SUB-18-20
180-119815-3	SSHS-B3864-SUB-20-22
180-119815-4	SSHS-B3864-SUB-22-24
180-119815-5	SSHS-B3864-SUB-24-26
180-119815-6	SSHS-B3864-SUB-26-28

Laboratory ID	Client ID
180-119815-7	SSHS-B3864-SUB-28-30
180-119815-8	SSHS-B3864-SUB-30-32
180-119815-8 MS	SSHS-B3864-SUB-30-32 MS
180-119815-8 MSD	SSHS-B3864-SUB-30-32 MSD

DRAFT

Laboratory ID	Client ID
180-119815-9	SSHS-B3864-SUB-32-34
180-119815-11	SSHS-B3863-SUB-16-18
180-119815-12	SSHS-B3863-SUB-18-20
180-119815-13	SSHS-B3863-SUB-20-22
180-119815-14	SSHS-B3863-SUB-22-24
180-119815-15	SSHS-B3863-SUB-24-26
180-119815-16	SSHS-B3863-SUB-26-28
180-119815-17	SSHS-B3863-SUB-28-30
180-119815-18	SSHS-B3863-SUB-30-32
180-119815-18 MS	SSHS-B3863-SUB-30-32 MS

Laboratory ID	Client ID
180-119815-18 MSD	SSHS-B3863-SUB-30-32 MSD
180-119815-19	SSHS-B3863-SUB-32-34
180-119815-20	SSHS-B3863-SUB-34-36
180-119815-21	DUP-19
180-119815-22	DUP-37
180-119815-23	DUP-38
180-119815-24	DUP-18
180-119815-25	DUP-39

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

The solids data, used to report the samples on a dry weight basis, were not validated.

SSHS-B3864-SUB-34-36 was received on hold and was not reported in the laboratory report. Sample SSHS-B3864-SUB-34-36 was reported in laboratory report 180-119815-2.

The laboratory noted sample 119815-610 was received but was not listed on the COC. The sample was not reported in the laboratory report.

Collection times were not documented for the field duplicates. The field duplicates were logged in with the collection time of 00:00.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per USEPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks

DRAFT

- ✓ Matrix Spike/Matrix Spike Duplicate
- ⊗ Laboratory Control Sample
- ✓ Surrogates
- ✓ Trip Blank
- ⊗ Field Duplicate
- ⊗ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect 1,4-dioxane results were R qualified as rejected due to low RRF in the initial calibration and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample are 48 hours from sample collection to freezing or preservation and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations. The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

DRAFT

The %RSDs of bromomethane (24.9%), chloroethane (23.1%) and 1,2,4-trichlorobenzene (27.4%) for the initial calibration performed on instrument CHHP11 in batch 344527 were high and outside of of the method specified acceptance criteria. Since the %RSDs of bromomethane, chloroethane and 1,2,4-trichlorobenzene were within the validation specified acceptance criteria, no qualifications were applied to the data.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance (NFG, June 2008) had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, November 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was 0.0023, less than 0.010. Therefore, based on professional and technical judgment and average RRF less than 0.010, the non-detect 1,4-dioxane results in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
DUP-19	1,4-Dioxane	37	U	37	R	9
DUP-37	1,4-Dioxane	43	U	43	R	9
DUP-38	1,4-Dioxane	43	U	43	R	9
DUP-39	1,4-Dioxane	38	U	38	R	9
SSHS-B3863-SUB-16-18	1,4-Dioxane	37	U	37	R	9
SSHS-B3863-SUB-18-20	1,4-Dioxane	40	U	40	R	9
SSHS-B3863-SUB-20-22	1,4-Dioxane	36	U	36	R	9
SSHS-B3863-SUB-22-24	1,4-Dioxane	36	U	36	R	9
SSHS-B3863-SUB-28-30	1,4-Dioxane	44	U	44	R	9
SSHS-B3864-SUB-16-18	1,4-Dioxane	38	U	38	R	9
SSHS-B3864-SUB-18-20	1,4-Dioxane	37	U	37	R	9
SSHS-B3864-SUB-20-22	1,4-Dioxane	36	U	36	R	9
SSHS-B3864-SUB-22-24	1,4-Dioxane	35	U	35	R	9
SSHS-B3864-SUB-24-26	1,4-Dioxane	36	U	36	R	9
SSHS-B3864-SUB-26-28	1,4-Dioxane	40	U	40	R	9
SSHS-B3864-SUB-28-30	1,4-Dioxane	41	U	41	R	9
SSHS-B3864-SUB-30-32	1,4-Dioxane	43	U	43	R	9
SSHS-B3864-SUB-32-34	1,4-Dioxane	45	U	45	R	9

µg/kg-micrograms per kilogram
U- laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICV and CCV were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of dichlorodifluoromethane (41.7%) and bromoform (21.9%) in the CCV in batch 353131 were outside of the laboratory specified acceptance criteria with low biases. Since the %D of bromoform was within the validation specified acceptance criteria, no qualifications were applied to the bromoform data. However, the non-detect dichlorodifluoromethane results in the associated samples were UJ qualified as estimated less than the MDL.

The %Ds of carbon disulfide (22.7%), 2-butanone (22.5%) and 4-methyl-2-pentanone (24.6%) in the CCV in batch 353131 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of acetone (32.6%), 2-butanone (22.9%), 2-hexanone (26.3%) and bromoform (25.0%) in the CCV in batch 353321 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of these analytes were within the validation specified acceptance criteria, no qualifications were applied to the data.

The %Ds of chloromethane (39.1%) and carbon disulfide (30.9%) in the CCV in batch 353321 were outside of the laboratory specified acceptance criteria with high biases. Since chloromethane and carbon disulfide were not detected in the associated samples, no qualifications were applied to the data.

The %D of bromoform (20.9%) in the CCV in batch 353484 was outside of the laboratory specified acceptance criteria with low bias. Since the %D of bromoform was within the validation specified acceptance criteria, no qualifications were applied to the data.

The %Ds of chloromethane (46.1%), vinyl chloride (21.9%), carbon disulfide (32.8%) and methyl acetate (27.6%) in the CCV in batch 353484 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

DRAFT

The %D of surrogate toluene-d8 (20.2%) in the CCV in batch 353484 was outside of the laboratory specified acceptance criteria with high bias. Since the recoveries of surrogate toluene-d8 in the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-19	Dichlorodifluoromethane	2.6	U	2.6	UJ	9
DUP-37	Dichlorodifluoromethane	3.0	U	3.0	UJ	9
DUP-38	Dichlorodifluoromethane	3.0	U	3.0	UJ	9
DUP-39	Dichlorodifluoromethane	2.7	U	2.7	UJ	9
SSHS-B3863-SUB-16-18	Dichlorodifluoromethane	2.6	U	2.6	UJ	9
SSHS-B3863-SUB-18-20	Dichlorodifluoromethane	2.8	U	2.8	UJ	9
SSHS-B3863-SUB-20-22	Dichlorodifluoromethane	2.5	U	2.5	UJ	9
SSHS-B3863-SUB-22-24	Dichlorodifluoromethane	2.6	U	2.6	UJ	9
SSHS-B3863-SUB-28-30	Dichlorodifluoromethane	3.1	U	3.1	UJ	9
SSHS-B3864-SUB-28-30	Dichlorodifluoromethane	2.9	U	2.9	UJ	9
SSHS-B3864-SUB-30-32	Dichlorodifluoromethane	3.0	U	3.0	UJ	9
SSHS-B3864-SUB-32-34	Dichlorodifluoromethane	3.1	U	3.1	UJ	9

µg/kg-micrograms per kilogram
U- laboratory flag indicating not detected at or above the MDL

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 353131, 353321 and 353484). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported using sample SSHS-B3864-SUB-30-32. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria.

DRAFT

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and two LCS/LCS duplicate (LCSD) pairs were reported. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The recovery of dichlorodifluoromethane in the LCS in batch 353131 was low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect dichlorodifluoromethane results in the associated samples were UJ qualified as estimated less than the MDL.

The recoveries of carbon disulfide and chloromethane in the LCSD in batch 353321 and the recovery of chloromethane in the LCSD in batch 353484 were high and outside of the QAPP specified acceptance criteria. Since carbon disulfide and chloromethane were not detected in the associated samples, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-19	Dichlorodifluoromethane	2.6	U	2.6	UJ	5
DUP-37	Dichlorodifluoromethane	3.0	U	3.0	UJ	5
DUP-38	Dichlorodifluoromethane	3.0	U	3.0	UJ	5
DUP-39	Dichlorodifluoromethane	2.7	U	2.7	UJ	5
SSHS-B3863-SUB-16-18	Dichlorodifluoromethane	2.6	U	2.6	UJ	5
SSHS-B3863-SUB-18-20	Dichlorodifluoromethane	2.8	U	2.8	UJ	5
SSHS-B3863-SUB-20-22	Dichlorodifluoromethane	2.5	U	2.5	UJ	5
SSHS-B3863-SUB-22-24	Dichlorodifluoromethane	2.6	U	2.6	UJ	5
SSHS-B3863-SUB-28-30	Dichlorodifluoromethane	3.1	U	3.1	UJ	5
SSHS-B3864-SUB-28-30	Dichlorodifluoromethane	2.9	U	2.9	UJ	5
SSHS-B3864-SUB-30-32	Dichlorodifluoromethane	3.0	U	3.0	UJ	5
SSHS-B3864-SUB-32-34	Dichlorodifluoromethane	3.1	U	3.1	UJ	5

µg/kg-micrograms per kilogram
U- laboratory flag indicating not detected at or above the MDL

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

DRAFT

The recoveries of surrogate 4-bromofluorobenzene in samples SSHS-B3863-SUB-18-20 and DUP-39 were high and outside of of the laboratory specified acceptance criteria. Since the recoveries of the remaining three surrogates were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

1.10 Trip Blank

A trip blank was not collected with the sample set; this did not result in qualification of the data but should be noted by the data user.

1.11 Field Duplicate

Four field duplicates were collected with the sample set, DUP-19, DUP-37, DUP-38 and DUP-39 and reported for VOCs per the COC. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original samples, SSHS-B3864-SUB-16-18, SSHS-B3864-SUB-30-32, SSHS-B3864-SUB-32-34 and SSHS-B3863-SUB-18-20, with the following exceptions.

Trichloroethene was detected at an estimated concentration greater than the MDL and less than the RL in SSHS-B3864-SUB-32-34 and was not detected in DUP-38, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the trichloroethene concentration in SSHS-B3864-SUB-32-34 was J qualified as estimated and the non-detect trichloroethene result in DUP-38 was UJ qualified as estimated less than the MDL.

Cyclohexane was detected at an estimated concentration greater than the MDL and less than the RL in SSHS-B3863-SUB-18-20 and was not detected in DUP-39, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the cyclohexane concentration in SSHS-B3863-SUB-18-20 was J qualified as estimated and the non-detect cyclohexane result in DUP-39 was UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3864-SUB-32-34	Trichloroethene	2.0	J	NC	2.0	J	7
DUP-38	Trichloroethene	1.9	U		1.9	UJ	7
SSHS-B3863-SUB-18-20	Cyclohexane	2.8	J	NC	2.8	J	7
DUP-39	Cyclohexane	2.6	U		2.6	UJ	7

µg/kg-micrograms per kilogram
J- laboratory flag indicating estimated concentration greater than the MDL and less than the RL
U- laboratory flag indicating not detected at or above the MDL
NC-not calculable

DRAFT

1.12 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria, with the following exception.

The response of internal standard 1,4-dichlorobenzene-d4 in sample DUP-39 was low and outside of the method specified acceptance criteria. Therefore, the non-detect results of the associated analytes in sample DUP-39 were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-39	1,2,3-Trichlorobenzene	3.0	U,*3	3.0	UJ	11
DUP-39	1,2,4-Trichlorobenzene	2.7	U,*3	2.7	UJ	11
DUP-39	1,2-Dibromo-3-Chloropropane	3.5	U,*3	3.5	UJ	11
DUP-39	1,2-Dichlorobenzene	1.8	U,*3	1.8	UJ	11
DUP-39	1,3-Dichlorobenzene	3.3	U,*3	3.3	UJ	11
DUP-39	1,4-Dichlorobenzene	1.6	U,*3	1.6	UJ	11

µg/kg-micrograms per kilogram
U- laboratory flag indicating not detected at or above the MDL
*3-laboratory flag indicating ISTD response or retention time was outside of acceptable limits

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per USEPA Methods 3541/8270D.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Instrument Performance
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

DRAFT

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of 2,2'-oxybis[1-chloropropane], 2-nitroaniline and 4-nitrophenol in the CCV in batch 353731 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 353303 and 353621). SVOCs were not detected in the method blanks above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported using sample SSHS-B3864-SUB-30-32. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exception.

The recovery of 2,4-dinitrophenol in the MSD was low and outside of of the QAPP specified acceptance criteria. Therefore, the non-detect 2,4-dinitrophenol result in sample SSHS-B3864-SUB-30-32 was UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3864-SUB-30-32	2,4-Dinitrophenol	2300	U,F1	2300	UJ	4

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the MDL

DRAFT

F1- laboratory flag indicating laboratory flag indicating MS and/or MS/MSD recovery was outside of of the laboratory specified acceptance criteria

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Duplicate

One field duplicate was collected with the sample set, DUP-19, and reported for SVOCs per the COC. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3864-SUB-16-18.

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

3.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by USEPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
⊗ Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

3.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the PCB analysis of a solid sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and

validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of PCB-1221 on GC column RTX-CLP2 in a bracketing CCV batch 352828 was outside of the laboratory specified acceptance criteria with low bias. Since the PCB-1221 results for the associated samples were reported from GC column RTX-CLP2 with CCV results within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of surrogate decachlorobiphenyl on one or both GC columns in bracketing CCVs in batch 352828 were outside of the laboratory specified acceptance criteria with high biases. Since the recoveries of surrogate decachlorobiphenyl in the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of PCB-1254 on GC column RTX-CLP1 in a bracketing CCV in batch 354108 was outside of the laboratory specified acceptance criteria with high bias. Since the PCB-1254 result for the associated sample was reported from GC column RTX-CLP2 with CCV results within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of PCB-1016 on GC column RTX-CLP1 in a bracketing CCV in batch 354108 was outside of the laboratory specified acceptance criteria with high bias. Since PCB-1016 was not detected in the associated sample, no qualifications were applied to the data.

The %Ds of PCB-1254 on GC column RTX-CLP1 in bracketing CCVs in batch 354283 were outside of the laboratory specified acceptance criteria with high bias. Since the PCB-1254 results for the associated samples were either not detected or reported from GC column RTX-CLP2 with CCV results within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

3.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 352696 and 353361). The PCBs were not detected in the method blanks above the MDLs.

DRAFT

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported using samples SSHS-B3864-SUB-30-32 and SSHS-B3863-SUB-30-32. The recovery and RPD results were within the QAPP specified acceptance criteria.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

Two field duplicates were collected with the sample set, DUP-19 and DUP-18, and reported for PCBs per the COC. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples, SSHS-B3864-SUB-16-18 and SSHS-B3863-SUB-20-22, with the following exception.

PCB-1254 was detected at a concentration greater than the RL in SSHS-B3863-SUB-20-22 and was not detected in DUP-18, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the PCB-1254 concentration in SSHS-B3863-SUB-20-22 was J qualified as estimated and the non-detect PCB-1254 result in DUP-18 was UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3863-SUB-20-22	PCB-1254	26	NA	NC	26	J	7
DUP-18	PCB-1254	5.2	U		5.2	UJ	7

µg/kg-micrograms per kilogram
U- laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable

3.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

DRAFT

3.11 Target Compound Identification

The target compound identifications were within the validation criteria.

3.12 Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

The estimated PCB-1260 concentration in sample SSHS-B3864-SUB-18-20 was p flagged to indicate the RPD between the GC columns were greater than 40%; therefore, based on professional and technical judgment the PCB-1260 concentration in sample SSHS-B3864-SUB-18-20 was J qualified as estimated.

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-19	PCB-1248	240	NA	240	J	13
SSHS-B3863-SUB-16-18	PCB-1248	2100	NA	2100	J	13
SSHS-B3863-SUB-18-20	PCB-1248	130	NA	130	J	13
SSHS-B3863-SUB-20-22	PCB-1248	83	NA	83	J	13
SSHS-B3863-SUB-22-24	PCB-1248	72	NA	72	J	13
SSHS-B3863-SUB-24-26	PCB-1248	100	NA	100	J	13
SSHS-B3863-SUB-28-30	PCB-1248	80	NA	80	J	13
SSHS-B3863-SUB-30-32	PCB-1248	130	NA	130	J	13
SSHS-B3863-SUB-34-36	PCB-1248	71	NA	71	J	13
SSHS-B3864-SUB-16-18	PCB-1248	220	NA	220	J	13
SSHS-B3864-SUB-18-20	PCB-1248	310	NA	310	J	13
SSHS-B3864-SUB-20-22	PCB-1248	220	NA	220	J	13
SSHS-B3864-SUB-22-24	PCB-1248	68	NA	68	J	13
SSHS-B3864-SUB-32-34	PCB-1248	94	NA	94	J	13
DUP-19	PCB-1254	66	NA	66	J	13
SSHS-B3863-SUB-16-18	PCB-1254	510	NA	510	J	13
SSHS-B3863-SUB-18-20	PCB-1254	36	NA	36	J	13
SSHS-B3863-SUB-20-22	PCB-1254	26	NA	26	J	13
SSHS-B3863-SUB-22-24	PCB-1254	22	NA	22	J	13

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3863-SUB-24-26	PCB-1254	30	NA	30	J	13
SSHS-B3863-SUB-28-30	PCB-1254	23	NA	23	J	13
SSHS-B3863-SUB-30-32	PCB-1254	36	NA	36	J	13
SSHS-B3863-SUB-34-36	PCB-1254	31	NA	31	J	13
SSHS-B3864-SUB-16-18	PCB-1254	73	NA	73	J	13
SSHS-B3864-SUB-18-20	PCB-1254	110	NA	110	J	13
SSHS-B3864-SUB-20-22	PCB-1254	67	NA	67	J	13
SSHS-B3864-SUB-22-24	PCB-1254	22	NA	22	J	13
SSHS-B3864-SUB-32-34	PCB-1254	26	NA	26	J	13
SSHS-B3863-SUB-16-18	PCB-1260	32	NA	32	J	13
SSHS-B3864-SUB-18-20	PCB-1260	11	J,p	11	J	13

µg/kg-micrograms per kilogram
J- laboratory flag indicating estimated concentration greater than the MDL and less than the RL
p-laboratory flag indicating the RPD between the GC columns was greater than 40%
NA-not applicable

3.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

3.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

4.0 METALS

The samples were analyzed for metals per USEPA methods 3050B/6010C. (Mercury was evaluated separately in Section 5.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ⊗ Serial Dilution
- ✓ Laboratory Control Sample
- ✓ Internal Standard
- ⊗ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

4.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding time for the total metals analysis of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

4.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

4.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

4.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method specified acceptance criteria, with the following exception.

DRAFT

Thallium was detected in a bracketing CCB in batch 354112. Since the CCB did not bracket the samples, no qualifications were applied to the data.

4.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks (batches 353852 and 353853) were reported. Metals were not detected in the method blanks above the MDLs.

4.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported using sample SSHS-B3864-SUB-30-32. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of antimony in the MS/MSD were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect antimony result in sample SSHS-B3864-SUB-30-32 was UJ qualified as estimated less than the MDL.

The recoveries of magnesium in the MS/MSD were high and outside of the QAPP specified acceptance criteria and the magnesium concentration in the post digestion spike (PDS) Therefore, the magnesium concentration in sample SSHS-B3864-SUB-30-32 was J qualified as estimated.

No qualifications were applied to the data based on the MS/MSD recoveries if the sample concentration was greater than four times the spiked concentration.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3864-SUB-30-32	Antimony	0.30	U,F1	0.30	UJ	4
SSHS-B3864-SUB-30-32	Magnesium	3900	F1	3900	J	4

mg/kg-milligrams per kilogram
U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MS/MSD recovery was outside of of the laboratory specified acceptance criteria

4.8 Serial Dilution

One sample set specific serial dilution was reported using sample SSHS-B3645-SUB-2-4. The %D results were within the method specified acceptance criteria, with the following exceptions.

The %Ds of calcium and iron were high and outside of the method specified acceptance criteria. Therefore, the calcium and iron concentrations in sample SSHS-B3645-SUB-2-4 were J qualified as estimated.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3864-SUB-30-32	Calcium	36000	NA	36000	J	8
SSHS-B3864-SUB-30-32	Iron	10000	NA	10000	J	8

mg/kg-milligrams per kilogram
NA-not applicable

4.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

4.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

4.11 Field Duplicate

One field duplicate was collected with the sample set, DUP-19, and reported for metals per the COC. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3864-SUB-16-18.

Antimony was detected in SSHS-B3864-SUB-16-18 at an estimated concentration greater than the MDL and less than the RL and was not detected in DUP-19, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment the antimony concentration in SSHS-B3864-SUB-16-18 was J qualified as estimated the non-detect antimony result in DUP-19 was UJ qualified as estimated less than the MDL.

Vanadium was detected in SSHS-B3864-SUB-16-18 at a concentration greater than the RL and was detected in DUP-19 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment the vanadium concentrations in field duplicate pair SSHS-B3864-SUB-16-18/DUP-19 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3864-SUB-16-18	Antimony	0.57	J	NC	0.57	J	7
DUP-19	Antimony	0.32	U		0.32	UJ	7
SSHS-B3864-SUB-16-18	Vanadium	6.1	NA	NC	6.1	J	7
DUP-19	Vanadium	4.6	J		4.6	J	7

mg/kg-milligrams per kilogram

DRAFT

J- laboratory flag indicating estimated concentration greater than the MDL and less than the RL
U- laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable

4.12 Compound Quantitation

The compound quantitations were within the validation criteria.

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

5.0 MERCURY

The samples were analyzed for mercury per USEPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

DRAFT

5.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

5.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks (batches 353979 and 354173) were reported. Mercury was not detected in the method blanks above the MDL.

5.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported using sample SSHS-B3864-SUB-30-32. The recovery and RPD results were within the QAPP specified acceptance criteria.

5.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

DRAFT

5.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-19, and reported for mercury per the COC. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3864-SUB-16-18.

5.10 Compound Quantitation

The compound quantitations were within the validation criteria.

5.11 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

5.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

6.0 PFAS

The samples were analyzed for PFAS per USEPA methods 537.1 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS

DRAFT

Analyte	Acronym
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine the impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Isotope Dilution Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

6.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this sample set is 100%.

6.2 Holding Time

The laboratory-specified holding times for the for the PFAS analyses of a solid sample are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

6.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The RRFs' relative standard deviations (RSDs) of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

6.4 Initial Calibration Verification and Continuing Calibration Verification

The ICVs and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICVs and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

6.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 480193). PFAS were not detected in the method blank above the MDLs.

6.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-B3864-SUB-30-32. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exception.

The recovery of PFBS in the MS in batch 480193 was high and outside of the laboratory specified acceptance criteria. Since PFBS was not detected in sample SSHS-B3864-SUB-30-32, no qualifications were applied to the data.

6.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria, with the following exception.

DRAFT

The recovery of PFBS in the LCS in batch 480193 was high and outside of the laboratory specified acceptance criteria. Since PFBS was not detected in the associated samples, no qualifications were applied to the data.

6.8 Field Duplicate

One field duplicate was collected with the sample set, DUP-19, and reported for PFAS per the COC. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample, SSHS-B3864-SUB-16-18.

6.9 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria.

6.10 Target Compound Identifications

The compound identifications were within the validation guidance.

6.11 Target Compound Quantitation

The compound quantitations were within the validation guidance.

6.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported

6.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of of limits
5	LCS recovery outside of of limits
6	Surrogate recovery outside of of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	June 21, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-120679-1**

SITE: Former Sperry Remington Site-Groundwater

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of three groundwater samples, one field duplicate and one trip blank collected on 26 April 2021, as part of the Former Sperry Remington Site-Groundwater sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the sample for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C
- Semivolatile Organic Compounds (SVOCs) by USEPA 3520C/8270D
- Polychlorinated Biphenyls (PCBs) by USEPA Methods 3510C/8082A
- Metals by USEPA Methods 3005A/6010C
- Mercury by USEPA Method 7470A

Eurofins TestAmerica, Edison, New Jersey analyzed the sample for the following analytical test:

- 1,4-Dioxane by USEPA Methods 3510C/8270E using Selected Ion Monitoring (SIM)

Eurofins TestAmerica, Canton, Ohio analyzed the sample for the following analytical test:

- Diesel Organic Range (DRO) (C10-C28) by USEPA Methods 3510C/8015D

Eurofins TestAmerica, West Sacramento, California analyzed the sample for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by USEPA Methods 3535/537 (modified)

DRAFT

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- USEPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- USEPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- USEPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

DRAFT

Laboratory ID	Client ID
180-120679-1	MW-48
180-120679-2	MW-53
180-120679-3	MW-65

Laboratory ID	Client ID
180-120679-4	DUP-3
180-120679-5	TP-20210426

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

Collection times were not documented on the chain of custody (COC) for the field duplicate and trip blank. The field duplicate and trip blank were logged in with the collection time of 00:00.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per USEPA Methods 5030C/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
⊗ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane were R qualified as rejected due to low RRF in the initial calibration and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number

DRAFT

of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding time for the VOC analysis of a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. Based on the method of calibration, the laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exception.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance (NFG, June 2008) had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was 0.0027, less than 0.010. Therefore, based on professional and technical judgment and average RRF less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Laboratory Result (µg/L)	Validation Qualifier*	Reason Code**
DUP-3	1,4-Dioxane	43	U	43	R	9

engineers | scientists | innovators

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Laboratory Result (µg/L)	Validation Qualifier*	Reason Code**
MW-48	1,4-Dioxane	43	U	43	R	9
MW-53	1,4-Dioxane	43	U	43	R	9
MW-65	1,4-Dioxane	43	U	43	R	9
TP-20210426	1,4-Dioxane	43	U	43	R	9

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICV and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICV and CCV were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of dichlorodifluoromethane (20.5%), bromomethane (40.1%), chlorobromomethane (20.3%), cis-1,3-dichloropropene (26.9%) and bromoform (34.7%) in the CCV in batch 356135 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The %D of 1,4-dioxane in the CCV in batch 356135 was outside of the laboratory specified acceptance criteria with low bias. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

The %Ds of bromomethane (43.8%), chloroethane (25.1%), trichlorofluoromethane (22.2%), cis-1,3-dichloropropene (30.6%) and tetrachloroethene (27.3%) in the CCV in batch 356248 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated sample, no qualifications were applied to the data.

The %Ds of methyl acetate (26.8%) and 1,4-dioxane (46.8%) in the CCV in batch 356248 were outside of the laboratory specified acceptance criteria with low biases. Since the %D of methyl acetate was within the validation specified acceptance criteria and the 1,4-dioxane result in the sample was rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

DRAFT

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 356135 and 356248). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCS duplicate (LCSD) pair were reported. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria, with the following exceptions.

The recovery of cis-1,3-dichloropropene in the LCS in batch 356135 was high and outside of the QAPP specified acceptance criteria. Since cis-1,3-dichloropropene was not detected in the associated samples, no qualifications were applied to the data.

One or both the recoveries of chlorobromomethane, cis-1,2-dichloroethene, cis-1,3-dichloropropene and trichloroethene in the LCS/LCSD pair in batch 356248 were high and outside of the QAPP specified acceptance criteria. Since these analytes were not detected in the associated sample, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recovery of surrogate dibromofluoromethane in TP-20210426 was high and outside of the laboratory specified acceptance criteria. Since the recoveries of the remaining three surrogates were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

1.10 Trip Blank

One trip blank was collected with the sample set, TP-20210426. VOCs were not detected in the trip blank above the MDLs.

DRAFT

1.11 Field Duplicate

One field duplicate was collected with the sample set, DUP-3. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicate and the original samples MW-65.

1.12 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

The MDLs of the following compounds did not meet the screening criteria listed in Table 2 of the QAPP.

Analyte	Method Detection Limit (MDL) (µg/L)	Screening Criteria (µg/L)
cis-1,3-Dichloropropene	0.59	0.4
1,2-Dibromo-3-Chloropropane	0.89	0.04
1,2-Dibromoethane	0.50	0.0006
trans-1,3-Dichloropropene	0.58	0.4

µg/L-micrograms per liter

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 1,4-DIOXANE

The samples were analyzed for 1,4-dioxane per USEPA Methods 3510C/8270E using SIM.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The 1,4-dioxane data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the 1,4-dioxane analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRF and the %RSD of 1,4-dioxane were within the method and validation specified acceptance criteria. The average RRF of 1,4-dioxane was above the method and validation specified acceptance criteria.

DRAFT

2.4 Initial and Continuing Calibration Verifications

The ICV and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICV and CCVs for the target analytes were within the method and validation specified acceptance criteria.

2.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 775289). 1,4-Dioxane was not detected in the method blank above the MDL.

2.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

2.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

2.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-3. However, the field duplicate was not analyzed for 1,4-dioxane per the COC.

2.10 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.11 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.12 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

DRAFT

2.13 Sensitivity

The sample was reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for 1,4-dioxane.

2.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per USEPA Methods 3520C/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
⊗ Sensitivity
✓ Electronic Data Deliverable Review

3.1 Overall Assessment

3.1.1 Completeness

The SVOC data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid

DRAFT

analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.1.2 Analysis Anomaly

Sample MW-48 was analyzed both as undiluted and at a 1:5 dilution. The bis(2-ethylhexyl) phthalate concentration in the undiluted analysis was E flagged to indicate the concentration exceeded the calibration range. Therefore, the bis(2-ethylhexyl) phthalate concentration from the 1:5 dilution was considered for validation and the remaining analytes were considered for validation from the undiluted analysis. The results not considered for validation were marked as not reportable on the EDD.

3.2 Holding Times

The holding times for the SVOC analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

3.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

3.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria.

DRAFT

3.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 355082). SVOCs were not detected in the method blank above the MDLs.

3.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

3.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria, with the following exception.

The recovery of pentachlorophenol in the LCS in batch 355082 was low and outside the QAPP specified acceptance criteria. Therefore, the non-detect pentachlorophenol results in the associated samples were UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Laboratory Result (µg/L)	Validation Qualifier	Reason Code
DUP-3	Pentachlorophenol	0.96	U	0.96	UJ	5
MW-48	Pentachlorophenol	0.81	U	0.81	UJ	5
MW-53	Pentachlorophenol	0.81	U	0.81	UJ	5
MW-65	Pentachlorophenol	0.92	U	0.92	UJ	5

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the MDL

3.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.10 Field Duplicate

One field duplicate was collected with the sample set, DUP-3. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-65.

3.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

DRAFT

3.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

3.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

The MDLs of the following compounds did not meet the screening criteria listed in Table 2 of the QAPP.

Analyte	Method Detection Limit (MDL) (µg/L)	Screening Criteria (µg/L)
Bis(2-ethylhexyl) phthalate	6.2	5.0
Hexachlorobenzene	0.056	0.04

µg/L-micrograms per liter

3.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 DIESEL ORGANIC RANGE

The samples were analyzed for DRO (C10-C28) per USEPA Methods 3510C/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample

DRAFT

- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

4.1 Overall Assessment

The DRO (C10-C28) data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding times for the DRO (C10-C28) analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the calibration factors (CFs). The %RSDs of the target analytes were within the method and validation specified acceptance criteria.

4.4 Initial and Continuing Calibration Verifications

The ICV and CCVs were performed at the required frequency. The %Ds between the CF in the ICV and CCVs for the target analytes were within the method and validation specified acceptance criteria.

4.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 483948). DRO (C10-C28) was not detected in the method blank above the MDL.

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

DRAFT

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the QAPP specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-3. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-65.

4.10 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

4.11 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

4.12 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

5.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by USEPA methods 3510C/8082A.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Compound Quantitation
- ✓ Total vs Dissolved Assessment
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

5.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding times for the PCB analysis of a water sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

5.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

5.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of surrogates dichlorobiphenyl and tetrachloro-m-xylene on GC column RTX-CLP2 in bracketing CCVs in batch 356031 were outside of the laboratory specified acceptance criteria with high biases. Since the recoveries of surrogates dichlorobiphenyl and tetrachloro-m-xylene in the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of PCB-1016 on GC column RTX-CLP2 in a bracketing CCV in batch 356031 was outside of the laboratory specified acceptance criteria with high bias. Since PCB-1016 was not detected in the associated samples, no qualifications were applied to the data.

5.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 354885). The PCBs were not detected in the method blank above the MDLs.

5.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

5.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

5.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recovery of surrogate decachlorobiphenyl on GC column RTX-CLP2 in the method blank in batch 354885 was high and outside of the laboratory specified acceptance criteria. Since the recoveries of the surrogates were within the laboratory specified acceptance criteria for the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

DRAFT

5.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-3. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-65.

5.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

5.11 Target Compound Identification

The target compound identifications were within the validation criteria.

5.12 Compound Quantitation

The compound quantitations were within the validation criteria.

5.13 Total vs Dissolved Assessment

The samples were analyzed for both total and dissolved PCBs. The total PCB concentrations were greater than the dissolved PCB concentrations or the dissolved PCB concentrations were greater than the total PCB concentrations and the RPDs were ≤ 30%.

5.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. A screening criterion was listed in Table 2 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 2 of the QAPP.

5.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

6.0 PFAS

The sample was analyzed for PFAS per USEPA methods 3535/537 (modified). The following PFAS were reported:

DRAFT

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate

- ✓ Isotope Dilution Standards
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

6.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this sample set is 100%.

6.2 Holding Time

The laboratory-specified holding times for the for the PFAS analysis of a water sample are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

6.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The %RSDs of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

6.4 Initial Calibration Verification and Continuing Calibration Verification

The ICV and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICV and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

6.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICB and CCB met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 484147). PFAS were not detected in the method blank above the MDLs.

DRAFT

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

6.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-3. However, the field duplicate was not analyzed for PFAS per the COC.

6.10 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria.

6.11 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

6.12 Target Compound Identifications

The compound identifications were within the validation guidance.

6.13 Target Compound Quantitation

The compound quantitations were within the validation guidance.

6.14 Sensitivity

The sample was reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for PFAS.

6.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

DRAFT

7.0 METALS

The samples were analyzed for metals per USEPA methods 3005A/6010C. (Mercury was evaluated separately in Section 8.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank
⊗ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Duplicate
✓ Compound Quantitation
⊗ Total vs Dissolved Assessment
✓ Sensitivity
✓ Electronic Data Deliverables Review

DRAFT

7.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

7.2 Holding Times

The holding time for the total metals analysis of a water sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

7.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria.

7.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

7.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

7.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 355955) was reported. Metals were not detected in the method blank above the MDLs, with the following exception.

Selenium was detected in the method blank in batch 355955 at an estimated concentration greater than the MDL and less than the RL. Therefore, the estimated selenium concentrations in the associated samples were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Laboratory Result (µg/L)	Validation Qualifier	Reason Code
MW-48	Dissolved Selenium	4.2	J,B	10	U	3
MW-53	Dissolved Selenium	4.2	J,B	10	U	3
MW-65	Total Selenium	4.1	J,B	10	U	3
MW-65	Dissolved Selenium	4.2	J,B	10	U	3

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating the analyte was detected in both the sample and method blank

7.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

7.8 Serial Dilution

Serial dilutions were not reported.

7.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

DRAFT

7.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

7.11 Field Duplicate

One field duplicate was collected with the sample set, DUP-3. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-65, with the following exceptions.

Total chromium was detected in MW-65 at an estimated concentration greater than the MDL and less than the RL and was not detected in DUP-3, resulting in a noncalculable RPD. Therefore, the total chromium concentration in MW-65 was J qualified as estimated and the non-detect total chromium result in DUP-3 was UJ qualified as estimated less than the MDL, based on professional and technical judgment.

Dissolved manganese was detected in DUP-3 at an estimated concentration greater than the MDL and less than the RL and was not detected in MW-65, resulting in a noncalculable RPD. Therefore, the dissolved manganese concentration in DUP-3 was J qualified as estimated and the non-detect dissolved manganese result in MW-65 was UJ qualified as estimated less than the MDL, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Laboratory Result (µg/L)	Validation Qualifier	Reason Code
MW-65	Total Chromium	3.5	J	NC	3.5	J	7
DUP-3	Total Chromium	1.9	U		1.9	UJ	7
MW-65	Dissolved Manganese	2.7	U	NC	2.7	UJ	7
DUP-3	Dissolved Manganese	3.9	J		3.9	J	7

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NC-not calculable

7.12 Compound Quantitation

The compound quantitations were within the validation criteria.

7.13 Total vs Dissolved Assessment

The samples were analyzed for both total and dissolved metals. The total metals concentrations were greater than the dissolved metal concentrations or the dissolved metal concentrations were greater than the total metal concentrations and the RPDs were ≤ 30%, with the following exceptions.

DRAFT

Dissolved selenium was detected in MW-48 at an estimated concentration greater than the MDL and less than the RL and total selenium was not detected in MW-48. However, since the dissolved selenium concentration in MW-48 was U qualified due to method blank contamination and based on professional and technical judgment, no additional qualifications were applied to the data.

Dissolved manganese was detected in DUP-3 at an estimated concentration greater than the MDL and less than the RL and total manganese was not detected in DUP-3. Therefore, the dissolved manganese concentration was J qualified as estimated and the non-detect total manganese result was UJ qualified as estimated less than the MDL in DUP-3, based on professional and technical judgment.

Dissolved cobalt was detected in MW-53 at an estimated concentration greater than the MDL and less than the RL and total cobalt was not detected in MW-53. Therefore, the dissolved cobalt concentration was J qualified as estimated and the non-detect total cobalt result was UJ qualified as estimated less than the MDL in MW-53, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Laboratory Result (µg/L)	Validation Qualifier	Reason Code
DUP-3	Total Manganese	2.7	U	NC	2.7	UJ	13
DUP-3	Dissolved Manganese	3.9	J		3.9	J	13
MW-53	Total Cobalt	0.55	U	NC	0.55	U	13
MW-53	Dissolved Cobalt	0.64	J		0.64	J	13

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NC-not calculable

7.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP.

7.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

8.0 MERCURY

The samples were analyzed for mercury per USEPA method 7470A.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Compound Quantitation
- ✓ Total vs Dissolved Assessment
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

8.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

8.2 Holding Times

The holding time for the mercury analysis of a water sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

8.3 Initial Calibration

The method specified initial calibration requirements were met.

8.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

8.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

DRAFT

8.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 355933) was reported. Mercury was not detected in the method blank above the MDL.

8.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

8.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the QAPP specified acceptance criteria.

8.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-3. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-65.

8.10 Compound Quantitation

The compound quantitations were within the validation criteria.

8.11 Total vs Dissolved Assessment

The samples were analyzed for both total and dissolved mercury. The total mercury concentrations were greater than the dissolved mercury concentrations or the dissolved mercury concentrations were greater than the total mercury concentrations and the RPDs were ≤ 30%.

8.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 2 of the QAPP.

8.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

DRAFT

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	March 3, 2022
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-121903-1**

SITE: Former Sperry Remington Site RI

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of twenty-one solid samples including four samples for matrix spike/matrix spike duplicate (MS/MSD) analysis, as well as four field duplicates collected on 19 May 2021, as part of the Former Sperry Remington Site RI sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by US EPA Method 3541/8270D
- Polychlorinated Biphenyls (PCBs) by US EPA Methods 3541/8082A
- Metals by US EPA Methods 3050B/6010C
- Mercury by US EPA Method 7471B

Eurofins TestAmerica, West Sacramento, California analyzed the samples for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by US EPA Method 537 (modified)

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, and the information provided, the data as qualified are usable for supporting project objectives, with the following exceptions.

DRAFT

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and based on technical and professional judgment. It should be noted that the 1,4-dioxane results from the SVOC analysis are considered valid for use.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- US EPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3A Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3C Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

DRAFT

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-121903-1	SSHS-B3886-SUB-16-18
180-121903-2	SSHS-B3886-SUB-18-20
180-121903-3	SSHS-B3886-SUB-20-22
180-121903-4	SSHS-B3886-SUB-22-24

Laboratory ID	Client ID
180-121903-5	SSHS-B3886-SUB-24-26
180-121903-5 MS	SSHS-B3886-SUB-24-26 MS
180-121903-5 MSD	SSHS-B3886-SUB-24-26 MSD

Laboratory ID	Client ID
180-121903-6	SSHS-B3886-SUB-26-28
180-121903-8	SSHS-B3883-SUB-20-22
180-121903-8 MS	SSHS-B3883-SUB-20-22 MS
180-121903-8 MSD	SSHS-B3883-SUB-20-22 MSD
180-121903-9	SSHS-B3883-SUB-22-24
180-121903-10	SSHS-B3883-SUB-24-26
180-121903-11	SSHS-B3883-SUB-26-28
180-121903-12	SSHS-B3883-SUB-28-30
180-121903-12 MS	SSHS-B3883-SUB-28-30 MS
180-121903-12 MSD	SSHS-B3883-SUB-28-30 MSD
180-121903-13	SSHS-B3903-SUB-14-16
180-121903-14	SSHS-B3903-SUB-16-18
180-121903-15	SSHS-B3903-SUB-18-20

Laboratory ID	Client ID
180-121903-16	SSHS-B3903-SUB-20-22
180-121903-17	SSHS-B3903-SUB-22-24
180-121903-18	SSHS-B3903-SUB-24-26
180-121903-19	SSHS-B3903-SUB-26-28
180-121903-20	SSHS-B3903-SUB-28-30
180-121903-21	SSHS-B3903-SUB-30-31
180-121903-22	SSHS-B3903-SUB-31-33
180-121903-22 MS	SSHS-B3903-SUB-31-33 MS
180-121903-22 MSD	SSHS-B3903-SUB-31-33 MSD
180-121903-24	DUP-6
180-121903-25	DUP-43
180-121903-26	DUP-2
180-121903-27	DUP-3

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

Collection times were not documented on the chain of custody (COC) for the field duplicates, DUP-6, DUP-43, DUP-2 and DUP-3. The field duplicates were logged in with the collection time of 00:01.

Samples were received on hold. The samples on hold were not reported in this laboratory report.

Sample SSHS-B3883-SUB-30-32 was received but was not listed on the COC. The sample was placed on hold and was not reported in this laboratory report.

Terracore samples were received without sample IDs. The samples were identified by the laboratory as DUP-2 and SSHS-B3883-SUB-30-32 based on the sample appearances and the labeled moisture content containers which were distinctly different, brown soil and gray clay.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane were R qualified as rejected due to the low RRFs in the initial calibrations and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample collected as a Terracore are 48 hours from collection to frozen (water preserved) and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

DRAFT

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was 0.0014, less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
DUP-2	1,4-Dioxane	40	U	40	R	9
DUP-3	1,4-Dioxane	42	U	42	R	9
DUP-43	1,4-Dioxane	39	U	39	R	9
SSHS-B3883-SUB-20-22	1,4-Dioxane	40	U	40	R	9
SSHS-B3883-SUB-22-24	1,4-Dioxane	38	U	38	R	9
SSHS-B3883-SUB-24-26	1,4-Dioxane	37	U	37	R	9
SSHS-B3883-SUB-26-28	1,4-Dioxane	37	U	37	R	9
SSHS-B3883-SUB-28-30	1,4-Dioxane	42	U	42	R	9
SSHS-B3903-SUB-31-33	1,4-Dioxane	45	U	45	R	9

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (ICVs and CCVs)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRFs, no additional qualifications were applied to the data, based on professional and technical judgment.

DRAFT

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of dichlorodifluoromethane (-32.4%), chloromethane (-21.2%), methyl acetate (-25.4%), 2-butanone (-22.4%), 1,4-dioxane (-21.4%), 2-hexanone (23.1%) and bromoform (-26.5%) in the CCV in batch 358347 were outside of the method specified acceptance criteria with low biases. Since the %Ds of dichlorodifluoromethane, chloromethane, methyl acetate, 2-butanone and 2-hexanone were within the validation specified acceptance criteria and the 1,4-dioxane results in the associated samples were rejected based on the initial calibration average RRFs, no additional qualifications were applied to these analytes, based on professional and technical judgment. However, the non-detect results of bromoform in the associated samples were UJ qualified as estimated less than the method detection limit (MDL).

The %D of trichlorofluoromethane (-21.0%) in the CCV in batch 358529 was outside of the method specified acceptance criteria with a low bias. Since the %D of trichlorofluoromethane was within the validation specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

The %Ds of acetone (20.8%), 1,1,2,2-tetrachloroethane (22.3%) and 1,2-dibromo-3-chloropropane (25.0%) in the CCV in batch 358529 were outside of the method specified acceptance criteria with high biases. Since the %Ds of acetone, 1,1,2,2-tetrachloroethane and 1,2-dibromo-3-chloropropane were within the validation specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

The %D of bromomethane (-24.0%) in the CCV in batch 358707 was outside of the method specified acceptance criteria with a low bias. Since the %D of bromomethane was within the validation specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-2	Bromoform	2.8	U	2.8	UJ	9
DUP-3	Bromoform	3.0	U	3.0	UJ	9
SSHS-B3883-SUB-20-22	Bromoform	2.8	U	2.8	UJ	9
SSHS-B3883-SUB-22-24	Bromoform	2.7	U	2.7	UJ	9
SSHS-B3883-SUB-24-26	Bromoform	2.7	U	2.7	UJ	9

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the MDL

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 358347, 358529 and 358707). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three sample set specific MS/MSD pairs were reported using samples SSHS-B3883-SUB-20-22, SSHS-B3883-SUB-28-30 and SSHS-B3903-SUB-31-33. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria, with the following exceptions.

The MSD recovery of 1,1,2,2-tetrachloroethane and RPD of chloromethane in the MS/MSD pair using sample SSHS-B3883-SUB-28-30 were high and outside of the QAPP specified acceptance criteria. Since 1,1,2,2-tetrachloroethane and chloromethane were not detected in sample SSHS-B3883-SUB-28-30, no qualifications were applied to the data.

1.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCS were reported. The recovery results were within the QAPP specified acceptance criteria.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Duplicate

Three field duplicates were collected with the sample set and analyzed for the VOCs, DUP-2, DUP-3 and DUP-43. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original samples SSHS-B3883-SUB-26-28, SSHS-B3883-SUB-28-30 and SSHS-B3883-SUB-20-22, respectively, with the following exception.

Methylene chloride was detected in DUP-3 at a concentration greater than the MDL and was not detected in SSHS-B3883-SUB-28-30, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the concentration of methylene chloride in DUP-3 was J qualified as estimated and the non-detect result of methylene chloride in SSHS-B3883-SUB-28-30 was UJ qualified as estimated less than the MDL.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3883-SUB-28-30	Methylene Chloride	5.3	U	NC	5.3	UJ	7
DUP-3	Methylene Chloride	5.9	NA		5.9	J	7

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
NA-not applicable
NC-not calculable
RPD-relative percent difference

1.11 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3541/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

DRAFT

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of 2-nitroaniline (24.0%) in the CCVs in batches 358547 (24.0%) and 358696 (21.6%) were outside of the method specified acceptance criteria with high biases. Since 2-nitroaniline was not detected in the associated samples, no qualifications were applied to the data.

The %D of 2,2'-oxybis[1-chloropropane] (42.1%) in the CCV in batch 358723 was outside of the method specified acceptance criteria with a high bias. Since 2,2'-oxybis[1-chloropropane] was not detected in the associated samples, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 358461, 358465 and 358471). SVOCs were not detected in the method blanks above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three sample set specific MS/MSD pairs were reported using samples SSHS-B3903-SUB-31-33, SSHS-B3883-SUB-28-30 and SSHS-B3883-SUB-20-2. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of 2,4-dinitrophenol in the MS/MSD pair using sample SSHS-B3883-SUB-28-30 were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect result for 2,4-dinitrophenol in sample SSHS-B3883-SUB-28-30 was UJ qualified as estimated less than the MDL.

One or both the recoveries of 2,4-dinitrophenol and 4-chloroaniline in the MS/MSD pair using sample SSHS-B3903-SUB-31-33 were low and outside of the QAPP specified acceptance criteria, in addition the RPD of 2,4-dinitrophenol was high and outside of the QAPP specified acceptance

DRAFT

criteria. Therefore, the non-detect results for 2,4-dinitrophenol and 4-chloroaniline in sample SSHS-B3903-SUB-31-33 were UJ qualified as estimated less than the MDLs.

The RPD of benzaldehyde in the MS/MSD pair using sample SSHS-B3903-SUB-31-33 was high and outside of the QAPP specified acceptance criteria. Since benzaldehyde was not detected in sample SSHS-B3903-SUB-31-33, no qualifications were applied to the data.

The MSD recoveries of caprolactam, 4,6-dinitro-2-methylphenol, fluoranthene and 3-nitroaniline in the MS/MSD pair using sample SSHS-B3903-SUB-31-33 were low and outside of the laboratory specified acceptance criteria. Since the recoveries were within the QAPP specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The MSD recovery of 4,6-dinitro-2-methylphenol in the MS/MSD pair using sample SSHS-B3883-SUB-28-30 was low and outside of the laboratory specified acceptance criteria. Since the recovery was within the QAPP specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3883-SUB-28-30	2,4-Dinitrophenol	2300	U,F1	2300	UJ	4
SSHS-B3903-SUB-31-33	2,4-Dinitrophenol	2300	U,F1,F2	2300	UJ	4
SSHS-B3903-SUB-31-33	4-Chloroaniline	29	U,F1	29	UJ	4

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside of the laboratory specified acceptance criteria
F2-laboratory flag indicating MS/MSD RPD were outside of the laboratory specified acceptance criteria

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

DRAFT

2.10 Field Duplicate

Three field duplicates were collected with the sample set and analyzed for the SVOCs, DUP-2, DUP-3 and DUP-43. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples SSHS-B3883-SUB-26-28, SSHS-B3883-SUB-28-30 and SSHS-B3883-SUB-20-22, respectively.

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by US EPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank

DRAFT

⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the PCB analysis of a solid sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of peak 5 for PCB-1254 for CCV 180-358331/1 on both GC columns were outside of the method specified acceptance criteria with low biases. Since the overall %Ds of PCB-1254 were within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of surrogate tetrachloro-m-xylene for CCVIS 180-358331/26, CCVIS 180-358331/47 and CCVIS 180-358331/68 on one or both GC columns were outside of the method specified

DRAFT

acceptance criteria with high biases. Since the surrogate recoveries for the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of peak 1 for PCB-1016 for CCVIS 180-358331/47 on GC column RTX-CLP1 was outside of the method specified acceptance criteria with a high bias. Since the overall %D of PCB-1016 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peaks 1, 2 and 3 for PCB-1016 for CCVIS 180-358331/47 on GC column RTX-CLP2 were outside of the method specified acceptance criteria with high biases. Since the PCBs were reported from GC column RTX-CLP1 with the overall CCV %D within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peaks 1 and 3 for PCB-1268 for the ICV in batch 357315 on GC column RTX-CLP1 were outside of the method specified acceptance criteria with low biases. Since the overall %D of PCB-1268 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peaks 1, 3 and 4 for PCB-1268 for the ICV in batch 357315 on GC column RTX-CLP2 were outside of the method specified acceptance criteria with low biases. Since the PCB-1268 was reported from GC column RTX-CLP1 with the overall ICV %D within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of peak 5 for PCB-1254 for CCV 180-358989/1 on GC column RTX-CLP2 was outside of the method specified acceptance criteria with a low bias. Since the overall %Ds of PCB-1254 were within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of peak 5 for PCB-1016 for CCV 180-358989/1 on GC column RTX-CLP2 was outside of the method specified acceptance criteria with a low bias. Since the overall %D of PCB-1016 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peaks 4 and 5 for PCB-1016 for CCVIS 180-358989/68 on GC column RTX-CLP1 were outside of the method specified acceptance criteria with high biases. Since the overall %D of PCB-1016 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

DRAFT

The %Ds of peaks 4 and 5 for PCB-1016 for CCVIS 180-358989/68 on GC column RTX-CLP2 were outside of the method specified acceptance criteria with high biases. Since PCB-1016 was not detected in the associated samples, no qualifications were applied to the data.

The %Ds of surrogate decachlorobiphenyl for CCVIS 180-359286/26 and CCVIS 180-359286/47 on GC column RTX-CLP1 were outside of the method specified acceptance criteria with high biases. Since the surrogate recoveries for the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of peak 1 for PCB-1260 for CCVIS 180-359286/26 on GC column RTX-CLP2 was outside of the method specified acceptance criteria with a high bias. Since the overall %Ds of PCB-1260 were within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peak 1 for PCB-1260 for CCVIS 180-359286/47 on both GC columns were outside of the method specified acceptance criteria with high biases. Since the overall %Ds of PCB-1260 were within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

3.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 358138, 358666 and 358815). The PCBs were not detected in the method blanks above the MDLs.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four sample set specific MS/MSD pairs were reported using sample SSHS-B3903-SUB-31-33, SSHS-B3886-SUB-24-26, SSHS-B3883-SUB-20-22 and SSHS-B3883-SUB-28-30. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The MSD recoveries of PCB-1016 and PCB-1260 in the MS/MSD pair using sample SSHS-B3903-SUB-31-33 were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect results for the PCBs in sample SSHS-B3903-SUB-31-33 were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3903-SUB-31-33	PCB-1016	6.7	U,F1,F2	6.7	UJ	4

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3903-SUB-31-33	PCB-1221	7.3	U	7.3	UJ	4
SSHS-B3903-SUB-31-33	PCB-1232	5.0	U	5.0	UJ	4
SSHS-B3903-SUB-31-33	PCB-1242	3.0	U	3.0	UJ	4
SSHS-B3903-SUB-31-33	PCB-1248	4.9	U	4.9	UJ	4
SSHS-B3903-SUB-31-33	PCB-1254	6.2	U	6.2	UJ	4
SSHS-B3903-SUB-31-33	PCB-1260	5.8	U,F1	5.8	UJ	4
SSHS-B3903-SUB-31-33	PCB-1262	7.2	U	7.2	UJ	4
SSHS-B3903-SUB-31-33	PCB-1268	2.8	U	2.8	UJ	4

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside of the laboratory specified acceptance criteria
F2-laboratory flag indicating MS/MSD RPD were outside of the laboratory specified acceptance criteria

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recovery of surrogate tetrachloro-m-xylene in the MSD using sample SSHS-B3903-SUB-31-33 was low and outside of the laboratory specified acceptance criteria. Since surrogate recoveries in the original analysis of sample SSHS-B3903-SUB-31-33 were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

3.9 Field Duplicate

Four field duplicates were collected with the sample set, DUP-2, DUP-3, DUP-6 and DUP-43. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples SSHS-B3883-SUB-26-28, SSHS-B3883-SUB-28-30, SSHS-B3886-SUB-22-24 and SSHS-B3883-SUB-20-22, respectively.

3.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

DRAFT

3.11 Target Compound Identification

The target compound identifications were within the validation criteria.

3.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

3.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria was listed in Table 1 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 1 of the QAPP.

3.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 PFAS

The samples were analyzed for PFAS per US EPA method 537 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS

DRAFT

Analyte	Acronym
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Isotope Dilution Standards
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

4.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

4.2 Holding Time

The laboratory-specified holding times for the for the PFAS analysis of solid samples are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The %RSDs of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

4.4 Initial Calibration Verification and Continuing Calibration Verification

The ICV and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICV and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

4.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICB and CCB met the method specified acceptance criteria.

4.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 492279 and 494941). PFAS were not detected in the method blanks above the MDLs.

4.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three sample set specific MS/MSD pairs were reported using samples SSHS-B3903-SUB-31-33, SSHS-B3883-SUB-20-22 and SSHS-B3883-SUB-28-30. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exception.

The MSD recovery of PFHxS in the MS/MSD pair using sample SSHS-B3883-SUB-20-22 was high and outside of the laboratory specified acceptance criteria. Since PFHxS was not detected in sample SSHS-B3883-SUB-20-22, no qualifications were applied to the data.

DRAFT

4.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

Three field duplicates were collected with the sample set and analyzed for the PFASs, DUP-2, DUP-3 and DUP-43. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples SSHS-B3883-SUB-26-28, SSHS-B3883-SUB-28-30 and SSHS-B3883-SUB-20-22, respectively.

4.10 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria.

4.11 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

4.12 Target Compound Identifications

The compound identifications were within the validation guidance.

4.13 Target Compound Quantitation

The compound quantitations were within the validation guidance.

4.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria were not listed in the QAPP for PFAS.

4.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

5.0 METALS

The samples were analyzed for metals per US EPA methods 3050B/6010C. (Mercury was evaluated separately in Section 6.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank
✓ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
⊗ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Duplicate
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverables Review

DRAFT

5.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding time for the total metals analysis of solid samples is 180 days from sample collection to analysis. The holding times were met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria, with the following exceptions.

Barium, cadmium, chromium and thallium were detected in the ICSA in batch 358510 at estimated concentrations greater than the MDLs and less than the reporting limits (RLs) and selenium was detected at a concentration greater than the RL. Since barium and chromium were detected in the associated samples at concentrations greater than ten times the ICSA concentrations and selenium were not detected in the associated samples, no qualifications were applied to these metals, based on professional and technical judgment. However, the estimated cadmium and thallium concentrations in the associated samples were J qualified as estimated.

The arsenic and nickel results in the ICSA in batch 358510 were more negative than the MDLs and less than the RLs and the lead result was more negative than the RL. Since nickel was detected in the associated samples at concentrations greater than the negative of the ICSA concentration, no qualifications were applied to the nickel data. However, the arsenic concentrations less than ten times the negative of the ICSA concentration were J- qualified as estimated with low biases.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
DUP-2	Arsenic	3.7	NA	3.7	J-	13
DUP-2	Cadmium	0.11	J	0.11	J	13
DUP-2	Thallium	0.55	J	0.55	J	13
DUP-3	Arsenic	4.9	NA	4.9	J-	13
DUP-3	Cadmium	0.19	J	0.19	J	13
DUP-3	Thallium	0.95	J	0.95	J	13
DUP-43	Arsenic	4.2	NA	4.2	J-	13
DUP-43	Cadmium	0.16	J	0.16	J	13
DUP-43	Thallium	0.71	J	0.71	J	13
SSHS-B3883-SUB-20-22	Arsenic	4.1	NA	4.1	J-	13
SSHS-B3883-SUB-20-22	Cadmium	0.16	J,F1	0.16	J	13
SSHS-B3883-SUB-20-22	Thallium	0.38	J	0.38	J	13
SSHS-B3883-SUB-22-24	Arsenic	4.3	NA	4.3	J-	13
SSHS-B3883-SUB-22-24	Cadmium	0.11	J	0.11	J	13
SSHS-B3883-SUB-22-24	Thallium	0.39	J	0.39	J	13
SSHS-B3883-SUB-24-26	Arsenic	3.8	NA	3.8	J-	13
SSHS-B3883-SUB-24-26	Cadmium	0.10	J	0.10	J	13
SSHS-B3883-SUB-24-26	Thallium	0.49	J	0.49	J	13
SSHS-B3883-SUB-26-28	Arsenic	3.1	NA	3.1	J-	13
SSHS-B3883-SUB-26-28	Cadmium	0.12	J	0.12	J	13
SSHS-B3883-SUB-26-28	Thallium	0.63	J	0.63	J	13
SSHS-B3883-SUB-28-30	Arsenic	9.3	F1,F2	9.3	J-	13
SSHS-B3883-SUB-28-30	Cadmium	0.21	J,F1,F2	0.21	J	13
SSHS-B3883-SUB-28-30	Thallium	0.97	J,F1,F2	0.97	J	13

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3903-SUB-31-33	Arsenic	6.6	NA	6.6	J-	13
SSHS-B3903-SUB-31-33	Cadmium	0.20	J,F1	0.20	J	13
SSHS-B3903-SUB-31-33	Thallium	1.1	J,F1	1.1	J	13

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
F1-laboratory flag indicating MS and/or MSD recoveries were outside of the laboratory specified acceptance criteria
F2-laboratory flag indicating MS/MSD RPD were outside of the laboratory specified acceptance criteria
NA-not applicable

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

5.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 358232) was reported. Metals were not detected in the method blank above the MDLs.

5.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three sample set specific MS/MSD pairs were reported using samples SSHS-B3903-SUB-31-33, SSHS-B3883-SUB-20-22 and SSHS-B3883-SUB-28-30. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

One or both the recoveries of antimony, cadmium and magnesium in the MS/MSD pair using sample SSHS-B3883-SUB-20-22 were low and outside of the laboratory specified acceptance criteria. Also, the post digestion spike (PDS) recoveries of antimony, cadmium and magnesium were within the method specified acceptance criteria. Therefore, the concentrations of antimony, cadmium and magnesium in sample SSHS-B3883-SUB-20-22 were J qualified as estimated.

The RPD of calcium in the MS/MSD pair using sample SSHS-B3883-SUB-20-22 were high and outside of the laboratory specified acceptance criteria. Therefore, the concentration of calcium in sample SSHS-B3883-SUB-20-22 was J qualified as estimated.

DRAFT

One or both the recoveries of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc in the MS/MSD pair using sample SSHS-B3883-SUB-28-30 were low and outside of the laboratory specified acceptance criteria. In addition, the RPDs of antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, sodium, thallium and zinc were high and outside of the QAPP specified acceptance criteria. Also, the PDS recoveries of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc were within the method specified acceptance criteria. Therefore, the non-detect results of selenium and silver in sample SSHS-B3883-SUB-28-30 were UJ qualified as estimated less than the MDLs and the concentrations of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, potassium, sodium, thallium, vanadium and zinc were J qualified as estimated.

The MS recoveries were low and the MSD recoveries and RPDs were high, all outside of the QAPP specified acceptance criteria for calcium and magnesium in the MS/MSD pair using sample SSHS-B3883-SUB-28-30 were low and outside of the laboratory specified acceptance criteria. The PDS recovery of calcium was low and outside of the method specified acceptance criteria and the PDS recovery of magnesium was within the method specified acceptance criteria. Therefore, the concentrations of calcium and magnesium were J qualified as estimated.

One or both the recoveries of antimony, barium, beryllium, cadmium, chromium, copper, lead, magnesium, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc in the MS/MSD pair using sample SSHS-B3903-SUB-31-33 were low and outside of the laboratory specified acceptance criteria. Also, the PDS recoveries of antimony, barium, beryllium, cadmium, chromium, copper, lead, magnesium, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc were within the method specified acceptance criteria. Therefore, the non-detect results for selenium and silver in sample SSHS-B3903-SUB-31-33 were UJ qualified as estimated less than the MDLs and the concentrations of antimony, barium, beryllium, cadmium, chromium, copper, lead, magnesium, nickel, potassium, sodium, thallium, vanadium and zinc were J qualified as estimated.

DRAFT

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3883-SUB-20-22	Antimony	0.35	J,F1	0.35	J	4
SSHS-B3883-SUB-20-22	Cadmium	0.16	J,F1	0.16	J	4
SSHS-B3883-SUB-20-22	Calcium	45000	F2	45000	J	4
SSHS-B3883-SUB-20-22	Magnesium	8100	F1	8100	J	4
SSHS-B3883-SUB-28-30	Antimony	0.98	J,F1,F2	0.98	J	4
SSHS-B3883-SUB-28-30	Arsenic	9.3	F1,F2	9.3	J	4
SSHS-B3883-SUB-28-30	Barium	94	F1	94	J	4
SSHS-B3883-SUB-28-30	Beryllium	0.54	F1,F2	0.54	J	4

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3883-SUB-28-30	Cadmium	0.21	J,F1,F2	0.21	J	4
SSHS-B3883-SUB-28-30	Calcium	10000	F1,F2	10000	J	4
SSHS-B3883-SUB-28-30	Chromium	17	F1,F2	17	J	4
SSHS-B3883-SUB-28-30	Cobalt	12	F1,F2	12	J	4
SSHS-B3883-SUB-28-30	Copper	17	F1,F2	17	J	4
SSHS-B3883-SUB-28-30	Lead	11	F1,F2	11	J	4
SSHS-B3883-SUB-28-30	Magnesium	6600	F1,F2	6600	J	4
SSHS-B3883-SUB-28-30	Nickel	27	F1,F2	27	J	4
SSHS-B3883-SUB-28-30	Potassium	1600	F1	1600	J	4
SSHS-B3883-SUB-28-30	Selenium	0.60	U,F1,F2	0.60	UJ	4
SSHS-B3883-SUB-28-30	Silver	0.12	U,F1,F2	0.12	UJ	4
SSHS-B3883-SUB-28-30	Sodium	100	J,F1,F2	100	J	4
SSHS-B3883-SUB-28-30	Thallium	0.97	J,F1,F2	0.97	J	4
SSHS-B3883-SUB-28-30	Vanadium	18	F1	18	J	4
SSHS-B3883-SUB-28-30	Zinc	58	F1,F2	58	J	4
SSHS-B3903-SUB-31-33	Antimony	0.72	J,F1	0.72	J	4
SSHS-B3903-SUB-31-33	Barium	88	F1	88	J	4
SSHS-B3903-SUB-31-33	Beryllium	0.62	F1	0.62	J	4
SSHS-B3903-SUB-31-33	Cadmium	0.20	J,F1	0.20	J	4
SSHS-B3903-SUB-31-33	Chromium	19	F1	19	J	4
SSHS-B3903-SUB-31-33	Copper	18	F1	18	J	4
SSHS-B3903-SUB-31-33	Lead	12	F1	12	J	4
SSHS-B3903-SUB-31-33	Magnesium	8400	F1	8400	J	4
SSHS-B3903-SUB-31-33	Nickel	29	F1	29	J	4
SSHS-B3903-SUB-31-33	Potassium	1900	F1	1900	J	4
SSHS-B3903-SUB-31-33	Selenium	0.52	U,F1	0.52	UJ	4
SSHS-B3903-SUB-31-33	Silver	0.11	U,F1	0.11	UJ	4
SSHS-B3903-SUB-31-33	Sodium	100	J,F1	100	J	4
SSHS-B3903-SUB-31-33	Thallium	1.1	J,F1	1.1	J	4
SSHS-B3903-SUB-31-33	Vanadium	20	F1	20	J	4
SSHS-B3903-SUB-31-33	Zinc	57	F1	57	J	4

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside of the laboratory specified acceptance criteria
F2-laboratory flag indicating MS/MSD RPD were outside of the laboratory specified acceptance criteria

5.8 Serial Dilution

Three sample set specific serial dilutions were reported using samples SSHS-B3883-SUB-20-22, SSHS-B3883-SUB-28-30 and SSHS-B3903-SUB-31-33. The %D results were within the method specified acceptance criteria, with the following exceptions.

DRAFT

The %Ds of iron in the serial dilutions using samples SSHS-B3883-SUB-28-30 and SSHS-B3903-SUB-31-33 were high and outside of the method specified acceptance criteria. Therefore, the iron concentrations in samples SSHS-B3883-SUB-28-30 and SSHS-B3903-SUB-31-33 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3883-SUB-28-30	Iron	25000	NA	25000	J	8
SSHS-B3903-SUB-31-33	Iron	26000	NA	26000	J	8

mg/kg-milligrams per kilogram
NA-not applicable

5.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

5.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

5.11 Field Duplicate

Three field duplicates were collected with the sample set and analyzed for the metals, DUP-2, DUP-3 and DUP-43. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples SSHS-B3883-SUB-26-28, SSHS-B3883-SUB-28-30 and SSHS-B3883-SUB-20-22, respectively, with the following exceptions.

For the metal concentrations with an RPD greater than 50% in the field duplicate pair, the concentrations were J qualified as estimated.

Antimony was detected in SSHS-B3883-SUB-26-28 at an estimated concentration greater than the MDL and less than the RL and was detected in DUP-2 at a concentration greater than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment the antimony concentrations in field duplicate pair SSHS-B3883-SUB-26-28/DUP-2 were J qualified as estimated.

Cobalt was detected in SSHS-B3883-SUB-20-22 at an estimated concentration greater than the MDL and less than the RL and was detected in DUP-43 at a concentration greater than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment the

DRAFT

cobalt concentrations in field duplicate pair SSHS-B3883-SUB-20-22/DUP-43 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B3883-SUB-26-28	Antimony	0.69	J	NC	0.69	J	7
DUP-2	Antimony	5.2	NA		5.2	J	7
SSHS-B3883-SUB-26-28	Calcium	24000	NA	61	24000	J	7
DUP-2	Calcium	45000	NA		45000	J	7
SSHS-B3883-SUB-26-28	Magnesium	3400	NA	81	3400	J	7
DUP-2	Magnesium	8000	NA		8000	J	7
SSHS-B3883-SUB-28-30	Arsenic	9.3	F1,F2	62	9.3	J	7
DUP-3	Arsenic	4.9	NA		4.9	J	7
SSHS-B3883-SUB-28-30	Barium	94	F1	67	94	J	7
DUP-3	Barium	47	NA		47	J	7
SSHS-B3883-SUB-28-30	Manganese	510	NA	62	510	J	7
DUP-3	Manganese	270	NA		270	J	7
SSHS-B3883-SUB-20-22	Calcium	45000	F2	81	45000	J	7
DUP-43	Calcium	19000	NA		19000	J	7
SSHS-B3883-SUB-20-22	Cobalt	3.3	J	NC	3.3	J	7
DUP-43	Cobalt	5.5	NA		5.5	J	7
SSHS-B3883-SUB-20-22	Copper	13	NA	70	13	J	7
DUP-43	Copper	27	NA		27	J	7
SSHS-B3883-SUB-20-22	Zinc	39	NA	57	39	J	7
DUP-43	Zinc	70	NA		70	J	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
F1-laboratory flag indicating MS and/or MSD recoveries were outside of the laboratory specified acceptance criteria
F2-laboratory flag indicating MS/MSD RPD were outside of the laboratory specified acceptance criteria
NA-not applicable
NC-not calculable
RPD-relative percent difference

5.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

DRAFT

5.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

5.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

6.0 MERCURY

The samples were analyzed for mercury per US EPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

6.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

6.2 Holding Times

The holding time for the total mercury analysis of solid samples is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

6.3 Initial Calibration

The method specified initial calibration requirements were met.

6.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

6.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 358886) was reported. Mercury was not detected in the method blank above the MDL.

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three sample set specific MS/MSD pairs were reported using samples SSHS-B3903-SUB-31-33, SSHS-B3883-SUB-20-22 and SSHS-B3883-SUB-28-30. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exception.

The MSD recovery of mercury in the MS/MSD pair using sample SSHS-B3903-SUB-31-33 was high and outside of the QAPP specified acceptance criteria. Since mercury was not detected in sample SSHS-B3903-SUB-31-33, no qualifications were applied to the data.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the QAPP specified acceptance criteria.

DRAFT

6.9 Field Duplicate

Three field duplicates were collected with the sample set and analyzed for mercury, DUP-2, DUP-3 and DUP-43. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples SSHS-B3883-SUB-26-28, SSHS-B3883-SUB-28-30 and SSHS-B3883-SUB-20-22, respectively.

6.10 Target Compound Quantitation

The compound quantitations were within the validation criteria.

6.11 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

6.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

engineers | scientists | innovators

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of of limits
5	LCS recovery outside of of limits
6	Surrogate recovery outside of of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	4 March 2022
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-122085-1**

SITE: Former Sperry Remington Site RI

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of four solid samples including one sample for matrix spike/matrix spike duplicate (MS/MSD) analysis, as well as one field duplicate collected on 21 May 2021, as part of the Former Sperry Remington Site RI sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by US EPA Method 3541/8270D
- Polychlorinated Biphenyls (PCBs) by US EPA Methods 3541/8082A

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below and the information provided, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and based on technical and professional judgment. It should be noted that the 1,4-dioxane results from the SVOC analysis are considered valid for use.

Qualified data that were not rejected should be used within the limits of the qualifications.

DRAFT

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-122085-2	SSHS-B4012-SUB-18-20
180-122085-3	SSHS-B4012-SUB-20-22
180-122085-8	SSHS-B4012-SUB-30-32

Laboratory ID	Client ID
180-122085-9	SSHS-B4012-SUB-32-34
180-122085-14	DUP-205

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

Collection times were not documented on the chain of custody (COC) for the field duplicate, DUP-205. The field duplicate was logged in with the collection time of 00:00.

Samples were received on hold. The samples on hold were not reported in the laboratory report.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane were R qualified as rejected due to the low RRFs in the initial calibrations and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample collected as a Terracore are 48 hours from collection to frozen (water preserved) and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

DRAFT

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was 0.0014, less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result	Validation Qualifier*	Reason Code**
SSHS-B4012-SUB-18-20	1,4-Dioxane	43	U	43	R	9
SSHS-B4012-SUB-20-22	1,4-Dioxane	45	U	45	R	9

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (ICVs and CCVs)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRFs, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of dichlorodifluoromethane (-20.6%) and bromoform (-22.2%) in the CCV in batch 358013 were outside of the method specified acceptance criteria with low biases. Since the %Ds

DRAFT

of dichlorodifluoromethane and bromoform were within the validation specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

The %Ds of dichlorodifluoromethane (-31.0%) and trichlorofluoromethane (26.1%) in the CCV in batch 358013 were outside of the method specified acceptance criteria with low biases. Since the %Ds of dichlorodifluoromethane and trichlorofluoromethane were within the validation specified acceptance criteria, no qualifications were applied to the data, based on professional and technical judgment.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 358013 and 358159). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported with the data.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCS were reported. The recovery results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of 1,1,2,2-tetrachloroethane in the LCSs in batches 358013 and 358159 were high and outside of the QAPP specified acceptance criteria. Since 1,1,2,2-tetrachloroethane was not detected in the associated samples, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Duplicate

One field duplicate was collected with the sample set; however, the field duplicate was not analyzed for the VOCs.

1.11 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

DRAFT

1.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3541/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

2.1 Overall Assessment

The SVOC data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of 2,2'-oxybis[1-chloropropane] (31.2%), 4-chloro-3-methylphenol (20.8%) and pentachlorophenol (29.9%) in the CCV in batch 358966 were outside of the method specified

DRAFT

acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 358796). SVOCs were not detected in the method blank above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported with the data.

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Duplicate

One field duplicate was collected with the sample set; however, the field duplicate was not analyzed for the SVOCs.

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

DRAFT

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by US EPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

3.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the PCB analysis of a solid sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of peaks 4 and 5 for PCB-1254 for CCV 180-358509/1 on GC column RTX-CLP1 were outside of the method specified acceptance criteria with low biases. Since the overall %D of PCB-1254 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peaks 2 and 5 for PCB-1254 for CCV 180-358509/1 on GC column RTX-CLP2 were outside of the method specified acceptance criteria with low biases. Since PCB-1254 was reported from GC column RTX-CLP1 with the overall %D of PCB-1254 within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of surrogate tetrachloro-m-xylene for CCVIS 180-358509/26 on GC column RTX-CLP2 was outside of the method specified acceptance criteria with a high bias. Since the surrogate recoveries for the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peaks 3, 4 and 5 for PCB-1016 for CCVIS 180-358509/48 on GC column RTX-CLP1 were outside of the method specified acceptance criteria with low biases. Since the overall %D of PCB-1016 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of peak 5 for PCB-1016 for CCVIS 180-358509/48 on GC column RTX-CLP2 was outside of the method specified acceptance criteria with a high bias. Since the overall %D of PCB-1016 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

DRAFT

3.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 358139). The PCBs were not detected in the method blank above the MDLs.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-B4012-SUB-30-32. The recovery and RPD results were within the QAPP specified acceptance criteria.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-205. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicate and the original sample SSHS-B4012-SUB-32-34.

3.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

3.11 Target Compound Identification

The target compound identifications were within the validation criteria.

3.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

DRAFT

3.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria was listed in Table 1 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 1 of the QAPP.

3.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of of limits
5	LCS recovery outside of of limits
6	Surrogate recovery outside of of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	October 13, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverables – Eurofins TestAmerica Job Numbers 180-123985-1 and 180-123985-2**

SITE: Former Sperry Remington Site RI

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of thirty-one solid samples including two samples for matrix spike/matrix spike duplicate (MS/MSD) analysis and three field duplicates collected on 1 July 2021, as part of the Former Sperry Remington Site RI sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by US EPA 3541/8270D
- Polychlorinated Biphenyls (PCBs) by US EPA Methods 3541/8082A
- Metals by US EPA Methods 3050B/6010C
- Mercury by US EPA Method 7471B
- Percent Moisture by Standard Method 2540G

Eurofins TestAmerica, West Sacramento, California analyzed the samples for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by US EPA Method 537 (modified)

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

DRAFT

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and based on technical and professional judgment.

The non-detect result for benzaldehyde in sample SSHS-B4026-SUB-4-6 was R qualified as rejected due to MS/MSD pair recoveries less than 10%.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- US EPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-123985-1	SSHS-B4027-SUB-4-6
180-123985-2	SSHS-B4026-SUB-4-6
180-123985-2 MS	SSHS-B4026-SUB-4-6 MS

Laboratory ID	Client ID
180-123985-2 MSD	SSHS-B4026-SUB-4-6 MSD
180-123985-3	SSHS-B4025-SUB-4-6

DRAFT

Laboratory ID	Client ID
180-123985-4	DUP-3
180-123985-5	SSHS-B4019-SUB-0-0.17
180-123985-6	SSHS-B4019-SUB-0.17-1
180-123985-7	SSHS-B4019-SUB-1-2
180-123985-8	SSHS-B4019-SUB-2-4
180-123985-10	SSHS-B4018-SUB-0-0.17
180-123985-10 MS	SSHS-B4018-SUB-0-0.17 MS
180-123985-10 MSD	SSHS-B4018-SUB-0-0.17 MSD
180-123985-11	SSHS-B4018-SUB-0.17-1
180-123985-12	SSHS-B4018-SUB-1-2
180-123985-13	SSHS-B4018-SUB-2-4
180-123985-14	DUP-1
180-123985-15	SSHS-B4018-SUB-4-6
180-123985-16	SSHS-B4017-SUB-0-0.17
180-123985-17	SSHS-B4017-SUB-0.17-1
180-123985-18	SSHS-B4017-SUB-1-2

Laboratory ID	Client ID
180-123985-19	SSHS-B4017-SUB-2-4
180-123985-20	SSHS-B4017-SUB-4-6
180-123985-21	SSHS-B3920-SUB-14-16
180-123985-22	SSHS-B3920-SUB-16-18
180-123985-23	SSHS-B3920-SUB-18-20
180-123985-24	SSHS-B3920-SUB-20-22
180-123985-25	SSHS-B3920-SUB-22-24
180-123985-26	SSHS-B3920-SUB-24-26
180-123985-27	SSHS-B3920-SUB-26-28
180-123985-28	SSHS-B3920-SUB-28-30
180-123985-29	SSHS-B3920-SUB-30-32
180-123985-30	SSHS-B4020-SUB-0-0.17
180-123985-31	SSHS-B4021-SUB-0-0.17
180-123985-32	SSHS-B4022-SUB-0-0.17
180-123985-33	SSHS-B4023-SUB-0-0.17
180-123985-34	SSHS-B4024-SUB-0-0.17
180-123985-35	DUP-2

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

Collection times were not documented on the chain of custody (COC) for the field duplicates, DUP-1, DUP-2 and DUP-3. The field duplicates were logged in with the collection time of 00:00.

Sample SSHS-B4019-SUB-4-6 was received on hold per the COC and was not reported. Sample SSHS-B4017-SUB-4-6 was received on hold per the COC and was reported for SVOCs in laboratory report 180-123985-2 per the client's request. SVOC analysis was added for samples SSHS-B3920-SUB-24-26, SSHS-B3920-SUB-26-28, SSHS-B3920-SUB-28-30 and SSHS-B3920-SUB-30-32 per the client's request.

The *relinquished by* signature, date and time were only documented on page 4 of the COC and were not documented on pages 1-3.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times

DRAFT

- ✓ Instrument Performance Check
- ⊗ Initial Calibration
- ⊗ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ⊗ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane were R qualified as rejected due to the low RRF in the initial calibrations and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a Terracore sample preserved in water are 48 hours from collection to frozen and 14 days from collection to analysis. Methanol preserved Terracore samples have a holding time of 14 days. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

DRAFT

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRFs for 1,4-dioxane in the initial calibrations were 0.0033 and 0.0023, less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
DUP-1	1,4-Dioxane	39	U	39	R	9
SSHS-B4019-SUB-0-0.17	1,4-Dioxane	41	U	41	R	9
SSHS-B4019-SUB-0.17-1	1,4-Dioxane	41	U	41	R	9
SSHS-B4019-SUB-1-2	1,4-Dioxane	39	U	39	R	9
SSHS-B4019-SUB-2-4	1,4-Dioxane	39	U	39	R	9
SSHS-B4018-SUB-0-0.17	1,4-Dioxane	47	U	47	R	9
SSHS-B4018-SUB-0.17-1	1,4-Dioxane	41	U	41	R	9
SSHS-B4018-SUB-1-2	1,4-Dioxane	42	U	42	R	9
SSHS-B4018-SUB-2-4	1,4-Dioxane	40	U	40	R	9
SSHS-B4018-SUB-4-6	1,4-Dioxane	40	U	40	R	9
SSHS-B3920-SUB-24-26	1,4-Dioxane	110000	U	110000	R	9
SSHS-B3920-SUB-26-28	1,4-Dioxane	130000	U	130000	R	9
SSHS-B3920-SUB-28-30	1,4-Dioxane	41	U	41	R	9
SSHS-B3920-SUB-30-32	1,4-Dioxane	45	U	45	R	9
SSHS-B4020-SUB-0-0.17	1,4-Dioxane	42	U	42	R	9
SSHS-B4021-SUB-0-0.17	1,4-Dioxane	38	U	38	R	9
SSHS-B4022-SUB-0-0.17	1,4-Dioxane	38	U	38	R	9
SSHS-B4023-SUB-0-0.17	1,4-Dioxane	37	U	37	R	9
SSHS-B4024-SUB-0-0.17	1,4-Dioxane	41	U	41	R	9
DUP-2	1,4-Dioxane	41	U	41	R	9

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRF, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of chloroethane (103.8%), trichlorofluoromethane (124.5%), carbon disulfide (21.6%), 1,4-dioxane (31.8%), 1,2-dibromo-3-chloropropane (28.8%) and 1,2,3-trichlorobenzene (21.3%) in the CCV in batch 364343 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of chloromethane (25.3%), acetone (46.3%), methyl acetate (32.2%), 2-butanone (38.5%), 4-methyl-2-pentanone (28.5%), 2-hexanone (44.1%), bromoform (22.4%) and 1,2,4-trichlorobenzene (20.2%) in the CCV in batch 363662 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of chloromethane, methyl acetate, 2-butanone, 4-methyl-2-pentanone, bromoform and 1,2,4-trichlorobenzene in the CCV were within the validation specified acceptance criteria, no qualifications were applied to the chloromethane, methyl acetate, 2-butanone, 4-methyl-2-pentanone, bromoform and 1,2,4-trichlorobenzene data. However, the non-detect results of acetone and 2-hexanone in the associated samples were UJ qualified as estimated less than the MDLs.

The %Ds of dichlorodifluoromethane (36.8%), chloromethane (36.2%), vinyl chloride (25.5%), chloroethane (22.0%), methyl acetate (26.3%), methylene chloride (23.0%) and bromoform (22.8%) in the CCV in batch 363817 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of dichlorodifluoromethane, chloroethane, methyl acetate, methylene chloride and bromoform in the CCV were within the validation specified acceptance criteria, no qualifications were applied to the dichlorodifluoromethane, chloroethane, methyl acetate, methylene chloride and bromoform data. However, the non-detect results of chloromethane and vinyl chloride in the associated samples were UJ qualified as estimated less than the MDLs.

The %Ds of dichlorodifluoromethane (26.4%), chloromethane (21.5%), methyl acetate (35.6%), cyclohexane (23.0%) and bromoform (22.6%) in the CCV in batch 363845 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of

DRAFT

dichlorodifluoromethane, chloromethane, methyl acetate, cyclohexane and bromoform in the CCV were within the validation specified acceptance criteria, no qualifications were applied to the data.

The %Ds of dichlorodifluoromethane (24.2%), chloromethane (28.9%), methyl acetate (37.2%), 1,1,2-trichloroethane (22.4%) and bromoform (27.7%) in the CCV in batch 364007 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of dichlorodifluoromethane, chloromethane and methyl acetate in the CCV were within the validation specified acceptance criteria, no qualifications were applied to the dichlorodifluoromethane, chloromethane and methyl acetate data. However, the non-detect results of 1,1,2-trichloroethane and bromoform in the associated sample were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B4018-SUB-4-6	1,1,2-Trichloroethane	1.1	U	1.1	UJ	9
SSHS-B4019-SUB-0.17-1	2-Hexanone	1.8	U	1.8	UJ	9
SSHS-B4019-SUB-1-2	2-Hexanone	1.8	U	1.8	UJ	9
SSHS-B4019-SUB-2-4	2-Hexanone	1.7	U	1.7	UJ	9
SSHS-B4018-SUB-0-0.17	2-Hexanone	2.1	U	2.1	UJ	9
SSHS-B4019-SUB-0.17-1	Acetone	4.5	U	4.5	UJ	9
SSHS-B4019-SUB-1-2	Acetone	4.3	U	4.3	UJ	9
SSHS-B4019-SUB-2-4	Acetone	4.3	U	4.3	UJ	9
SSHS-B4018-SUB-0-0.17	Acetone	5.1	U	5.1	UJ	9
SSHS-B4018-SUB-4-6	Bromoform	2.8	U	2.8	UJ	9
SSHS-B4019-SUB-0-0.17	Chloromethane	2.3	U	2.3	UJ	9
SSHS-B4020-SUB-0-0.17	Chloromethane	2.4	U	2.4	UJ	9
SSHS-B4021-SUB-0-0.17	Chloromethane	2.1	U	2.1	UJ	9
SSHS-B4023-SUB-0-0.17	Chloromethane	2.1	U	2.1	UJ	9
SSHS-B4024-SUB-0-0.17	Chloromethane	2.3	U	2.3	UJ	9
SSHS-B4019-SUB-0-0.17	Vinyl chloride	4.2	U	4.2	UJ	9
SSHS-B4020-SUB-0-0.17	Vinyl chloride	4.3	U	4.3	UJ	9

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B4021-SUB-0-0.17	Vinyl chloride	3.8	U	3.8	UJ	9
SSHS-B4023-SUB-0-0.17	Vinyl chloride	3.8	U	3.8	UJ	9
SSHS-B4024-SUB-0-0.17	Vinyl chloride	4.2	U	4.2	UJ	9

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the MDL

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Five method blanks were reported (batches 363662, 363817, 363845, 364007 and 364082). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported using sample SSHS-B4018-SUB-0-0.17. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs and three LCS/laboratory control sample duplicate (LCSD) pairs were reported. The recovery and RPD results were within the QAPP specified acceptance criteria. with the following exceptions.

The recoveries of chloroethane and trichlorofluoromethane in the LCS/LCSD pair in batch 364082 were high and outside of the QAPP specified acceptance criteria. Since chloroethane and trichlorofluoromethane were not detected in the associated samples, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recovery of surrogate toluene-d8 in sample SSHS-B4019-SUB-2-4 was high and outside of the laboratory specified acceptance criteria. Since the recoveries of the remaining three surrogates

DRAFT

were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

1.10 Field Duplicate

Two field duplicates were collected with the sample set and reported for VOCs per the COC, DUP-1 and DUP-2. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original samples SSHS-B4018-SUB-2-4 and SSHS-B4020-SUB-0-0.17, respectively, with the following exceptions.

Methylene chloride was not detected in SSHS-B4020-SUB-0-0.17 and was detected in DUP-2 at a concentration greater than the reporting limit (RL), resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the non-detect result of methylene chloride in SSHS-B4020-SUB-0-0.17 was UJ qualified as estimated less than the MDL and the methylene chloride concentration in DUP-2 was J qualified as estimated.

m/p-Xylene was not detected in DUP-2 and was detected in SSHS-B4020-SUB-0-0.17 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the non-detect result of m/p-xylene in DUP-2 was UJ qualified as estimated less than the MDL and the m/p-xylene concentration in SSHS-B4020-SUB-0-0.17 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-2	Methylene Chloride	10	NA	NC	10	J	7
SSHS-B4020-SUB-0-0.17	Methylene Chloride	5.4	U		5.4	UJ	7
DUP-2	m-Xylene & p-Xylene	2.1	U	NC	2.1	UJ	7
SSHS-B4020-SUB-0-0.17	m-Xylene & p-Xylene	2.4	J		2.4	J	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable

1.11 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

DRAFT

1.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3541/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

2.1 Overall Assessment

The SVOC data reported in this SDG are considered usable for supporting project objectives, with the following exception. The non-detect result for benzaldehyde in sample SSHS-B4026-SUB-4-6 was R qualified as rejected due to MS/MSD pair recoveries less than 10%. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 99.9%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of 4-nitrophenol (30.2%) and hexachlorobutadiene (21.0%) in the CCV in batch 363480 were outside of the laboratory specified acceptance criteria with high biases. Since 4-nitrophenol

DRAFT

and hexachlorobutadiene were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of bis(2-chloroethoxy)methane (21.2%) and 4-chloro-3-methylphenol (22.3%) in the CCV in batch 363568 were outside of the laboratory specified acceptance criteria with low biases. Since the %D of bis(2-chloroethoxy)methane in the CCV was within the validation specified acceptance criteria, no qualifications were applied to the bis(2-chloroethoxy)methane data. However, the non-detect results of 4-chloro-3-methylphenol in the associated samples were UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B4018-SUB-0-0.17	4-Chloro-3-methylphenol	20	U	20	UJ	9
DUP-1	4-Chloro-3-methylphenol	18	U	18	UJ	9
SSHS-B4018-SUB-4-6	4-Chloro-3-methylphenol	18	U	18	UJ	9
SSHS-B4017-SUB-0-0.17	4-Chloro-3-methylphenol	19	U	19	UJ	9
SSHS-B4017-SUB-0.17-1	4-Chloro-3-methylphenol	18	U	18	UJ	9
SSHS-B4017-SUB-1-2	4-Chloro-3-methylphenol	17	U	17	UJ	9
SSHS-B4017-SUB-2-4	4-Chloro-3-methylphenol	18	U	18	UJ	9
SSHS-B4017-SUB-4-6	4-Chloro-3-methylphenol	17	U	17	UJ	9
SSHS-B3920-SUB-24-26	4-Chloro-3-methylphenol	18	U	18	UJ	9
SSHS-B3920-SUB-26-28	4-Chloro-3-methylphenol	19	U	19	UJ	9
SSHS-B3920-SUB-28-30	4-Chloro-3-methylphenol	19	U	19	UJ	9
SSHS-B3920-SUB-30-32	4-Chloro-3-methylphenol	19	U	19	UJ	9
SSHS-B4020-SUB-0-0.17	4-Chloro-3-methylphenol	18	U	18	UJ	9
SSHS-B4021-SUB-0-0.17	4-Chloro-3-methylphenol	17	U	17	UJ	9
SSHS-B4022-SUB-0-0.17	4-Chloro-3-methylphenol	17	U	17	UJ	9
SSHS-B4023-SUB-0-0.17	4-Chloro-3-methylphenol	17	U	17	UJ	9
SSHS-B4024-SUB-0-0.17	4-Chloro-3-methylphenol	18	U	18	UJ	9

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the MDL

DRAFT

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 363370 and 363387). SVOCs were not detected in the method blanks above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported using samples SSHS-B4018-SUB-0-0.17 and SSHS-B4026-SUB-4-6. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of 1,4-dioxane and 2,4-dinitrophenol in the MS/MSD pair using sample SSHS-B4026-SUB-4-6 were low and outside of the QAPP specified acceptance criteria. Also, the RPDs of 4,6-dinitro-2-methylphenol and 2,4-dinitrophenol were high and outside of the QAPP specified acceptance criteria. Since 4,6-dinitro-2-methylphenol was not detected in sample SSHS-B4026-SUB-4-6, no qualifications were applied to the 4,6-dinitro-2-methylphenol data. However, the non-detect results of 1,4-dioxane and 2,4-dinitrophenol in sample SSHS-B4026-SUB-4-6 were UJ qualified as estimated less than the MDLs.

The recoveries of benzaldehyde in the MS/MSD pair using sample SSHS-B4026-SUB-4-6 were less than 10% and outside of the QAPP specified acceptance criteria. Therefore, the non-detect result of benzaldehyde in sample SSHS-B4026-SUB-4-6 was R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B4026-SUB-4-6	1,4-Dioxane	120	U,F1	120	UJ	4
SSHS-B4026-SUB-4-6	2,4-Dinitrophenol	2100	U,F1,F2	2100	UJ	4
SSHS-B4026-SUB-4-6	Benzaldehyde	47	U,F1	47	R	4

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria
F2-laboratory flag indicating MS/MSD RPD was outside the laboratory specified acceptance criteria

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

DRAFT

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Duplicate

Three field duplicates were collected with the sample set, DUP-1, DUP-2 and DUP-3. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples SSHS-B4018-SUB-2-4, SSHS-B4020-SUB-0-0.17 and SSHS-B4025-SUB-4-6, respectively, with the following exceptions.

For analytes with an RPD in a field duplicate pair greater than the 50% the concentrations in the field duplicate pair were J qualified as estimated.

For analytes with both a non-detect result and concentration greater than the MDL in a field duplicate pair, the resulting RPD was not calculable. Therefore, based on professional and technical judgment, these non-detect results were UJ qualified as estimated less than the MDLs and the concentrations were J qualified as estimated.

For analytes with both an estimated concentration greater than the MDL and less than the RL and a concentration greater than the RL in a field duplicate pair, the resulting RPD was not calculable. Therefore, based on professional and technical judgment, these concentrations were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-1	2-Methylnaphthalene	86	NA	NC	86	J	7
SSHS-B4018-SUB-2-4	2-Methylnaphthalene	18	U		18	UJ	7
DUP-1	Acenaphthylene	410	NA	NC	410	J	7
SSHS-B4018-SUB-2-4	Acenaphthylene	60	J		60	J	7
DUP-1	Anthracene	290	NA	NC	290	J	7
SSHS-B4018-SUB-2-4	Anthracene	26	J		26	J	7
DUP-1	Benzo[a]anthracene	880	NA	149	880	J	7
SSHS-B4018-SUB-2-4	Benzo[a]anthracene	130	NA		130	J	7
DUP-1	Benzo[a]pyrene	990	NA	157	990	J	7
SSHS-B4018-SUB-2-4	Benzo[a]pyrene	120	NA		120	J	7
DUP-1	Benzo[b]fluoranthene	1100	NA	146	1100	J	7
SSHS-B4018-SUB-2-4	Benzo[b]fluoranthene	170	NA		170	J	7
DUP-1	Benzo[g,h,i]perylene	740	NA	152	740	J	7

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B4018-SUB-2-4	Benzo[g,h,i]perylene	100	NA		100	J	7
DUP-1	Benzo[k]fluoranthene	590	NA	NC	590	J	7
SSHS-B4018-SUB-2-4	Benzo[k]fluoranthene	60	J		60	J	7
DUP-1	Carbazole	68	J	NC	68	J	7
SSHS-B4018-SUB-2-4	Carbazole	18	U		18	UJ	7
DUP-1	Chrysene	870	NA	148	870	J	7
SSHS-B4018-SUB-2-4	Chrysene	130	NA		130	J	7
DUP-1	Dibenz(a,h)anthracene	170	NA	NC	170	J	7
SSHS-B4018-SUB-2-4	Dibenz(a,h)anthracene	48	U		48	UJ	7
DUP-1	Dibenzofuran	56	J	NC	56	J	7
SSHS-B4018-SUB-2-4	Dibenzofuran	17	U		17	UJ	7
DUP-1	Fluoranthene	1500	NA	164	1500	J	7
SSHS-B4018-SUB-2-4	Fluoranthene	150	NA		150	J	7
DUP-1	Fluorene	52	J	NC	52	J	7
SSHS-B4018-SUB-2-4	Fluorene	15	U		15	UJ	7
DUP-1	Indeno[1,2,3-cd]pyrene	580	NA	149	580	J	7
SSHS-B4018-SUB-2-4	Indeno[1,2,3-cd]pyrene	85	NA		85	J	7
DUP-1	Naphthalene	140	NA	161	140	J	7
SSHS-B4018-SUB-2-4	Naphthalene	15	U		15	UJ	7
DUP-1	Phenanthrene	820	NA	NC	820	J	7
SSHS-B4018-SUB-2-4	Phenanthrene	58	J		58	J	7
DUP-1	Pyrene	1500	NA	155	1500	J	7
SSHS-B4018-SUB-2-4	Pyrene	190	NA		190	J	7
DUP-2	2-Methylnaphthalene	18	U	NC	18	UJ	7
SSHS-B4020-SUB-0-0.17	2-Methylnaphthalene	24	J		24	J	7
DUP-2	Carbazole	18	U	NC	18	UJ	7
SSHS-B4020-SUB-0-0.17	Carbazole	41	J		41	J	7
DUP-2	Fluoranthene	310	NA	51	310	J	7
SSHS-B4020-SUB-0-0.17	Fluoranthene	520	NA		520	J	7
DUP-2	Naphthalene	15	U	NC	15	UJ	7

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B4020-SUB-0-0.17	Naphthalene	45	J		45	J	7
DUP-2	Phenanthrene	79	NA	91	79	J	7
SSHS-B4020-SUB-0-0.17	Phenanthrene	210	NA		210	J	7
DUP-3	2-Methylnaphthalene	19	J	NC	19	J	7
SSHS-B4025-SUB-4-6	2-Methylnaphthalene	19	U		19	UJ	7
DUP-3	Acenaphthylene	94	NA	NC	94	J	7
SSHS-B4025-SUB-4-6	Acenaphthylene	60	J		60	J	7
DUP-3	Anthracene	59	J	NC	59	J	7
SSHS-B4025-SUB-4-6	Anthracene	31	J		31	J	7
DUP-3	Benzo[a]anthracene	210	NA	82	210	J	7
SSHS-B4025-SUB-4-6	Benzo[a]anthracene	88	NA		88	J	7
DUP-3	Benzo[a]pyrene	240	NA	59	240	J	7
SSHS-B4025-SUB-4-6	Benzo[a]pyrene	130	NA		130	J	7
DUP-3	Benzo[b]fluoranthene	300	NA	79	300	J	7
SSHS-B4025-SUB-4-6	Benzo[b]fluoranthene	130	NA		130	J	7
DUP-3	Benzo[k]fluoranthene	93	NA	NC	93	J	7
SSHS-B4025-SUB-4-6	Benzo[k]fluoranthene	78	J		78	J	7
DUP-3	Chrysene	240	NA	74	240	J	7
SSHS-B4025-SUB-4-6	Chrysene	110	NA		110	J	7
DUP-3	Fluoranthene	350	NA	75	350	J	7
SSHS-B4025-SUB-4-6	Fluoranthene	160	NA		160	J	7
DUP-3	Indeno[1,2,3-cd]pyrene	170	NA	52	170	J	7
SSHS-B4025-SUB-4-6	Indeno[1,2,3-cd]pyrene	100	NA		100	J	7
DUP-3	Naphthalene	27	J	NC	27	J	7
SSHS-B4025-SUB-4-6	Naphthalene	15	U		15	UJ	7
DUP-3	Phenanthrene	160	NA	NC	160	J	7
SSHS-B4025-SUB-4-6	Phenanthrene	74	J		74	J	7
DUP-3	Pyrene	380	NA	87	380	J	7
SSHS-B4025-SUB-4-6	Pyrene	150	NA		150	J	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL

DRAFT

engineers | scientists | innovators

U-laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

3.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by US EPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
⊗ Surrogates

DRAFT

⊗ Field Duplicate
⊗ Internal Standards
✓ Target Compound Identification
⊗ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the PCB analysis of a solid sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of PCB-1260 on both GC columns in a bracketing CCV in batch 363647 were outside of the laboratory specified acceptance criteria with low bias. Therefore, the non-detect PCB-1260 result in the associated sample was UJ qualified as estimated less than the MDL.

The %Ds of PCB-1016 on GC column RTX-CLP1 in a bracketing CCV in batch 363647 was outside of the laboratory specified acceptance criteria with a high bias. Since PCB-1016 was not detected in the associated samples, no qualifications were not applied to the data.

The %D of PCB-1268 on GC column RTX-CLP2 in an ICV in batch 357315 was outside of the laboratory specified acceptance criteria with low bias. Since PCB-1268 results for the associated

DRAFT

samples were reported from GC column RTX-CLP1 with the %D in the ICV within the laboratory specified acceptance criteria and based on professional and technical judgment.

The %Ds of PCB-1254 on GC column RTX-CLP1 in a bracketing CCV in batch 363534 was outside of the laboratory specified acceptance criteria with a high bias. Since PCB-1254 results for the associated samples were reported from GC column RTX-CLP2 with the %D in the CCV within the laboratory specified acceptance criteria and based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3920-SUB-20-22	PCB-1260	5.6	U,*3	5.6	UJ	9

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
*3-laboratory flag indicating the internal standard response was outside the method specified acceptance criteria

3.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 363208 and 363286). The PCBs were not detected in the method blanks above the MDLs.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported using samples SSHS-B4018-SUB-0-0.17 and SSHS-B3920-SUB-20-22. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exception.

The MSD recovery of PCB-1016 in the MS/MSD pair using sample SSHS-B3920-SUB-20-22 was high and outside of the QAPP specified acceptance criteria. Therefore, the PCB-1248 concentration in SSHS-B3920-SUB-20-22 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3920-SUB-20-22	PCB-1248	34	NA	34	J	4

µg/kg-micrograms per kilogram
NA-not applicable

DRAFT

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

The recovery of surrogate decachlorobiphenyl on GC column RTX-CLP1 for the MSD using sample SSHS-B4018-SUB-0-0.17 was high and outside of the laboratory specified acceptance criteria. Since the surrogates in the analysis of sample SSHS-B4018-SUB-0-0.17 were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The recoveries of surrogate decachlorobiphenyl on both GC columns for sample SSHS-B3920-SUB-20-22 were low and outside of the laboratory specified acceptance criteria. Therefore, the non-detect PCB results in sample SSHS-B3920-SUB-20-22 were UJ qualified as estimated less than the MDLs and the PCB-1248 concentration in sample SSHS-B3920-SUB-20-22 was J-qualified as estimated with a low bias.

The surrogates were not recovered in samples SSHS-B3920-SUB-24-26, SSHS-B3920-SUB-26-28 and SSHS-B3920-SUB-28-30 due to sample dilution. No qualifications were applied to the data, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3920-SUB-20-22	PCB-1016	6.4	U,F1	6.4	UJ	6
SSHS-B3920-SUB-20-22	PCB-1221	7.0	U	7.0	UJ	6
SSHS-B3920-SUB-20-22	PCB-1232	4.8	U	4.8	UJ	6
SSHS-B3920-SUB-20-22	PCB-1242	2.9	U	2.9	UJ	6
SSHS-B3920-SUB-20-22	PCB-1248	34	NA	34	J-	6
SSHS-B3920-SUB-20-22	PCB-1254	5.9	U,*3	5.9	UJ	6
SSHS-B3920-SUB-20-22	PCB-1260	5.6	U,*3	5.6	UJ	6
SSHS-B3920-SUB-20-22	PCB-1262	6.9	U,*3	6.9	UJ	6
SSHS-B3920-SUB-20-22	PCB-1268	2.7	U,*3	2.7	UJ	6

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria
*3-laboratory flag indicating the internal standard response was outside the method specified acceptance criteria
NA-not applicable

DRAFT

3.9 Field Duplicate

Two field duplicates were collected with the sample set and reported for PCBs per the COC, DUP-1 and DUP-2. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original samples SSHS-B4018-SUB-2-4 and SSHS-B4020-SUB-0-0.17, respectively, with the following exceptions.

The RPD of PCB-1248 in field duplicate pair DUP-2/SSHS-B4020-SUB-0-0.17 was greater than 50%; therefore, based on professional and technical judgment the PCB-1248 concentrations in field duplicate pair DUP-2/SSHS-B4020-SUB-0-0.17 were J qualified as estimated.

PCB-1254 was detected in DUP-2 at an estimated concentration greater than the MDL and less than the RL and was detected in SSHS-B4020-SUB-0-0.17 at a concentration greater than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment the PCB-1254 concentrations in field duplicate pair DUP-2/SSHS-B4020-SUB-0-0.17 were J qualified as estimated.

PCB-1260 was not detected in SSHS-B4020-SUB-0-0.17 and was detected in DUP-2 at an estimated concentration greater than the MDL and less than the RL. Therefore, based on professional and technical judgment, the non-detect result of PCB-1260 in SSHS-B4020-SUB-0-0.17 was UJ qualified as estimated less than the MDL and the PCB-1260 concentration in DUP-2 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-2	PCB-1248	36	NA	108	36	J	7
SSHS-B4020-SUB-0-0.17	PCB-1248	120	NA		120	J	7
DUP-2	PCB-1254	17	J	NC	17	J	7
SSHS-B4020-SUB-0-0.17	PCB-1254	48	NA		48	J	7
DUP-2	PCB-1260	6.8	J,p	NC	6.8	J	7
SSHS-B4020-SUB-0-0.17	PCB-1260	5.4	U		5.4	UJ	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
p-laboratory flag indicating the RPD between the GC columns was greater than 40%
NA-not applicable
NC-not calculable

DRAFT

3.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria, with the following exceptions.

The responses of PCB-205 on both GC columns for sample SSHS-B3920-SUB-20-22 was low and outside the method specified acceptance criteria. Therefore, the non-detect results of PCBs 1254, 1260, 1262 and 1268 in sample SSHS-B3920-SUB-20-22 were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3920-SUB-20-22	PCB-1254	5.9	U,*3	5.9	UJ	11
SSHS-B3920-SUB-20-22	PCB-1260	5.6	U,*3	5.6	UJ	11
SSHS-B3920-SUB-20-22	PCB-1262	6.9	U,*3	6.9	UJ	11
SSHS-B3920-SUB-20-22	PCB-1268	2.7	U,*3	2.7	UJ	11

µg/kg-micrograms per kilogram
U-not detected at or above the MDL
*3-laboratory flag indicating the internal standard response was outside the method specified acceptance criteria

3.11 Target Compound Identification

The target compound identifications were within the validation criteria.

3.12 Target Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

The %Ds between the concentrations on the GC columns for PCB-1248 in samples SSHS-B4018-SUB-0.17-1 and SSHS-B4018-SUB-1-2, PCB-1254 in samples SSHS-B4018-SUB-2-4, SSHS-B3920-SUB-24-26, SSHS-B3920-SUB-26-28, SSHS-B3920-SUB-28-30 and SSHS-B4021-SUB-0-0.17 and PCB-1260 in samples SSHS-B4018-SUB-1-2 and DUP-2 were greater than 25%. Therefore, these concentrations were J qualified as estimated, based on professional and technical judgment.

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B4018-SUB-0.17-1	PCB-1248	28	NA	28	J	13
SSHS-B4018-SUB-1-2	PCB-1248	160	NA	160	J	13
SSHS-B4018-SUB-2-4	PCB-1248	140	NA	140	J	13
DUP-1	PCB-1248	160	NA	160	J	13
SSHS-B3920-SUB-22-24	PCB-1248	190	NA	190	J	13
SSHS-B3920-SUB-24-26	PCB-1248	1700000	NA	1700000	J	13
SSHS-B3920-SUB-26-28	PCB-1248	650000	NA	650000	J	13
SSHS-B3920-SUB-28-30	PCB-1248	120000	NA	120000	J	13
SSHS-B3920-SUB-30-32	PCB-1248	9900	NA	9900	J	13
SSHS-B4020-SUB-0-0.17	PCB-1248	120	NA	120	J	13
SSHS-B4021-SUB-0-0.17	PCB-1248	100	NA	100	J	13
SSHS-B4022-SUB-0-0.17	PCB-1248	190	NA	190	J	13
SSHS-B4024-SUB-0-0.17	PCB-1248	47	NA	47	J	13
DUP-2	PCB-1248	36	NA	36	J	13
SSHS-B4018-SUB-0.17-1	PCB-1254	18	J	18	J	13
SSHS-B4018-SUB-1-2	PCB-1254	120	NA	120	J	13
SSHS-B4018-SUB-2-4	PCB-1254	79	NA	79	J	13
DUP-1	PCB-1254	60	NA	60	J	13
SSHS-B3920-SUB-22-24	PCB-1254	34	NA	34	J	13
SSHS-B3920-SUB-24-26	PCB-1254	730000	NA	730000	J	13
SSHS-B3920-SUB-26-28	PCB-1254	280000	NA	280000	J	13
SSHS-B3920-SUB-28-30	PCB-1254	53000	NA	53000	J	13
SSHS-B3920-SUB-30-32	PCB-1254	2700	NA	2700	J	13
SSHS-B4020-SUB-0-0.17	PCB-1254	48	NA	48	J	13
SSHS-B4021-SUB-0-0.17	PCB-1254	31	NA	31	J	13
SSHS-B4022-SUB-0-0.17	PCB-1254	37	NA	37	J	13
SSHS-B4024-SUB-0-0.17	PCB-1254	10	J	10	J	13
DUP-2	PCB-1254	17	J	17	J	13
SSHS-B4018-SUB-1-2	PCB-1260	21	NA	21	J	13
SSHS-B3920-SUB-28-30	PCB-1260	3600	NA	3600	J	13
SSHS-B3920-SUB-30-32	PCB-1260	300	NA	300	J	13
DUP-2	PCB-1260	6.8	J,p	6.8	J	13

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
p-laboratory flag indicating the RPD between the GC columns was greater than 40%
NA-not applicable

3.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. A screening criterion was listed in Table 1 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 1 of the QAPP.

DRAFT

3.14 Electronic Data Deliverable Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

4.0 PFAS

The sample was analyzed for PFAS per US EPA method 537 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas

where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ⊗ Field Duplicate
- ✓ Isotope Dilution Standards
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ⊗ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

4.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this sample set is 100%.

4.2 Holding Time

The laboratory-specified holding times for the for the PFAS analysis of a solid sample are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The %RSDs of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

DRAFT

4.4 Initial Calibration Verification and Continuing Calibration Verification

The ICV and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICV and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

4.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICB and CCB met the method specified acceptance criteria.

4.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 504901). PFAS were not detected in the method blank above the MDLs.

4.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-B4018-SUB-0-0.17. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exception.

The recovery of PFUnA in the MS using sample SSHS-B4018-SUB-0-0.17 was high and outside of the laboratory specified acceptance criteria. Since PFUnA was not detected in sample SSHS-B4018-SUB-0-0.17, no qualifications were applied to the data.

4.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

Two field duplicates were collected with the sample set and reported for PFASs per the COC, DUP-1 and DUP-2. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original samples SSHS-B4018-SUB-2-4 and SSHS-B4020-SUB-0-0.17, respectively, with the following exception.

PFHpA was not detected in SSHS-B4018-SUB-2-4 and was detected in DUP-1 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD.

DRAFT

Therefore, based on professional and technical judgment, the non-detect result of PFHpA in SSHS-B4018-SUB-2-4 was UJ qualified as estimated less than the MDL and the PFHpA concentration in DUP-1 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-1	PFHpA	0.034	J	NC	0.034	J	7
SSHS-B4018-SUB-2-4	PFHpA	0.032	U		0.032	UJ	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NC-not calculable

4.10 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria, with the following exception.

The recoveries of M2-6:2 FTS in samples SSHS-B4020-SUB-0-0.17 and SSHS-B4023-SUB-0-0.17 were high and outside of the laboratory specified acceptance criteria. Since 6:2 FTS was not detected in samples SSHS-B4020-SUB-0-0.17 and SSHS-B4023-SUB-0-0.17, no qualifications were applied to the data.

4.11 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria, with the following exception.

The response of internal standard 13C2 PFOA in sample SSHS-B4022-SUB-0-0.17 was high and outside of the method specified acceptance criteria. Since the isotope dilution standards were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

4.12 Target Compound Identifications

The compound identifications were within the validation guidance.

4.13 Target Compound Quantitation

The compound quantitations were within the validation guidance, with the following exceptions.

The PFOS concentrations in samples SSHS-B4020-SUB-0-0.17, SSHS-B4023-SUB-0-0.17, DUP-1, SSHS-B4018-SUB-2-4 and SSHS-B4024-SUB-0-0.17 and PFHxS concentration in

DRAFT

sample SSHS-B4018-SUB-1-2 were flagged I to indicate the reported concentrations were an estimated maximum possible concentration (EMPC). Therefore, based on professional and technical judgment these concentrations were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B4018-SUB-1-2	PFHxS	0.038	J,I	0.038	J	13
SSHS-B4018-SUB-2-4	PFOS	0.26	J,I	0.26	J	13
DUP-1	PFOS	0.25	J,I	0.25	J	13
SSHS-B4024-SUB-0-0.17	PFOS	0.46	J,I	0.46	J	13
SSHS-B4020-SUB-0-0.17	PFOS	0.69	I	0.69	J	13
SSHS-B4023-SUB-0-0.17	PFOS	0.55	I	0.55	J	13

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
I-laboratory flag indicating an EMPC
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria

4.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria were not listed in the QAPP for PFAS.

4.15 Electronic Data Deliverable Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

5.0 METALS

The samples were analyzed for metals per US EPA methods 3050B/6010C. (Mercury was evaluated separately in Section 6.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

✓ Overall Assessment
✓ Holding Times
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank
✓ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
⊗ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Duplicate
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding time for the total metals analysis of a solid sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria, with the following exceptions.

The antimony and thallium results in the ICSA in batch 364484 were more negative than the MDLs and less than the RLs. Therefore, the non-detect results of antimony and thallium in the associated samples were UJ qualified as estimated less than the MDLs and the estimated antimony concentrations were J qualified as estimated.

Barium, cobalt and nickel were detected in the ICSA in batch 364484 at estimated concentrations greater than the MDLs and less than the RLs. Since barium, cobalt and nickel were detected in the

DRAFT

associated samples at concentrations greater than ten times the ICSA concentrations, no qualifications were applied to the data, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B4018-SUB-0-0.17	Antimony	0.36	U,F1	0.36	UJ	13
SSHS-B4018-SUB-0.17-1	Antimony	0.40	U	0.40	UJ	13
SSHS-B4018-SUB-1-2	Antimony	0.35	U	0.35	UJ	13
SSHS-B4018-SUB-2-4	Antimony	0.36	J	0.36	J	13
SSHS-B4018-SUB-4-6	Antimony	0.34	J	0.34	J	13
SSHS-B4017-SUB-0-0.17	Antimony	0.36	U	0.36	UJ	13
SSHS-B4017-SUB-0.17-1	Antimony	0.36	U	0.36	UJ	13
SSHS-B4017-SUB-1-2	Antimony	0.36	J	0.36	J	13
SSHS-B4017-SUB-2-4	Antimony	0.35	U	0.35	UJ	13
SSHS-B4020-SUB-0-0.17	Antimony	0.38	U	0.38	UJ	13
SSHS-B4021-SUB-0-0.17	Antimony	0.32	U	0.32	UJ	13
SSHS-B4022-SUB-0-0.17	Antimony	0.42	J	0.42	J	13
SSHS-B4023-SUB-0-0.17	Antimony	0.35	J	0.35	J	13
SSHS-B4024-SUB-0-0.17	Antimony	0.30	U	0.30	UJ	13
DUP-2	Antimony	0.56	J	0.56	J	13
SSHS-B4018-SUB-0-0.17	Thallium	0.34	U	0.34	UJ	13
SSHS-B4018-SUB-0.17-1	Thallium	0.38	U	0.38	UJ	13
SSHS-B4018-SUB-1-2	Thallium	0.33	U	0.33	UJ	13
SSHS-B4018-SUB-2-4	Thallium	0.29	U	0.29	UJ	13
SSHS-B4018-SUB-4-6	Thallium	0.29	U	0.29	UJ	13
SSHS-B4017-SUB-0-0.17	Thallium	0.34	U	0.34	UJ	13
SSHS-B4017-SUB-0.17-1	Thallium	0.34	U	0.34	UJ	13
SSHS-B4017-SUB-1-2	Thallium	0.30	U	0.30	UJ	13
SSHS-B4017-SUB-2-4	Thallium	0.33	U	0.33	UJ	13
SSHS-B4020-SUB-0-0.17	Thallium	0.36	U	0.36	UJ	13
SSHS-B4021-SUB-0-0.17	Thallium	0.30	U	0.30	UJ	13
SSHS-B4022-SUB-0-0.17	Thallium	0.26	U	0.26	UJ	13
SSHS-B4023-SUB-0-0.17	Thallium	0.33	U	0.33	UJ	13
SSHS-B4024-SUB-0-0.17	Thallium	0.29	U	0.29	UJ	13
DUP-2	Thallium	0.33	U	0.33	UJ	13

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria
NA-not applicable

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

DRAFT

5.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks (batches 363249, 360779 and 360958) were reported. Metals were not detected in the method blanks above the MDLs.

5.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-B4018-SUB-0-0.17. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

One or both the recoveries of antimony, magnesium, selenium and zinc in the MS/MSD pair were low and outside of the QAPP specified acceptance criteria. Also, the antimony, magnesium and selenium recoveries in the post digestion spike (PDS) were within the laboratory specified acceptance criteria and the zinc recovery in the PDS was low and outside of the laboratory specified acceptance criteria. Therefore, the non-detect results of antimony and selenium in sample SSHS-B4018-SUB-0-0.17 were UJ qualified as estimated less than the MDLs, the magnesium concentration in sample SSHS-B4018-SUB-0-0.17 was J qualified as estimated and the zinc concentration in sample SSHS-B4018-SUB-0-0.17 was J- qualified as estimated with a low bias.

For metals concentrations greater than four times the spiked concentration no qualifications were applied based on the MS/MSD recovery results.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B4018-SUB-0-0.17	Antimony	0.36	U,F1	0.36	UJ	4
SSHS-B4018-SUB-0-0.17	Magnesium	2800	F1	2800	J	4
SSHS-B4018-SUB-0-0.17	Selenium	0.55	U,F1	0.55	UJ	4
SSHS-B4018-SUB-0-0.17	Zinc	80	F1	80	J-	4

mg/kg-milligrams per kilogram
U-not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria

5.8 Serial Dilution

One sample set specific serial dilution was reported using sample SSHS-B4018-SUB-0-0.17. The %D results were within the method specified acceptance criteria, with the following exceptions.

DRAFT

The %Ds of aluminum, barium, iron, magnesium and manganese in the serial dilution using sample SSHS-B4018-SUB-0-0.17 were high and outside of the method specified acceptance criteria. Therefore, the aluminum, barium, iron, magnesium and manganese concentrations in sample SSHS-B4018-SUB-0-0.17 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-B4018-SUB-0-0.17	Aluminum	8800	NA	8800	J	8
SSHS-B4018-SUB-0-0.17	Barium	82	NA	82	J	8
SSHS-B4018-SUB-0-0.17	Iron	17000	NA	17000	J	8
SSHS-B4018-SUB-0-0.17	Magnesium	2800	F1	2800	J	8
SSHS-B4018-SUB-0-0.17	Manganese	400	NA	400	J	8

mg/kg-milligrams per kilogram
NA-not applicable
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria

5.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

5.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

5.11 Field Duplicate

Two field duplicates were collected with the sample set and reported for metals per the COC, DUP-1 and DUP-2. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original samples SSHS-B4018-SUB-2-4 and SSHS-B4020-SUB-0-0.17, respectively, with the following exceptions.

Beryllium was detected in at an estimated concentration greater than the MDL and less than the RL in the SSHS-B4020-SUB-0-0.17 and was detected in at a concentration greater than the RL in the DUP-2, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment the beryllium concentration in field duplicate pair DUP-2/SSHS-B4020-SUB-0-0.17 were J qualified as estimated.

Selenium and antimony were not detected in SSHS-B4018-SUB-2-4 and were detected in DUP-2 at estimated concentrations greater than the MDLs and less than the RLs, resulting in noncalculable RPDs. Therefore, based on professional and technical judgment, the non-detect results of selenium

DRAFT

and antimony in SSHS-B4018-SUB-2-4 were UJ qualified as estimated less than the MDLs and the selenium and antimony concentrations in DUP-2 were J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	RPD	Validation Result (mg/kg)	Validation Qualifier	Reason Code
DUP-1	Selenium	0.61	J	NC	0.61	J	7
SSHS-B4018-SUB-2-4	Selenium	0.47	U		0.47	UJ	7
DUP-2	Antimony	0.56	J	NC	0.56	J	7
SSHS-B4020-SUB-0-0.17	Antimony	0.38	U		0.38	UJ	7
DUP-2	Beryllium	0.47	NA	NC	0.47	J	7
SSHS-B4020-SUB-0-0.17	Beryllium	0.44	J		0.44	J	7

mg/kg-milligrams per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

5.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

5.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

5.14 Electronic Data Deliverable Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

6.0 MERCURY

The samples were analyzed for mercury per US EPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

6.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

6.2 Holding Times

The holding time for the mercury analysis of a solid sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

6.3 Initial Calibration

The method specified initial calibration requirements were met.

6.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

6.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 363542) was reported. Mercury was not detected in the method blank above the MDL.

DRAFT

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-B4018-SUB-0-0.17. The recovery and RPD results were within the QAPP specified acceptance criteria.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the QAPP specified acceptance criteria.

6.9 Field Duplicate

Two field duplicates were collected with the sample set and reported for mercury per the COC, DUP-1 and DUP-2. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original samples SSHS-B4018-SUB-2-4 and SSHS-B4020-SUB-0-0.17, respectively.

6.10 Target Compound Quantitation

The compound quantitations were within the validation criteria.

6.11 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 2 of the QAPP.

6.12 Electronic Data Deliverable Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	September 20, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-124580-1 Revision 1**

SITE: Former Sperry Remington Site Groundwater

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of eight groundwater samples, one field duplicate and one trip blank collected on 15 July 2021, as part of the Former Sperry Remington Site groundwater sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C
- Semivolatile Organic Compounds (SVOCs) by US EPA 3520C/8270D
- Total and Dissolved Polychlorinated Biphenyls (PCBs) by US EPA Methods 3510C/8082A
- Total and Dissolved Metals by US EPA Methods 3005A/6010C
- Total and Dissolved Metals Mercury by US EPA Method 7470A

Eurofins TestAmerica, Edison, New Jersey analyzed the samples for the following analytical test:

- Polycyclic Aromatic Hydrocarbon (PAHs) and 1,4-Dioxane by US EPA 3510C/8270E using Selected Ion Monitoring (SIM)

Eurofins TestAmerica, Canton, Ohio analyzed the samples for the following analytical test:

- Diesel Organic Range (DRO) (C10-C28) by US EPA Methods 3510C/8015D

Eurofins TestAmerica, West Sacramento, California analyzed the samples for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by US EPA Methods 3535/537 (modified)

DRAFT

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- US EPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

DRAFT

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-124580-1	MW-11D
180-124580-2	MW-20
180-124580-3	MW-5
180-124580-4	MW-22
180-124580-5	MW-85I

Laboratory ID	Client ID
180-124580-6	MW-88I
180-124580-7	MW-13
180-124580-8	MW-88S
180-124580-9	DUP-2
180-124580-10	TRIP BLANK -02

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

Collection times were not documented on the chain of custody (COC) for the field duplicates. The field duplicates were logged in with the collection time of 00:01.

The laboratory report was revised on September 22, 2021 to add missing initial calibration verifications (ICVs) to the SVO and DRO data. The revised report was identified as 180-124580-1 Revision 1.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5030C/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
⊗ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
⊗ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

1.1.1 Completeness

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane were R qualified as rejected due to low RRF in the initial calibration and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.1.2 Analysis Anomaly

Sample MW-5 was reanalyzed due to one low surrogate recovery in the initial analysis. The recoveries of two surrogates were low in the reanalysis. The initial analysis was considered for validation based on professional and technical judgment and the reanalysis was designated as not reportable in the EDD.

1.2 Holding Times

The holding time for the VOC analysis of a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

The average RRFs for target analytes met the method and validation specified acceptance criteria, with the following exceptions.

DRAFT

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRFs for 1,4-dioxane in the initial calibration were 0.0026 and 0.0018, less than 0.010. Therefore, based on professional and technical judgment and average RRF less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

The percent errors of calibration levels for bromoethane and 1,2,3-trichlorobenzene in the calibration performed in batch 361372 were high and outside of the method specified acceptance criteria. Since bromoethane and 1,2,3-trichlorobenzene were not detected in the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
DUP-2	1,4-Dioxane	43	U	43	R	9
MW-13	1,4-Dioxane	43	U	43	R	9
MW-20	1,4-Dioxane	43	U	43	R	9
MW-22	1,4-Dioxane	43	U	43	R	9
MW-5	1,4-Dioxane	43	U	43	R	9
MW-85I	1,4-Dioxane	43	U	43	R	9
MW-88I	1,4-Dioxane	43	U	43	R	9
MW-88S	1,4-Dioxane	43	U	43	R	9
TRIP BLANK -02	1,4-Dioxane	43	U	43	R	9

µg/L-micrograms per liter
U-not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of bromomethane (34.7%), chloroethane (132.7%), dichlorodifluoromethane (187.5%), trichlorofluoromethane (138.9%), acetone (35.9%) and 1,4-dioxane (30.9%) in the CCV in batch

365888 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated sample, no qualifications were applied to the data.

The %Ds of 1,2,4-trichlorobenzene (24.1%) and 1,2,3-trichlorobenzene (43.1%) in the CCV in batch 365888 were outside of the laboratory specified acceptance criteria with low biases. Since the %D of 1,2,4-trichlorobenzene in the CCV was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the 1,2,4-trichlorobenzene data. However, the non-detect 1,2,3-trichlorobenzene result in the associated sample was UJ qualified as estimated less than the MDL.

The %Ds of dichlorodifluoromethane (42.4), bromomethane (24.2%), trichlorofluoromethane (26.0%), methylene chloride (24.8%), trans-1,2-dichloroethene (20.2%) and methyl tert-butyl ether (21.5%) in the CCV in batch 365519 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of bromomethane, trichlorofluoromethane, methylene chloride and methyl tert-butyl ether in the CCV were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the bromomethane, trichlorofluoromethane, methylene chloride and methyl tert-butyl ether data. However, the non-detect dichlorodifluoromethane and trans-1,2-dichloroethene results in the associated sample were UJ qualified as estimated less than the MDLs.

The %Ds of chloromethane (31.8%), vinyl chloride (20.9%), acetone (56.6%) and 2-hexanone (24.8%) in the CCV in batch 365576 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were either not detected or U quailed as not detected due to method blank contamination in the associated samples, no additional qualifications were applied to the data.

The %Ds of cyclohexane (23.8%), 1,4-dioxane (21.3%) and cis-1,3-dichloropropene (28.3%) in the CCV in batch 365576 were outside the laboratory specified acceptance criteria with low biases. Since the %D of cyclohexane in the CCV was within the validation specified acceptance criteria, the non-detect 1,4-dioxane results in the associated samples were R qualified as rejected due to low RRF in the initial calibration and based on professional and technical judgment, no additional qualifications were applied to the cyclohexane and 1,4-dioxane data. However, the non-detect cis-1,3-dichloropropene results in the associated samples were UJ qualified as estimated less than the MDL.

The %Ds of chloromethane (24.5%) and vinyl chloride (22.3%) in the CCV in batch 365731 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
TRIP BLANK -02	1,2,3-Trichlorobenzene	1.1	U	1.1	UJ	9
MW-20	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
MW-22	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
MW-5	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
MW-85I	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
MW-88I	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
DUP-2	Dichlorodifluoromethane	0.83	U	0.83	UJ	9
MW-13	Dichlorodifluoromethane	0.83	U	0.83	UJ	9
MW-88S	Dichlorodifluoromethane	0.83	U	0.83	UJ	9
DUP-2	trans-1,2-Dichloroethene	0.67	U	0.67	UJ	9
MW-13	trans-1,2-Dichloroethene	0.67	U	0.67	UJ	9
MW-88S	trans-1,2-Dichloroethene	0.67	U	0.67	UJ	9

µg/L-micrograms per liter
U-not detected at or above the MDL

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four method blanks were reported (batches 365519, 365576, 365731 and 365888). VOCs were not detected in the method blanks above the MDLs, with the following exceptions.

Vinyl chloride was detected in the method blanks in batches 365576 and 365731 at estimated concentrations greater than the MDL and less than the reporting limit (RL). Therefore, the estimated vinyl chloride concentrations in the associated samples were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-22	Vinyl chloride	0.43	J,B	1	U	3
MW-85I	Vinyl chloride	0.55	J,B	1	U	3
MW-88I	Vinyl chloride	0.71	J,B	1	U	3

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating analyte was detected in both the sample and method blank

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

DRAFT

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four LCS were reported. The recovery results were within the QAPP specified acceptance criteria, with the following exceptions.

The recovery of chlorobenzene in the LCS in batch 365519 was low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect chlorobenzene results in the associated samples were UJ qualified as estimated less than the MDL.

The recovery of chloromethane in the LCS in batch 365576 was high and outside of the QAPP specified acceptance criteria. Since chloromethane was not detected in the associated samples, no qualifications were applied to the data.

The recoveries of chloroethane and trichlorofluoromethane in the LCS in batch 365888 were high and outside of the QAPP specified acceptance criteria. Since chloroethane and trichlorofluoromethane were not detected in the associated samples, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-2	Chlorobenzene	0.50	U	0.50	UJ	5
MW-13	Chlorobenzene	0.50	U	0.50	UJ	5
MW-88S	Chlorobenzene	0.50	U	0.50	UJ	5

µg/L-micrograms per liter
U-not detected at or above the MDL

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

The recovery of 4-bromofluorobenzene in sample MW-5 was low and outside of the laboratory specified acceptance criteria. Since three of four surrogate recoveries were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The recoveries of 4-bromofluorobenzene and toluene-d8 in the reanalysis of sample MW-5 were low and outside of the laboratory specified acceptance criteria. Since two of four surrogate recoveries were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

DRAFT

1.10 Trip Blank

One trip blank was shipped with the sample set, TRIP BLANK-02. VOCs were not detected in the trip blank above the MDLs.

1.11 Field Duplicate

One field duplicate was collected with the sample set, DUP-2. Acceptable precision [relative percent difference (RPD) <30% for results greater than five times the RL] was demonstrated between the field duplicate and the original samples MW-88S.

1.12 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

The MDLs of the following compounds did not meet the screening criteria listed in Table 2 of the QAPP.

Analyte	Method Detection Limit (MDL) (µg/L)	Screening Criteria (µg/L)
cis-1,3-Dichloropropene	0.71	0.4
1,2-Dibromo-3-Chloropropane	0.89	0.04
1,2-Dibromoethane	0.50	0.0006
trans-1,3-Dichloropropene	0.58	0.4

µg/L-micrograms per liter

1.16 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

2.0 POLYCYCLIC AROMATIC HYDROCARBONS AND 1,4-DIOXANE

The samples were analyzed for PAHs and 1,4-dioxane per US EPA Methods 3510C/8270E using SIM.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ⊗ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

2.1 Overall Assessment

The PAH and 1,4-dioxane data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the PAH and 1,4-dioxane analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICV and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICV and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of acenaphthylene (24.6%), dibenz(a,h)anthracene (27.4%), fluorene (21.5%) and indeno[1,2,3-cd]pyrene (37.9%) in the CCV in batch 361456 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of acenaphthylene, dibenz(a,h)anthracene and fluorene in the CCV were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the acenaphthylene, dibenz(a,h)anthracene and fluorene data. However, the non-detect indeno[1,2,3-cd]pyrene result in the associated sample was UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-11D	Indeno[1,2,3-cd]pyrene	0.036	U	0.036	UJ	9

µg/L-micrograms per liter
U-not detected at or above the MDL

DRAFT

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 791645). PAHs and 1,4-dioxane were not detected in the method blank above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair was reported. The recovery and RPD results were within the laboratory specified acceptance criteria, with the following exception.

The RPD of 1,4-dioxane in the LCS/LCSD pair was high and outside the laboratory specified acceptance criteria. Since 1,4-dioxane was not detected in the associated samples, no qualifications were applied to the data.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Duplicate

One field duplicate was collected with the sample set, DUP-2. However, per the COC the field duplicate was not analyzed for PAHs and 1,4-dioxane.

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

DRAFT

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3520C/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
⊗ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
⊗ Sensitivity
✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The SVOC data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

3.2 Holding Times

The holding times for the SVOC analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the GC column performance and injection port inertness resulted in acceptable results.

3.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

3.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICVs and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of di-n-octyl phthalate (23.5%) in the CCV in batch 365727 was outside of the laboratory specified acceptance criteria with a high bias. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to the data.

The %Ds of pentachlorophenol (39.0%) and di-n-octyl phthalate (26.4%) in the CCV in batch 365620 were outside the laboratory specified acceptance criteria with high biases. Since pentachlorophenol and di-n-octyl phthalate were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of 2-nitroaniline (21.8%), 4-nitrophenol (28.0%) and pentachlorophenol (12.8%) in the CCV in batch 365620 were outside the laboratory specified acceptance criteria with high biases.

DRAFT

Since of 2-nitroaniline, 4-nitrophenol and pentachlorophenol were not detected in the associated samples, no qualifications were applied to the data.

3.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 364948, 365122 and 365331). SVOCs were not detected in the method blanks above the MDLs, with the following exception.

Di-n-butyl phthalate was detected in the method blank in batch 365331 at an estimated concentration greater than the MDL and less than the RL. Therefore, based on professional and technical judgment the di-n-butyl phthalate concentrations in the associated samples were J+ qualified as estimated with high biases.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-2	Di-n-butyl phthalate	2.1	B	2.1	J+	3
MW-13	Di-n-butyl phthalate	3.1	B	3.1	J+	3
MW-88I	Di-n-butyl phthalate	1.7	B	1.7	J+	3
MW-88S	Di-n-butyl phthalate	2.1	B	2.1	J+	3

µg/L-micrograms per liter
B-laboratory flag indicating analyte was detected in both the sample and method blank

3.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

3.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs and one LCS/LCSD pair were reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

3.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.10 Field Duplicate

One field duplicate was collected with the sample set, DUP-2. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-88S, with the following exceptions.

DRAFT

Acenaphthene and caprolactam were not detected in MW-88S and were detected in DUP-2 at estimated concentrations greater than the MDLs and less than the RLs, resulting in noncalculable RPDs. Therefore, based on professional and technical judgment the non-detect acenaphthene and caprolactam results in MW-88S were UJ qualified as estimated less than the MDLs and the acenaphthene and caprolactam concentrations in DUP-2 were J qualified as estimated.

Naphthalene and phenanthrene were detected in MW-88S at estimated concentrations greater than the MDLs and less than the RLs and were not detected in DUP-2, resulting in noncalculable RPDs. Therefore, based on professional and technical judgment, the naphthalene and phenanthrene concentrations in MW-88S were J qualified as estimated and the non-detect naphthalene and phenanthrene results in DUP-2 were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Laboratory Result (µg/L)	Laboratory Flag
MW-88S	Acenaphthene	0.063	U	NC	0.063	UJ
DUP-2	Acenaphthene	0.074	J		0.074	J
MW-88S	Caprolactam	0.45	U	NC	0.45	UJ
DUP-2	Caprolactam	1.5	J		1.5	J
MW-88S	Naphthalene	0.10	J	NC	0.10	J
DUP-2	Naphthalene	0.057	U		0.057	UJ
MW-88S	Phenanthrene	0.084	J	NC	0.084	J
DUP-2	Phenanthrene	0.053	U		0.053	UJ

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NC-not calculable

3.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

3.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

3.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

DRAFT

The MDLs of the following compounds did not meet the screening criteria listed in Table 2 of the QAPP.

Analyte	Method Detection Limit (MDL) (µg/L)	Screening Criteria (µg/L)
Bis(2-ethylhexyl) phthalate	6.2	5.0
Hexachlorobenzene	0.056	0.04

µg/L-micrograms per liter

3.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 DIESEL ORGANIC RANGE

The samples were analyzed for DRO (C10-C28) per US EPA Methods 3510C/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

4.1 Overall Assessment

The DRO (C10-C28) data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

4.2 Holding Times

The holding times for the DRO (C10-C28) analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the calibration factors (CFs). The %RSDs of the target analytes were within the method and validation specified acceptance criteria.

4.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The %Ds between the CF in the ICV and CCVs for the target analytes were within the method and validation specified acceptance criteria.

4.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 495962). DRO (C10-C28) was not detected in the method blank above the MDL.

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the laboratory specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-2. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-88S.

DRAFT

4.10 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

4.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

4.12 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria was listed in the QAPP for DRO.

4.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

5.0 TOTAL AND DISSOLVED POLYCHLORINATED BIPHENYLS

The samples were analyzed for total and dissolved PCBs by US EPA methods 3510C/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ⊗ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Total vs Dissolved Assessment
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

5.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding times for the PCB analysis of a water sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

5.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

5.4 Initial and Continuing Calibration Verifications

ICV and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of surrogate decachlorobiphenyl on GC column RTX-CLP1 in a bracketing CCV in batch 365193 was outside of the laboratory specified acceptance criteria with a high bias. Based on professional and technical judgment, no qualifications were applied to surrogate CCV results.

5.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 365092). The PCBs were not detected in the method blank above the MDLs.

5.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

DRAFT

5.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair was reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

5.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

The recovery of decachlorobiphenyl on GC column RTX-CLP2 for the total PCB analysis of sample MW-88S was low and outside of the laboratory specified acceptance criteria. Therefore, the non-detect total PCB results in sample MW-88S were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-88S	Total PCB-1016	0.0045	U	0.0045	UJ	6
MW-88S	Total PCB-1221	0.0054	U	0.0054	UJ	6
MW-88S	Total PCB-1232	0.0049	U	0.0049	UJ	6
MW-88S	Total PCB-1242	0.0034	U	0.0034	UJ	6
MW-88S	Total PCB-1248	0.0028	U	0.0028	UJ	6
MW-88S	Total PCB-1254	0.0043	U	0.0043	UJ	6
MW-88S	Total PCB-1260	0.0037	U	0.0037	UJ	6
MW-88S	Total PCB-1262	0.0067	U	0.0067	UJ	6
MW-88S	Total PCB-1268	0.0043	U	0.0043	UJ	6

µg/L-micrograms per liter
U-not detected at or above the MDL

5.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-2. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-88S.

5.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

5.11 Target Compound Identification

The target compound identifications were within the validation criteria.

DRAFT

5.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

5.13 Total vs Dissolved Assessment

The samples were analyzed for both total and dissolved PCBs. The total PCB concentrations were greater than the dissolved PCB concentrations or the dissolved PCB concentrations were greater than the total PCB concentrations and the RPDs were ≤ 30%.

5.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. A screening criterion was listed in Table 1 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 1 of the QAPP.

5.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

6.0 PFAS

The sample was analyzed for PFAS per US EPA methods 3535/537 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA

DRAFT

Analyte	Acronym
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Time
✓ Initial Calibration
✓ Initial and Continuing Calibration Verification
✓ Initial and Continuing Calibration Blank
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Field Duplicate
⊗ Isotope Dilution Standards
✓ Internal Standards
✓ Target Compound Identifications
⊗ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

6.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this sample set is 100%.

DRAFT

6.2 Holding Time

The laboratory-specified holding times for the for the PFAS analysis of a water sample are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

6.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The %RSDs of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

6.4 Initial Calibration Verification and Continuing Calibration Verification

The ICV and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICV and CCVs for the target analytes were within the method and laboratory specified acceptance criteria, with the following exception.

The %D of PFTeA in the CCV in batch 509071 was outside of the laboratory specified acceptance criteria with a high bias. Since PFTeA was not detected in the associated sample, no qualifications were applied to the data.

6.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICB and CCB met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 508648). PFAS was not detected in the method blank above the MDLs.

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria.

DRAFT

6.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-2. However, per the COC the field duplicate was not analyzed for PFAS.

6.10 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of M2-6:2 FTS and M2-8:2 FTS in sample MW-13 were high and outside of the laboratory specified acceptance criteria. Therefore, the non-detect 6:2FTS and 8:2FTS results in sample MW-13 were UJ qualified as estimated less than MDLs.

Sample	Analyte	Laboratory Result (ng/L)	Laboratory Flag	Validation Result (ng/L)	Validation Qualifier	Reason Code
MW-13	6:2 FTS	2.1	U	2.1	UJ	6,11
MW-13	8:2 FTS	0.39	U	0.39	UJ	6,11

ng/L-nanograms per liter
U-not detected at or above the MDL

6.11 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

6.12 Target Compound Identifications

The compound identifications were within the validation guidance.

6.13 Target Compound Quantitation

The compound quantitations were within the validation guidance, with the following exception.

The PFBS concentration in sample MW-13 was flagged I to indicate the concentration was the estimated maximum possible concentration (EMPC); therefore, the PFBS concentration in sample MW-13 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-13	PFBS	6.1	I	6.1	J	13

µg/L-micrograms per liter
I-laboratory flag indicating value is EMPC

DRAFT

6.14 Sensitivity

The sample was reported to the MDL. Elevated non-detect results were not reported. Screening criteria were not listed in the QAPP for PFAS.

6.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

7.0 TOTAL AND DISSOLVED METALS

The samples were analyzed for total and dissolved metals per US EPA methods 3005A/6010C. (Mercury was evaluated separately in Section 9.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank
⊗ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Duplicate
✓ Target Compound Quantitation
⊗ Total vs Dissolved Assessment
✓ Sensitivity
✓ Electronic Data Deliverables Review

7.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total

DRAFT

number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

7.2 Holding Times

The holding time for the total metals analysis of a water sample is 180 days from sample collection to analysis. The holding time was met for the sample analyses.

7.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria, with the following exceptions.

The arsenic and thallium results in the ICSA in batch 365188 were more negative than the MDLs and less than the RLs. Therefore, the estimated total and dissolved thallium concentrations in the associated samples were J qualified as estimated and the non-detect results of total and dissolved arsenic and thallium in the associated samples were UJ qualified as estimated less than the MDLs.

Antimony, barium, nickel and selenium were detected in the ICSA in batch 365188 at estimated concentrations greater than the MDLs and less than the RLs. Since total and dissolved antimony were not detected in the associated samples, no qualifications were applied to the total and dissolved antimony data, based on professional and technical judgment. However, the estimated concentrations of total and dissolved barium, nickel and selenium in the associated samples were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-2	Dissolved Arsenic	4.1	U	4.1	UJ	13
MW-13	Dissolved Arsenic	4.1	U	4.1	UJ	13
MW-20	Dissolved Arsenic	4.1	U	4.1	UJ	13
MW-22	Dissolved Arsenic	4.1	U	4.1	UJ	13
MW-5	Dissolved Arsenic	4.1	U	4.1	UJ	13
MW-85I	Dissolved Arsenic	4.1	U	4.1	UJ	13
MW-88I	Dissolved Arsenic	4.1	U	4.1	UJ	13
MW-88S	Dissolved Arsenic	4.1	U	4.1	UJ	13
DUP-2	Dissolved Barium	17	J	17	J	13
MW-13	Dissolved Barium	59	J	59	J	13
MW-20	Dissolved Barium	140	J	140	J	13
MW-5	Dissolved Barium	160	J	160	J	13
MW-85I	Dissolved Barium	120	J	120	J	13
MW-88I	Dissolved Barium	120	J	120	J	13

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-88S	Dissolved Barium	17	J	17	J	13
DUP-2	Dissolved Nickel	21	J	21	J	13
MW-13	Dissolved Nickel	5.6	J	5.6	J	13
MW-88S	Dissolved Nickel	21	J	21	J	13
DUP-2	Dissolved Selenium	4.7	J	4.7	J	13
MW-88S	Dissolved Selenium	4.7	J	4.7	J	13
DUP-2	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-13	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-20	Dissolved Thallium	5.3	J	5.3	J	13
MW-22	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-5	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-85I	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-88I	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-88S	Dissolved Thallium	3.3	U	3.3	UJ	13
DUP-2	Total Arsenic	4.1	U	4.1	UJ	13
MW-13	Total Arsenic	4.1	U	4.1	UJ	13
MW-20	Total Arsenic	4.1	U	4.1	UJ	13
MW-22	Total Arsenic	4.1	U	4.1	UJ	13
MW-5	Total Arsenic	4.1	U	4.1	UJ	13
MW-85I	Total Arsenic	4.1	U	4.1	UJ	13
MW-88I	Total Arsenic	4.1	U	4.1	UJ	13
MW-88S	Total Arsenic	4.1	U	4.1	UJ	13
DUP-2	Total Barium	17	J	17	J	13
MW-13	Total Barium	52	J	52	J	13
MW-20	Total Barium	140	J	140	J	13
MW-5	Total Barium	160	J	160	J	13
MW-85I	Total Barium	130	J	130	J	13
MW-88I	Total Barium	110	J	110	J	13
MW-88S	Total Barium	19	J	19	J	13
DUP-2	Total Nickel	23	J	23	J	13
MW-13	Total Nickel	5.5	J	5.5	J	13
MW-88S	Total Nickel	24	J	24	J	13
DUP-2	Total Selenium	5.0	J	5.0	J	13
MW-13	Total Selenium	4.3	J	4.3	J	13
MW-88S	Total Selenium	3.6	U	3.6	UJ	13
DUP-2	Total Thallium	3.3	U	3.3	UJ	13
MW-13	Total Thallium	3.3	U	3.3	UJ	13
MW-20	Total Thallium	3.3	U	3.3	UJ	13
MW-22	Total Thallium	3.3	U	3.3	UJ	13
MW-5	Total Thallium	3.4	J	3.4	J	13
MW-85I	Total Thallium	3.3	U	3.3	UJ	13
MW-88I	Total Thallium	3.3	U	3.3	UJ	13
MW-88S	Total Thallium	3.3	U	3.3	UJ	13

DRAFT

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL

7.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICV and CCVs were within the method specified acceptance criteria.

7.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

7.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks (batches 364793, 361295 and 361299) were reported. Metals were not detected in the method blanks above the MDLs, with the following exceptions.

Vanadium was detected in the method blank in batch 364793 at an estimated concentration greater than the MDL and less than the RL. Therefore, the estimated vanadium concentration in the associated sample was U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-20	Total Vanadium	6.1	J,B	50	U	3

µg/l-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating analyte was detected in both the sample and method blank

7.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pair were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample MW-20. The recovery and RPD results were within the QAPP specified acceptance criteria.

7.8 Serial Dilution

One sample set specific serial dilution was reported using sample MW-20. The %D results were within the method specified acceptance criteria.

DRAFT

7.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

7.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

7.11 Field Duplicate

One field duplicate was collected with the sample set, DUP-2. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-88S, with the following exceptions.

The RPD of total iron in the field duplicate pair was greater than 30%. Therefore, the total iron concentrations in the field duplicate pair were J qualified as estimated.

Dissolved lead and total selenium were not detected in MW-88S and were detected in DUP-2 at estimated concentrations greater than the MDLs and less than the RLs, resulting in noncalculable RPDs. Therefore, based on professional and technical judgment the non-detect results of dissolved lead and total selenium in MW-88S were UJ qualified as estimated less than the MDLs and the dissolved lead and total selenium concentrations in DUP-2 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Laboratory Result (µg/L)	Laboratory Flag	Reason Code
MW-88S	Total Iron	7300	NA	124	7300	J	13
DUP-2	Total Iron	1700	NA		1700	J	13
MW-88S	Dissolved Lead	2.9	U	NC	2.9	UJ	13
DUP-2	Dissolved Lead	3.0	J		3.0	J	13
MW-88S	Total Selenium	3.6	U	NC	3.6	UJ	13
DUP-2	Total Selenium	5.0	J		5.0	J	13

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NA-not applicable
NC-not calculable

7.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

DRAFT

7.13 Total vs Dissolved Assessment

The samples were analyzed for both total and dissolved metals. The total metals concentrations were greater than the dissolved metal concentrations or the dissolved metal concentrations were greater than the total metal concentrations and the RPDs were ≤ 30%, with the following exceptions.

Dissolved cadmium was detected in MW-13 at an estimated concentration at the MDL and less than the RL and total cadmium was not detected in MW-13. Therefore, the dissolved cadmium concentration was J qualified as estimated and the non-detect total cadmium result was UJ qualified as estimated less than the MDL in MW-13, based on professional and technical judgment.

Dissolved selenium was detected in MW-88S at an estimated concentration greater than the MDL and less than the RL and total selenium was not detected in MW-88S. Therefore, the dissolved selenium concentration was J qualified as estimated and the non-detect total selenium result was UJ qualified as estimated less than the MDL in MW-88S, based on professional and technical judgment.

Dissolved thallium was detected in MW-20 at an estimated concentration greater than the MDL and less than the RL and total thallium was not detected in MW-20. Therefore, the dissolved thallium concentration was J qualified as estimated and the non-detect total thallium result was UJ qualified as estimated less than the MDL in MW-20, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Laboratory Result (µg/L)	Laboratory Flag	Reason Code
MW-13	Total Cadmium	0.28	U	NC	0.28	UJ	13
MW-13	Dissolved Cadmium	0.28	J		0.28	J	13
MW-88S	Total Selenium	3.6	U	NC	3.6	UJ	13
MW-88S	Dissolved Selenium	4.7	J		4.7	J	13
MW-20	Total Thallium	3.3	U	NC	3.3	UJ	13
MW-20	Dissolved Thallium	5.3	J		5.3	J	13

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NC-not calculable

7.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

DRAFT

7.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

8.0 TOTAL AND DISSOLVED MERCURY

The samples were analyzed for total and dissolved mercury per US EPA method 7470A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Target Compound Quantitation
- ✓ Total vs Dissolved Assessment
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

8.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

8.2 Holding Times

The holding time for the mercury analysis of a water sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

DRAFT

8.3 Initial Calibration

The method specified initial calibration requirements were met.

8.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICV and CCVs were within the method specified acceptance limits.

8.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

8.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks (batches 364974 and 364975) were reported. Mercury was not detected in the method blanks above the MDL.

8.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

8.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

8.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-2. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate and the original samples MW-88S.

8.10 Target Compound Quantitation

The compound quantitations were within the validation criteria.

8.11 Total vs Dissolved Assessment

The samples were analyzed for both total and dissolved mercury. The total mercury concentrations were greater than the dissolved mercury concentrations or the dissolved mercury concentrations were greater than the total mercury concentrations and the RPDs were ≤ 30%.

DRAFT

8.12 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 2 of the QAPP.

8.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20% as part of the data validation process. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

23ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	March 25, 2022
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-129052-1**

SITE: Former Sperry Remington Site RI

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of seven solid samples and one field duplicate collected on 26 October 2021, as part of the Former Sperry Remington Site RI sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical test:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below and the information provided, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005);

DRAFT

- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014;
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010; and,
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-129052-1	SSHS-B4261-SUB-26-28
180-129052-2	DUP-02
180-129052-3	SSHS-B4261-SUB-28-30
180-129052-4	SSHS-B4265-SUB-20-22

Laboratory ID	Client ID
180-129052-5	SSHS-B4265-SUB-22-24
180-129052-6	SSHS-B4265-SUB-24-26
180-129052-7	SSHS-B4265-SUB-26-28
180-129052-8	SSHS-B4265-SUB-28-30

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

A collection time was not documented on the chain of custody (COC) for the field duplicate, DUP-02. The field duplicate was logged in with the collection time of 00:00.

The percent solid data used for dry weight analysis were not validated.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate

DRAFT

- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane were R qualified as rejected due to the low RRF in the initial calibration and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample collected as a Terracore are 48 hours from collection to frozen (water preserved) and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits. The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations, with the following exceptions.

The %RSD of trichlorofluoromethane (33.4%) was high and outside of the method specified acceptance criteria. In addition, the recalculated concentrations for levels 2, 3, 5 and 7 compared to the true concentrations had percent errors greater than 30%, outside of the method specified acceptance criteria. Since the %RSD for trichlorofluoromethane was within the validation specified acceptance criteria, the percent error for level 1 (0.7%) which equates to the low level

DRAFT

calibration standard, was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
DUP-02	1,4-Dioxane	45	U	45	R	9
SSHS-B4261-SUB-26-28	1,4-Dioxane	43	U	43	R	9
SSHS-B4261-SUB-28-30	1,4-Dioxane	34	U	34	R	9
SSHS-B4265-SUB-20-22	1,4-Dioxane	22	U	22	R	9
SSHS-B4265-SUB-22-24	1,4-Dioxane	40	U	40	R	9
SSHS-B4265-SUB-24-26	1,4-Dioxane	40	U	40	R	9
SSHS-B4265-SUB-26-28	1,4-Dioxane	74	U	74	R	9
SSHS-B4265-SUB-28-30	1,4-Dioxane	33	U	33	R	9

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (ICVs and CCVs)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRFs, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of dichlorodifluoromethane (53.6%), chloromethane (33.4%), vinyl chloride (28.0%), bromomethane (29.9%), chloroethane (32.1%), trichlorofluoromethane (59.6%) and carbon

DRAFT

disulfide (21.9%) in the CCV in batch 377119 were outside of the method specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of dichlorodifluoromethane (50.4%), chloromethane (34.3%), vinyl chloride (33.7%), bromomethane (42.8%), chloroethane (47.4%) and trichlorofluoromethane (97.1%) in the CCV in batch 377274 were outside of the method specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The %D of methyl acetate (-21.1%) in the CCV in batch 377274 was outside of the method specified acceptance criteria with a low bias. Since the %D of methyl acetate was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 377119 and 377274). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCS/LCS duplicate (LCSD) pairs were reported. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria, with the following exceptions.

The LCS recoveries of dichlorodifluoromethane and trichlorofluoromethane and the LCSD recovery of chloromethane in the LCS/LCSD pair in batch 377119 were high and outside of the QAPP specified acceptance criteria. Since dichlorodifluoromethane, trichlorofluoromethane and chloromethane were not detected in the associated samples, no qualifications were applied to the data.

One or both the recoveries of chloromethane and vinyl chloride and the RPD of chloromethane in the LCS/LCSD pair in batch 377274 were high and outside of the QAPP specified acceptance criteria. Since chloromethane and vinyl chloride were not detected in the associated samples, no qualifications were applied to the data.

DRAFT

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Duplicate

One field duplicate was collected with the sample set, DUP-02. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original sample SSHS-B4261-SUB-26-28.

1.11 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

---

* * * * *

engineers | scientists | innovators

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	March 25, 2022
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-129230-1**

SITE: Former Sperry Remington Site RI

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of twenty water samples, two field duplicates, one trip blank and one field blank collected on 26-28 October 2021, as part of the Former Sperry Remington Site RI sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C
- Semivolatile Organic Compounds (SVOCs) by US EPA Method 3520C/8270D
- Total and Dissolved Polychlorinated Biphenyls (PCBs) by US EPA Methods 3510C/8082A
- Total and Dissolved Metals by US EPA Methods 3005A/6010C
- Total and Dissolved Mercury by US EPA Method 7470A

Eurofins TestAmerica, Edison, New Jersey analyzed the samples for the following analytical test:

- 1,4-Dioxane by US EPA Methods 3510C/8270E using selected ion monitoring (SIM)

Eurofins TestAmerica, West Sacramento, California analyzed the samples for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by US EPA Methods 3535/537 (modified)

Eurofins TestAmerica, North Canton, Ohio analyzed the samples for the following analytical test:

- Diesel Range Organics (DRO) by US EPA Methods 3510C/8015D

DRAFT

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and based on technical and professional judgment. The 1,4-dioxane results analyzed by US EPA Method 8270D and 8270E using SIM are considered usable.

The non-detect result for hexachlorocyclopentadiene in sample MW-77S was R qualified as rejected due to matrix spike (MS) recovery less than 10%.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- US EPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

DRAFT

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-129230-1	FIELD BLANK 20211028
180-129230-2	TRIP BLANK-2
180-129230-3	MW-71S
180-129230-4	MW-71I
180-129230-5	MW-70I
180-129230-6	MW-94S
180-129230-7	MW-94S
180-129230-8	MW-70S
180-129230-9	MW-73S
180-129230-10	MW-73I
180-129230-11	MW-47I
180-129230-12	DUP-01
180-129230-13	MW-94I

Laboratory ID	Client ID
180-129230-14	MW-94I
180-129230-15	MW-82S
180-129230-16	MW-77S
180-129230-17	MW-77I
180-129230-18	MW-92I
180-129230-19	MW-92S
180-129230-20	MW-90S
180-129230-21	MW-90I
180-129230-22	MW-83I
180-129230-23	MW-83S
180-129230-24	MW-76I
180-129230-25	MW-76S
180-129230-26	DUP-03

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC), with the following exception.

The laboratory noted the cooler containing the sample containers for the dissolved and total metals analysis for sample MW-94I and the containers for the MS/MS duplicate (MSD) analysis for sample MW-94I were delayed and received at 13.0ºC. Since there is no temperature requirement for total and dissolved metals, these analyses were performed. However, the MS/MSD analyses were canceled.

Collection times were not documented on the chain of custody (COC) for the field duplicates, DUP-01 and DUP-03, field blank, FIELD BLANK 20211028, and trip blank, TRIP BLANK-2. The field duplicates, field blank and trip blank were logged in with the collection time of 00:00.

Samples MW-94S and MW-94I were listed twice on the COC; both were collected on October 27, 2021, and October 28, 2021. The samples collected on October 27, 2021, were analyzed for VOCs, SVOCs, PCBs, metals, mercury and DRO. The samples collected on October 28, 2021, were analyzed for PFAS and 1,4-dioxane.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5030C/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
⊗ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane were R qualified as rejected due to the low RRFs in the initial calibrations and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample collected as a Terracore are 48 hours from collection to frozen (water preserved) and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits. The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria

DRAFT

or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations, with the following exceptions.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
DUP-01	1,4-Dioxane	43	U	43	R	9
DUP-03	1,4-Dioxane	43	U	43	R	9
FIELD BLANK 20211028	1,4-Dioxane	43	U	43	R	9
MW-47I	1,4-Dioxane	43	U	43	R	9
MW-70I	1,4-Dioxane	43	U	43	R	9
MW-70S	1,4-Dioxane	43	U	43	R	9
MW-71I	1,4-Dioxane	43	U	43	R	9
MW-71S	1,4-Dioxane	43	U	43	R	9
MW-73I	1,4-Dioxane	43	U	43	R	9
MW-73S	1,4-Dioxane	43	U	43	R	9
MW-76I	1,4-Dioxane	43	U	43	R	9
MW-76S	1,4-Dioxane	43	U	43	R	9
MW-77I	1,4-Dioxane	43	U	43	R	9
MW-77S	1,4-Dioxane	43	U	43	R	9
MW-82S	1,4-Dioxane	43	U	43	R	9
MW-90I	1,4-Dioxane	43	U	43	R	9
MW-90S	1,4-Dioxane	43	U	43	R	9
MW-92I	1,4-Dioxane	43	U	43	R	9
MW-92S	1,4-Dioxane	43	U	43	R	9
MW-94I	1,4-Dioxane	43	U	43	R	9
MW-94S	1,4-Dioxane	43	U	43	R	9
TRIP BLANK-2	1,4-Dioxane	43	U	43	R	9

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.5 Initial and Continuing Calibration Verifications (ICVs and CCVs)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRFs, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of acetone (29.5%), 1,1,2-trichloro-1,2,2-trifluoroethane (24.9%) and methylene chloride (27.7%) in the CCV in batch 378011 were outside of the laboratory specified acceptance criteria with high biases. Since the %Ds of these analytes were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of acetone (32.1%) in the CCV in batch 378164 was outside of the laboratory specified acceptance criteria with a high bias. Since the %D of acetone was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of 1,1,2,2-tetrachloroethane (23.3%) in the CCV in batch 378344 was outside of the laboratory specified acceptance criteria with a high bias. Since the %D of 1,1,2,2-tetrachloroethane was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of trichlorofluoromethane (25.9%), methyl tert-butyl ether (28.2%) and chloroform (22.1%) in the CCV in batch 378532 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Four method blanks were reported (batches 378011, 378164, 378344 and 378532). VOCs were not detected in the method blanks above the MDLs.

DRAFT

1.7 Matrix Spike/Matrix Spike Duplicate

Two sample set specific MS/MSD pairs were reported using samples MW-73S and MW-92S. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria, with the following exceptions.

The MSD recovery of 1,1,2,2-tetrachloroethane in the MS/MSD pair using sample MW-92S was high and outside of the QAPP specified acceptance criteria. Since 1,1,2,2-tetrachloroethane was not detected in sample MW-92S, no qualifications were applied to the data.

The RPDs of 1,1-dichloroethene in the MS/MSD pairs using samples MW-73S and MW-92S were high and outside of the QAPP specified acceptance criteria. Since 1,1-dichloroethene was not detected in samples MW-73S and MW-92S, no qualifications were applied to the data.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs and two LCS/LCS duplicate (LCSD) pairs were reported. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of 1,1,2,2-tetrachloroethane, bromoform, chloromethane, dichlorodifluoromethane and vinyl chloride in the LCS/LCSD pair in batch 378164 were high and outside of the QAPP specified acceptance criteria. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The LCSD recoveries of methylene chloride in the LCS/LCSD pairs in batches 378164 and 378344 were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect results of methylene chloride in the associated samples were UJ qualified as estimated less than the MDL.

The RPDs of chloromethane and methylene chloride in the LCS/LCSD pair in batch 378164 were high and outside of the QAPP specified acceptance criteria. Since chloromethane and methylene chloride were not detected in the associated samples, no qualifications were applied to the data.

The RPDs of chloromethane, dichlorodifluoromethane, methylene chloride, trichlorofluoromethane and vinyl chloride in the LCS/LCSD pair in batch 378344 were high and outside of the QAPP specified acceptance criteria. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

One or both the recoveries of 1,1,2,2-tetrachloroethane, chloromethane and 1,2-dibromoethane in the LCS/LCSD pair in batch 378344 were high and outside of the QAPP specified acceptance

DRAFT

criteria. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The recovery of chloromethane in the LCS in batch 378532 was high and outside of the QAPP specified acceptance criteria. Since chloromethane was not detected in the associated samples, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-01	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-70I	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-71I	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-71S	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-82S	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-94I	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-94S	Methylene Chloride	0.89	U,*1	0.89	UJ	5
FIELD BLANK 20211028	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-47I	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-70S	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-73I	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-76I	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-77I	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-90I	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-92I	Methylene Chloride	0.89	U,*1	0.89	UJ	5
MW-92S	Methylene Chloride	0.89	U,*1	0.89	UJ	5
TRIP BLANK-2	Methylene Chloride	0.89	U,*1	0.89	UJ	5

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the MDL
*1-laboratory flag indicating LCS/LCSD RPD was outside the laboratory limits

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-03. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original samples MW-47I and MW-76I, respectively, with the following exception.

Tetrachloroethene was not detected in MW-76I and was detected in DUP-03 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD.

DRAFT

Therefore, based on professional and technical judgment, the non-detect result of tetrachloroethene in MW-76I was UJ qualified as estimated less than the MDL and the concentration of tetrachloroethene in DUP-03 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-76I	Tetrachloroethene	0.47	U	NC	0.47	UJ	7
DUP-03	Tetrachloroethene	0.53	J		0.53	J	7

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NC-not calculable
RPD-relative percent difference

1.11 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

Analyte	Method Detection Limit (µg/L)	Screening Criteria (µg/L)
cis-1,3-Dichloropropene	0.59	0.4
1,2-Dibromo-3-Chloropropane	0.89	0.04
1,2-Dibromoethane	0.50	0.0006
1,2-Dichloroethane	0.57	0.6
trans-1,3-Dichloropropene	0.58	0.4

µg/L-micrograms per liter

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

2.0 1,4-DIOXANE

The samples were analyzed for 1,4-dioxane per US EPA Methods 3510C/8270E using SIM.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The 1,4-dioxane data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the 1,4-dioxane analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

DRAFT

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs. The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria. The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 811209). 1,4-Dioxane was not detected in the method blank above the MDL.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair was reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

DRAFT

2.10 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-03. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-47I and MW-76I, respectively.

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for 1,4-dioxane.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3520C/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks

DRAFT

⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
⊗ Sensitivity
✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The SVOC data reported in this SDG are considered to be usable for supporting project objectives, with the following exception. The non-detect result for hexachlorocyclopentadiene in sample MW-77S was R qualified as rejected due to MS recovery less than 10%. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 99.9%.

3.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the GC column performance and injection port inertness resulted in acceptable results.

3.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs. The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria.

DRAFT

3.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria. The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria.

3.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 377195, 377470 and 377591). SVOCs were not detected in the method blanks above the MDLs.

3.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS was reported using sample MW-77S. The recovery results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of caprolactam and phenanthrene in the MS were low and outside of the QAPP specified acceptance criteria. Therefore, the concentrations of caprolactam and phenanthrene in sample MW-77S were J qualified as estimated.

The recoveries of the following analytes in the MS were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect results of these analytes in sample MW-77S were UJ qualified as estimated less than the MDLs.

1,1-Biphenyl	2-Nitrophenol	Benzo[k]fluoranthene
1,2,4,5-Tetrachlorobenzene	3,3-Dichlorobenzidine	Bis(2-chloroethyl)ether
2,2-oxybis[1-chloropropane]	3-Nitroaniline	Dibenzofuran
2,3,4,6-Tetrachlorophenol	4-Chloroaniline	Fluorene
2,4,6-Trichlorophenol	4-Chlorophenyl phenyl ether	Hexachlorobutadiene
2,4-Dichlorophenol	4-Nitroaniline	Hexachloroethane
2,4-Dimethylphenol	Acenaphthene	Methylphenol, 3 & 4
2-Chloronaphthalene	Acenaphthylene	Naphthalene
2-Chlorophenol	Anthracene	N-Nitrosodi-n-propylamine
2-Methylnaphthalene	Benzo[a]pyrene	N-Nitrosodiphenylamine
2-Methylphenol	Benzo[b]fluoranthene	Phenol

The recovery of hexachlorocyclopentadiene in the MS was less than 10% and outside of the QAPP specified acceptance criteria. Therefore, the non-detect result of hexachlorocyclopentadiene in sample MW-77S was R qualified as rejected.

The recoveries of 2,4,5-trichlorophenol, 2,4-dinitrotoluene, 2,6-dinitrotoluene, acetophenone, benzo[g,h,i]perylene, bis(2-chloroethoxy)methane, carbazole, chrysene, dibenz(a,h)anthracene,

DRAFT

dimethyl phthalate, di-n-butyl phthalate, fluoranthene and indeno[1,2,3-cd]pyrene in the MS were low and outside of the laboratory specified acceptance criteria. Since these recoveries were within the QAPP specified acceptance criteria and based on professional and technical judgement, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-77S	1,1'-Biphenyl	0.15	U,F1	0.15	UJ	4
MW-77S	1,2,4,5-Tetrachlorobenzene	0.16	U,F1	0.16	UJ	4
MW-77S	2,2'-oxybis[1-chloropropane]	0.060	U	0.060	UJ	4
MW-77S	2,3,4,6-Tetrachlorophenol	0.34	U,F1	0.34	UJ	4
MW-77S	2,4,6-Trichlorophenol	0.23	U,F1	0.23	UJ	4
MW-77S	2,4-Dichlorophenol	0.053	U,F1	0.053	UJ	4
MW-77S	2,4-Dimethylphenol	0.17	U,F1	0.17	UJ	4
MW-77S	2-Chloronaphthalene	0.061	U,F1	0.061	UJ	4
MW-77S	2-Chlorophenol	0.13	U,F1	0.13	UJ	4
MW-77S	2-Methylnaphthalene	0.065	U,F1	0.065	UJ	4
MW-77S	2-Methylphenol	0.31	U,F1	0.31	UJ	4
MW-77S	2-Nitrophenol	0.20	U,F1	0.20	UJ	4
MW-77S	3,3'-Dichlorobenzidine	0.61	U,F1	0.61	UJ	4
MW-77S	3-Nitroaniline	0.46	U,F1	0.46	UJ	4
MW-77S	4-Chloroaniline	0.39	U,F1	0.39	UJ	4
MW-77S	4-Chlorophenyl phenyl ether	0.23	U,F1	0.23	UJ	4
MW-77S	4-Nitroaniline	0.38	U,F1	0.38	UJ	4
MW-77S	Acenaphthene	0.068	U,F1	0.068	UJ	4
MW-77S	Acenaphthylene	0.068	U,F1	0.068	UJ	4
MW-77S	Anthracene	0.051	U,F1	0.051	UJ	4
MW-77S	Benzo[a]pyrene	0.055	U,F1	0.055	UJ	4
MW-77S	Benzo[b]fluoranthene	0.10	U,F1	0.10	UJ	4
MW-77S	Benzo[k]fluoranthene	0.092	U,F1	0.092	UJ	4
MW-77S	Bis(2-chloroethyl)ether	0.042	U,F1	0.042	UJ	4
MW-77S	Caprolactam	1.2	J,F1	1.2	J	4
MW-77S	Dibenzofuran	0.20	U,F1	0.20	UJ	4
MW-77S	Fluorene	0.072	U,F1	0.072	UJ	4
MW-77S	Hexachlorobutadiene	0.072	U,F1	0.072	UJ	4
MW-77S	Hexachlorocyclopentadiene	0.52	U,F1	0.52	R	4
MW-77S	Hexachloroethane	0.14	U,F1	0.14	UJ	4
MW-77S	Methylphenol, 3 & 4	0.39	U,F1	0.39	UJ	4
MW-77S	Naphthalene	0.061	U,F1	0.061	UJ	4
MW-77S	N-Nitrosodi-n-propylamine	0.074	U,F1	0.074	UJ	4
MW-77S	N-Nitrosodiphenylamine	0.12	U,F1	0.12	UJ	4
MW-77S	Phenanthrene	0.19	J,F1	0.19	J	4
MW-77S	Phenol	0.51	U,F1	0.51	UJ	4

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL

DRAFT

U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria

3.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the QAPP specified acceptance criteria, with the following exception.

The recovery of 1,4-dioxane in the LCS in batch 377591 was high and outside of the QAPP specified acceptance criteria. Since 1,4-dioxane was not detected in the associated samples, no qualifications were applied to the data.

3.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.10 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-03. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-47I and MW-76I, respectively, with the following exceptions.

For analytes with both a non-detect result and concentration greater than the MDL in the field duplicate pairs, the RPD was not calculable. Therefore, based on professional and technical judgment, the non-detect results were UJ qualified as estimated less than the MDLs and the concentrations were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-47I	1,1'-Biphenyl	0.13	U	NC	0.13	UJ	7
DUP-01	1,1'-Biphenyl	0.26	J		0.26	J	7
MW-47I	1,2,4,5-Tetrachlorobenzene	0.14	U	NC	0.14	UJ	7
DUP-01	1,2,4,5-Tetrachlorobenzene	0.37	J		0.37	J	7
MW-47I	2,4-Dichlorophenol	0.047	U	NC	0.047	UJ	7
DUP-01	2,4-Dichlorophenol	0.20	NA		0.20	J	7
MW-47I	2-Chloronaphthalene	0.055	U	NC	0.055	UJ	7
DUP-01	2-Chloronaphthalene	0.32	NA		0.32	J	7
MW-47I	2-Methylnaphthalene	0.057	U	NC	0.057	UJ	7
DUP-01	2-Methylnaphthalene	0.41	NA		0.41	J	7
MW-47I	Acenaphthene	0.060	U	NC	0.060	UJ	7

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-01	Acenaphthene	0.18	J		0.18	J	7
MW-47I	Acenaphthylene	0.060	U	NC	0.06	UJ	7
DUP-01	Acenaphthylene	0.17	J		0.17	J	7
MW-47I	Naphthalene	0.055	U	NC	0.055	UJ	7
DUP-01	Naphthalene	0.40	NA		0.40	J	7
MW-76I	Butyl benzyl phthalate	0.43	U	NC	0.43	UJ	7
DUP-03	Butyl benzyl phthalate	0.81	J		0.81	J	7
MW-76I	Diethyl phthalate	0.53	U	NC	0.53	UJ	7
DUP-03	Diethyl phthalate	0.60	J		0.60	J	7
MW-76I	Naphthalene	0.055	U	NC	0.055	UJ	7
DUP-03	Naphthalene	0.072	J		0.072	J	7

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable
RPD-relative percent difference

3.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

3.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

3.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

Analyte	Method Detection Limit (µg/L)	Screening Criteria (µg/L)
Bis(2-ethylhexyl) phthalate	6.2	5
Hexachlorobenzene	0.056	0.04

µg/L-micrograms per liter

DRAFT

3.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 DIESEL RANGE ORGANIC

The samples were analyzed for DRO (C10 – C28) per US EPA Methods 3510C/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

4.1 Overall Assessment

The DRO (C10 – C28) data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding times for the DRO (C10 – C28) analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for DRO (C10 – C28). The laboratory calculated %RSD of the calibration factors (CFs). The %RSD of DRO (C10 – C28) was within the method specified acceptance criteria.

4.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The %Ds between the CFs in the ICVs and CCVs for DRO (C10 – C28) were within the method specified acceptance criteria.

4.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 510970 and 511173). DRO (C10 – C28) was not detected in the method blanks above the MDL.

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-03. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-47I and MW-76I, respectively.

4.10 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

4.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

DRAFT

4.12 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for DRO.

4.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

5.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by US EPA methods 3510C/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Total vs Dissolved Assessment
- ✓ Electronic Data Deliverable Review

5.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

5.2 Holding Times

The holding times for the PCB analysis of a solid sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

5.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

5.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of peak 4 (20.5%) and peak 5 (37.2%) for PCB-1248 on GC column RTX-CLP1 in CCV 180-378176/4 were outside of the method specified acceptance criteria with high biases. Since the overall %D of PCB-1248 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %D of peak 3 (-23.9%) for PCB-1260 on GC column RTX-CLP1 in CCV 180-378176/5 was outside of the method specified acceptance criteria with a low bias. Since the overall %D of PCB-1260 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peak 2 (21.8%), peak 3 (20.5%), peak 4 (25.3%) and peak 5 (27.5%) for PCB-1248 on GC column RTX-CLP1 in CCV 180-378176/6 were outside of the method specified acceptance criteria with high biases. Since PCB-1248 was not detected in the associated samples, no qualifications were applied to the data.

The %D of peak 5 (22.2%) for PCB-1254 on GC column RTX-CLP1 in CCV 180-378176/6 was outside of the method specified acceptance criteria with a high bias. Since the overall %D of PCB-1254 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

DRAFT

5.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 377340, 377342 and 377344). The PCBs were not detected in the method blanks above the MDLs.

5.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

5.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCS/LCSD pairs were reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

5.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

The recovery of surrogate tetrachloro-m-xylene on GC column RTX-CLP1 for the LCS in batch 377342 was high and outside of the laboratory specified acceptance criteria. Since the surrogate recoveries in the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The recoveries of surrogate tetrachloro-m-xylene on GC column RTX-CLP1 for samples MW-73I, MW-76I and DUP-03 were high and outside of the laboratory specified acceptance criteria. Since the recoveries of surrogate decachlorobiphenyl were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The recovery of surrogate tetrachloro-m-xylene on GC column RTX-CLP1 for sample MW-92I was low and outside of the laboratory specified acceptance criteria. Since the recovery of surrogate decachlorobiphenyl was within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The recoveries of surrogate tetrachloro-m-xylene on GC column RTX-CLP2 for samples MW-73S and MW-82S were high and outside the laboratory specified acceptance criteria. Since the recoveries of surrogate decachlorobiphenyl were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

DRAFT

5.9 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-03. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-47I and MW-76I, respectively.

5.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

5.11 Target Compound Identification

The target compound identifications were within the validation criteria.

5.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

5.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria was listed in Table 2 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 2 of the QAPP.

5.14 Total vs Dissolved Assessment

The samples were reported for total and dissolved PCBs. The total PCBs concentrations were greater than the dissolved PCBs concentrations or for dissolved PCBs concentrations that were greater than the total PCBs concentration the RPD was ≤ 30%.

5.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

6.0 PFAS

The samples were analyzed for PFAS per US EPA methods 3535/537 (modified). The following PFAS were reported:

DRAFT

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate

- ✓ Isotope Dilution Standards
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

6.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

6.2 Holding Time

The laboratory-specified holding times for the for the PFAS analysis of solid samples are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

6.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The %RSDs of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

6.4 Initial Calibration Verification and Continuing Calibration Verification

The ICV and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICV and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

6.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICB and CCB met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 540160). PFAS were not detected in the method blank above the MDLs.

DRAFT

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

6.9 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-03. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-47I and MW-76I, respectively.

6.10 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria.

6.11 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

6.12 Target Compound Identifications

The compound identifications were within the validation guidance.

6.13 Target Compound Quantitation

The compound quantitations were within the validation guidance.

6.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria were not listed in the QAPP for PFAS.

6.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

7.0 METALS

The samples were analyzed for metals per US EPA methods 3005A/6010C. (Mercury was evaluated separately in Section 8.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
⊗ Initial and Continuing Calibration Blank
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Duplicate
✓ Target Compound Quantitation
✓ Sensitivity
⊗ Total vs Dissolved Assessment
✓ Electronic Data Deliverables Review

DRAFT

7.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

7.2 Holding Times

The holding time for the total metals analysis of solid samples is 180 days from sample collection to analysis. The holding times were met for the sample analyses.

7.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria, with the following exceptions.

Barium, nickel and selenium were detected in the ICSA in batch 377719 at estimated concentrations greater than the MDLs and less than the RLs. Therefore, the estimated concentrations of dissolved and total barium, nickel and selenium in the associated samples were J qualified as estimated.

The antimony and thallium results in the ICSA in batch 377719 were more negative than the MDLs and less than the RLs. Therefore, the non-detect results of dissolved and total antimony and thallium in the associated samples were UJ qualified as estimated less than the MDLs and the estimated concentrations of dissolved and total thallium in the associated samples were J qualified as estimated.

Barium, lead, nickel, selenium and zinc were detected in the ICSA in batch 378321 at estimated concentrations greater than the MDLs and less than the RLs. Since dissolved lead, nickel, selenium and zinc were not detected in the associated sample, no qualifications were applied to the dissolved lead, nickel, selenium and zinc, based on professional and technical judgment. However, the estimated concentration of dissolved barium in the associated sample was J qualified as estimated.

The thallium result in the ICSA in batch 378321 was more negative than the MDL and less than the RL. Therefore, the estimated concentration of dissolved thallium in the associated sample was J qualified as estimated.

Barium, nickel and selenium were detected in the ICSA in batch 378510 at estimated concentrations greater than the MDLs and less than the RLs. Since dissolved and total nickel and selenium were not detected in the associated samples, no qualifications were applied to the dissolved and total nickel and selenium results, based on professional and technical judgment. However, the estimated concentrations of dissolved and total barium in the associated samples were J qualified as estimated.

The thallium result in the ICSA in batch 378510 was more negative than the MDL and less than the RL. Therefore, the non-detect results of dissolved and total thallium in the associated samples were UJ qualified as estimated less than the MDL.

See qualifications in Attachment 3 at the end of this report.

7.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria, with the following exceptions.

DRAFT

The recoveries of arsenic in the low level ICV (ICVL) and bracketing low level CCVs were high and outside the method specified acceptance criteria. Since arsenic was not detected in the associated samples, no qualifications were applied to the data.

7.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria, with the following exceptions.

Vanadium was detected in a bracketing CCB in batch 377719 at an estimated concentration greater than the MDL and less than the RL. Therefore, the estimated concentration of total vanadium in sample MW-92S was U qualified as not detected at the RL.

Selenium and vanadium were detected in the ICB in batch 377719 at estimated concentrations greater than the MDLs and less than the RLs. Since selenium and vanadium were not detected in the CCBs that bracketed the associated samples and based on professional and technical judgment, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-92S	Total Vanadium	8.0	J	50	U	3

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL

7.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks (batches 377329, 377332 and 377576) were reported. Metals were not detected in the method blanks above the MDLs.

7.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported for dissolved metals using sample MW-73I. The recovery and RPD results were within the QAPP specified acceptance criteria.

7.8 Serial Dilution

Two sample set specific serial dilutions were reported for dissolved metals using samples MW-73I and MW-90I. The %D results were within the method specified acceptance criteria.

DRAFT

7.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

7.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

7.11 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-03. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-47I and MW-76I, respectively, with the following exceptions.

Total selenium was detected in MW-47I at an estimated concentration greater than the MDL and less than the RL and was not detected in DUP-01, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the concentration of total selenium in MW-47I was J qualified as estimated and the non-detect result of total selenium in DUP-01 was UJ qualified as estimated less than the MDL.

Dissolved zinc was not detected in MW-47I and was detected in DUP-01 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment, the non-detect result of dissolved zinc in MW-47I was UJ qualified as estimated less than the MDL and the concentration of dissolved zinc in DUP-01 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-47I	Total Selenium	4.9	J	NC	4.9	J	7
DUP-01	Total Selenium	3.7	U		3.7	UJ	7
MW-47I	Dissolved Zinc	2.6	U	NC	2.6	UJ	7
DUP-01	Dissolved Zinc	2.7	J		2.7	J	7

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NC-not calculable
RPD-relative percent difference

DRAFT

7.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

7.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exception.

The MDL, 6.2 µg/L, for antimony did not meet the screening criteria, 6 µg/L, listed in the QAPP.

7.14 Total vs Dissolved Assessment

The samples were reported for total and dissolved metals. The total metals concentrations were greater than the dissolved metals concentrations or for dissolved metals concentrations that were greater than the total metals concentration the RPD was ≤ 30%, with the following exceptions.

For samples with a non-detect result for total metals and a concentration of dissolved metals greater than the MDL, the non-detect results for total metals were UJ qualified as estimated less than the MDLs and the concentrations of dissolved metals were J qualified as estimated, based on professional and technical judgment.

For dissolved metals concentrations greater than the totals metals concentrations with an RPD greater than 30%, the dissolved and total metals concentrations were J qualified as estimated, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result	Validation Qualifier	Reason Code
DUP-01	Total Zinc	2.6	U	NC	2.6	UJ	13
DUP-01	Dissolved Zinc	2.7	J		2.7	J	13
MW-70I	Total Copper	2.2	U	NC	2.2	UJ	13
MW-70I	Dissolved Copper	2.3	J		2.3	J	13
MW-71I	Total Vanadium	5.3	U	NC	5.3	UJ	13
MW-71I	Dissolved Vanadium	5.9	J		5.9	J	13
MW-73S	Total Vanadium	5.3	U	NC	5.3	UJ	13
MW-73S	Dissolved Vanadium	6.9	J		6.9	J	13
MW-77S	Total Manganese	17	NA	81	17	J	13
MW-77S	Dissolved Manganese	40	NA		40	J	13
MW-90I	Total Thallium	3.0	U	NC	3.0	UJ	13
MW-90I	Dissolved Thallium	3.2	J		3.2	J	13
MW-92I	Total Copper	2.2	U	NC	2.2	UJ	13
MW-92I	Dissolved Copper	2.5	J		2.5	J	13
MW-92S	Total Copper	2.2	U	NC	2.2	UJ	13

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result	Validation Qualifier	Reason Code
MW-92S	Dissolved Copper	2.3	J		2.3	J	13
MW-94I	Total Calcium	10000	NA	150	10000	J	13
MW-94I	Dissolved Calcium	70000	NA		70000	J	13
MW-94I	Total Magnesium	7600	NA	37	7600	J	13
MW-94I	Dissolved Magnesium	11000	NA		11000	J	13
MW-94I	Total Manganese	52	NA	124	52	J	13
MW-94I	Dissolved Manganese	220	NA		220	J	13
MW-94I	Total Thallium	3.0	U	NC	3.0	UJ	13
MW-94I	Dissolved Thallium	3.1	J		3.1	J	13

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable
RPD-relative percent difference

7.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

8.0 MERCURY

The samples were analyzed for mercury per US EPA method 7470A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Total vs Dissolved Assessment
- ✓ Electronic Data Deliverables Review

8.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

8.2 Holding Times

The holding time for the total mercury analysis of solid samples is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

8.3 Initial Calibration

The method specified initial calibration requirements were met.

8.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

8.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

8.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Five method blanks (batches 377752, 377753, 377754,

DRAFT

377831 and 378408) were reported. Mercury was not detected in the method blanks above the MDL.

8.7 Matrix Spike/Matrix Spike Duplicate

Four sample set specific MS/MSD pairs were reported; two for total mercury using samples MW-71S and MW-92I and two for dissolved mercury using samples MW-71S and MW-90I. The recovery and RPD results were within the QAPP specified acceptance criteria.

8.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs and one LCS/LCSD pair were reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

8.9 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-03. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-47I and MW-76I, respectively.

8.10 Target Compound Quantitation

The compound quantitations were within the validation criteria.

8.11 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 2 of the QAPP.

8.12 Total vs Dissolved Assessment

The samples were reported for total and dissolved mercury. The total mercury concentrations were greater than the dissolved mercury concentrations or for dissolved mercury concentrations that were greater than the total mercury concentration the RPD was ≤ 30%.

8.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

ATTACHMENT 3
ADDITIONAL METALS QUALIFICATIONS

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-01	Total Antimony	6.2	U	6.2	UJ	13
DUP-01	Total Barium	82	J	82	J	13
DUP-01	Total Thallium	3.0	U	3.0	UJ	13
DUP-01	Dissolved Antimony	6.2	U	6.2	UJ	13
DUP-01	Dissolved Barium	82	J	82	J	13
DUP-01	Dissolved Thallium	3.0	U	3.0	UJ	13
DUP-03	Total Thallium	3.0	U	3.0	UJ	13
DUP-03	Dissolved Thallium	3.0	U	3.0	UJ	13
FIELD BLANK 20211028	Total Antimony	6.2	U	6.2	UJ	13
FIELD BLANK 20211028	Total Thallium	3.0	U	3.0	UJ	13
MW-47I	Total Antimony	6.2	U	6.2	UJ	13
MW-47I	Total Barium	86	J	86	J	13
MW-47I	Total Selenium	4.9	J	4.9	J	13
MW-47I	Total Thallium	3.0	U	3.0	UJ	13
MW-47I	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-47I	Dissolved Barium	86	J	86	J	13
MW-47I	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-70I	Total Antimony	6.2	U	6.2	UJ	13
MW-70I	Total Barium	120	J	120	J	13
MW-70I	Total Thallium	3.0	U	3.0	UJ	13
MW-70I	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-70I	Dissolved Barium	120	J	120	J	13
MW-70I	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-70S	Total Antimony	6.2	U	6.2	UJ	13
MW-70S	Total Barium	44	J	44	J	13
MW-70S	Total Thallium	3.0	U	3.0	UJ	13
MW-70S	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-70S	Dissolved Barium	42	J	42	J	13
MW-70S	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-71I	Total Antimony	6.2	U	6.2	UJ	13
MW-71I	Total Barium	120	J	120	J	13
MW-71I	Total Thallium	3.0	U	3.0	UJ	13
MW-71I	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-71I	Dissolved Barium	120	J	120	J	13
MW-71I	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-71S	Total Antimony	6.2	U	6.2	UJ	13
MW-71S	Total Barium	77	J	77	J	13

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-71S	Total Thallium	3.0	U	3.0	UJ	13
MW-71S	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-71S	Dissolved Barium	72	J	72	J	13
MW-71S	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-73I	Total Antimony	6.2	U	6.2	UJ	13
MW-73I	Total Barium	89	J	89	J	13
MW-73I	Total Thallium	3.0	U	3.0	UJ	13
MW-73I	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-73I	Dissolved Barium	71	J	71	J	13
MW-73I	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-73S	Total Antimony	6.2	U	6.2	UJ	13
MW-73S	Total Barium	79	J	79	J	13
MW-73S	Total Thallium	3.0	U	3.0	UJ	13
MW-73S	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-73S	Dissolved Barium	81	J	81	J	13
MW-73S	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-76I	Total Barium	100	J	100	J	13
MW-76I	Total Thallium	3.0	U	3.0	UJ	13
MW-76I	Dissolved Barium	100	J	100	J	13
MW-76I	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-76S	Total Barium	100	J	100	J	13
MW-76S	Total Thallium	3.0	U	3.0	UJ	13
MW-76S	Dissolved Barium	110	J	110	J	13
MW-76S	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-77I	Total Antimony	6.2	U	6.2	UJ	13
MW-77I	Total Barium	96	J	96	J	13
MW-77I	Total Thallium	3.0	U	3.0	UJ	13
MW-77I	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-77I	Dissolved Barium	97	J	97	J	13
MW-77I	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-77S	Total Antimony	6.2	U	6.2	UJ	13
MW-77S	Total Barium	91	J	91	J	13
MW-77S	Total Thallium	3.1	J	3.1	J	13
MW-77S	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-77S	Dissolved Barium	91	J	91	J	13
MW-77S	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-82S	Total Antimony	6.2	U	6.2	UJ	13
MW-82S	Total Barium	100	J	100	J	13
MW-82S	Total Nickel	2.3	J	2.3	J	13
MW-82S	Total Thallium	3.0	U	3.0	UJ	13
MW-82S	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-82S	Dissolved Barium	100	J	100	J	13
MW-82S	Dissolved Thallium	3.0	U	3.0	UJ	13

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-90I	Total Antimony	6.2	U	6.2	UJ	13
MW-90I	Total Barium	79	J	79	J	13
MW-90I	Total Thallium	3.0	U	3.0	UJ	13
MW-90I	Dissolved Barium	79	J	79	J	13
MW-90I	Dissolved Thallium	3.2	J	3.2	J	13
MW-90S	Total Antimony	6.2	U	6.2	UJ	13
MW-90S	Total Barium	130	J	130	J	13
MW-90S	Total Nickel	9.4	J	9.4	J	13
MW-90S	Total Thallium	3.0	U	3.0	UJ	13
MW-90S	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-90S	Dissolved Barium	120	J	120	J	13
MW-90S	Dissolved Nickel	7.8	J	7.8	J	13
MW-90S	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-92I	Total Antimony	6.2	U	6.2	UJ	13
MW-92I	Total Barium	110	J	110	J	13
MW-92I	Total Thallium	3.0	U	3.0	UJ	13
MW-92I	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-92I	Dissolved Barium	110	J	110	J	13
MW-92I	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-92S	Total Antimony	6.2	U	6.2	UJ	13
MW-92S	Total Barium	95	J	95	J	13
MW-92S	Total Thallium	3.0	U	3.0	UJ	13
MW-92S	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-92S	Dissolved Barium	96	J	96	J	13
MW-92S	Dissolved Thallium	3.0	U	3.0	UJ	13
MW-94I	Total Antimony	6.2	U	6.2	UJ	13
MW-94I	Total Barium	20	J	20	J	13
MW-94I	Total Thallium	3.0	U	3.0	UJ	13
MW-94I	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-94I	Dissolved Barium	86	J	86	J	13
MW-94I	Dissolved Thallium	3.1	J	3.1	J	13
MW-94S	Total Antimony	6.2	U	6.2	UJ	13
MW-94S	Total Barium	74	J	74	J	13
MW-94S	Total Thallium	3.0	U	3.0	UJ	13
MW-94S	Dissolved Antimony	6.2	U	6.2	UJ	13
MW-94S	Dissolved Barium	73	J	73	J	13
MW-94S	Dissolved Thallium	3.0	U	3.0	UJ	13

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
^1+-laboratory flag indicating the ICV recovery was outside the acceptance criteria
^+-laboratory flag indicating the CCV recovery was high and outside the acceptance criteria

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	October 19, 2022
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins Job Number 180-140136-1**

SITE: Former Sperry Remington Site-Dry Well SVS

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of eighteen solid samples including one sample for matrix spike/matrix spike duplicate (MS/MSD) analysis, as well as two field duplicates collected on 20 June 2022, as part of the Former Sperry Remington Site sampling event.

Eurofins Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C
- Semivolatile Organic Compounds (SVOCs) by US EPA Method 3541/8270D
- Polychlorinated Biphenyls (PCBs) by US EPA Methods 3541/8082A
- Metals by US EPA Methods 3050B/6010C and 3050B/6020B
- Mercury by US EPA Method 7471B
- Hexavalent Chromium by US EPA Methods 3060A/7196A

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below and the information provided, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

DRAFT

The non-detect results of 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol and benzaldehyde in sample SSHS-DW-3B-SUB-8-10 were R qualified as rejected due to MS/MSD recoveries less than 10%.

Qualified data that were not rejected should be used within the limitations of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005);
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006);
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014;
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010;
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015;
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016;
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016;
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010; and
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

DRAFT

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-140136-1	SSHS-DW-3A-SUB-4-6
180-140136-2	SSHS-DW-3A-SUB-6-8
180-140136-3	SSHS-DW-3A-SUB-8-10
180-140136-4	SSHS-DW-3A-SUB-10-12
180-140136-5	SSHS-DW-3A-SUB-12-14
180-140136-6	SSHS-DW-3A-SUB-14-16
180-140136-7	SSHS-DW-3B-SUB-4-6
180-140136-8	SSHS-DW-3B-SUB-6-8

Laboratory ID	Client ID
180-140136-9	SSHS-DW-3B-SUB-8-10
180-140136-9 MS	SSHS-DW-3B-SUB-8-10 MS
180-140136-9 MSD	SSHS-DW-3B-SUB-8-10 MSD
180-140136-10	SSHS-DW-3B-SUB-10-12
180-140136-11	SSHS-DW-3B-SUB-12-14
180-140136-12	SSHS-DW-3B-SUB-14-16
180-140136-13	SSHS-DW-06-SUB-4-6

Laboratory ID	Client ID
180-140136-14	SSHS-DW-06-SUB-6-8
180-140136-15	SSHS-DW-06-SUB-8-10
180-140136-16	SSHS-DW-06-SUB-10-12
180-140136-17	SSHS-DW-06-SUB-12-14

Laboratory ID	Client ID
180-140136-18	SSHS-DW-06-SUB-14-16
180-140136-19	DUP-01
180-140136-20	DUP-02

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

The year was not documented for the *relinquished by* date on pages 1 and 2 of the chain of custody (COC).

Collection times were not documented on the COC for the field duplicates, DUP-01 and DUP-02. The field duplicates were logged in with the collection time of 00:00.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
⊗ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane were R qualified as rejected due to the low RRF in the initial calibration and based on technical and

DRAFT

professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample collected as a Terracore are 48 hours from collection to frozen (water preserved) and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed prior to the initial calibration. The initial calibration was analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits. The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations, with the following exception.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
DUP-01	1,4-Dioxane	38	U	38	R	9
DUP-02	1,4-Dioxane	41	U	41	R	9
SSHS-DW-06-SUB-10-12	1,4-Dioxane	39	U	39	R	9
SSHS-DW-06-SUB-14-16	1,4-Dioxane	38	U	38	R	9

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier*	Reason Code**
SSHS-DW-06-SUB-4-6	1,4-Dioxane	40	U	40	R	9
SSHS-DW-06-SUB-6-8	1,4-Dioxane	39	U	39	R	9
SSHS-DW-06-SUB-8-10	1,4-Dioxane	39	U	39	R	9
SSHS-DW-3A-SUB-10-12	1,4-Dioxane	38	U	38	R	9
SSHS-DW-3A-SUB-14-16	1,4-Dioxane	38	U	38	R	9
SSHS-DW-3A-SUB-4-6	1,4-Dioxane	38	U	38	R	9
SSHS-DW-3A-SUB-6-8	1,4-Dioxane	40	U	40	R	9
SSHS-DW-3A-SUB-8-10	1,4-Dioxane	38	U	38	R	9
SSHS-DW-3B-SUB-10-12	1,4-Dioxane	36	U	36	R	9
SSHS-DW-3B-SUB-14-16	1,4-Dioxane	38	U	38	R	9
SSHS-DW-3B-SUB-4-6	1,4-Dioxane	37	U	37	R	9
SSHS-DW-3B-SUB-6-8	1,4-Dioxane	36	U	36	R	9
SSHS-DW-3B-SUB-8-10	1,4-Dioxane	37	U	37	R	9

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (ICVs and CCVs)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRFs, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of dichlorodifluoromethane (-27.6%), bromoform (-30.0%) and 1,2,3-trichlorobenzene (-21.4%) in the CCV in batch 403303 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of dichlorodifluoromethane and 1,2,3-trichlorobenzene in the CCV were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the dichlorodifluoromethane and 1,2,3-trichlorobenzene data. However, the non-detect results of bromoform in the associated samples were UJ qualified as estimated less than the MDL.

The %Ds of dichlorodifluoromethane (-26.0%), chlorobromomethane (-20.4%) bromoform (-30.2%) and 1,2,3-trichlorobenzene (-25.2%) in the CCV in batch 403428 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of

DRAFT

dichlorodifluoromethane and 1,2,3-trichlorobenzene in the CCV were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the dichlorodifluoromethane and 1,2,3-trichlorobenzene data. However, the non-detect results of chlorobromomethane and bromoform in the associated samples were UJ qualified as estimated less than the MDL.

The %D of 1,2-dibromo-3-chloropropane (31.4%) in the CCV in batch 403428 was outside of the laboratory specified acceptance criteria with a high bias. Since 1,2-dibromo-3-chloropropane was not detected in the associated samples, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-01	Bromoform	2.7	U	2.7	UJ	9
DUP-02	Bromoform	2.9	U	2.9	UJ	9
DUP-02	Chlorobromomethane	3.5	U	3.5	UJ	9
SSHS-DW-06-SUB-10-12	Bromoform	2.8	U	2.8	UJ	9
SSHS-DW-06-SUB-14-16	Bromoform	2.7	U	2.7	UJ	9
SSHS-DW-06-SUB-4-6	Bromoform	2.9	U	2.9	UJ	9
SSHS-DW-06-SUB-4-6	Chlorobromomethane	3.4	U	3.4	UJ	9
SSHS-DW-06-SUB-6-8	Bromoform	2.8	U	2.8	UJ	9
SSHS-DW-06-SUB-6-8	Chlorobromomethane	3.3	U	3.3	UJ	9
SSHS-DW-06-SUB-8-10	Bromoform	2.8	U	2.8	UJ	9
SSHS-DW-3A-SUB-10-12	Bromoform	2.7	U	2.7	UJ	9
SSHS-DW-3A-SUB-10-12	Chlorobromomethane	3.2	U	3.2	UJ	9
SSHS-DW-3A-SUB-14-16	Bromoform	2.7	U	2.7	UJ	9
SSHS-DW-3A-SUB-14-16	Chlorobromomethane	3.2	U	3.2	UJ	9
SSHS-DW-3A-SUB-4-6	Bromoform	2.7	U	2.7	UJ	9
SSHS-DW-3A-SUB-4-6	Chlorobromomethane	3.2	U	3.2	UJ	9
SSHS-DW-3A-SUB-6-8	Bromoform	2.9	U	2.9	UJ	9
SSHS-DW-3A-SUB-6-8	Chlorobromomethane	3.4	U	3.4	UJ	9
SSHS-DW-3A-SUB-8-10	Bromoform	2.7	U	2.7	UJ	9
SSHS-DW-3A-SUB-8-10	Chlorobromomethane	3.2	U	3.2	UJ	9
SSHS-DW-3B-SUB-10-12	Bromoform	2.6	U	2.6	UJ	9
SSHS-DW-3B-SUB-10-12	Chlorobromomethane	3.1	U	3.1	UJ	9
SSHS-DW-3B-SUB-14-16	Bromoform	2.7	U	2.7	UJ	9
SSHS-DW-3B-SUB-14-16	Chlorobromomethane	3.2	U	3.2	UJ	9
SSHS-DW-3B-SUB-4-6	Bromoform	2.7	U	2.7	UJ	9
SSHS-DW-3B-SUB-4-6	Chlorobromomethane	3.2	U	3.2	UJ	9
SSHS-DW-3B-SUB-6-8	Bromoform	2.5	U	2.5	UJ	9
SSHS-DW-3B-SUB-6-8	Chlorobromomethane	3.0	U	3.0	UJ	9
SSHS-DW-3B-SUB-8-10	Bromoform	2.6	U	2.6	UJ	9

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the MDL

DRAFT

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 403303 and 403428). VOCs were not detected in the method blanks above the MDLs, with the following exception.

Chloroform was detected in the method blank in batch 403428 at an estimated concentration greater than the MDL and less than the reporting limit (RL). Therefore, the estimated chloroform concentrations in the associated samples were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
DUP-02	Chloroform	2.9	J,B	5.8	U	3
SSHS-DW-06-SUB-4-6	Chloroform	2.6	J,B	5.7	U	3
SSHS-DW-06-SUB-6-8	Chloroform	2.6	J,B	5.5	U	3
SSHS-DW-3A-SUB-10-12	Chloroform	2.7	J,B	5.3	U	3
SSHS-DW-3A-SUB-14-16	Chloroform	2.7	J,B	5.3	U	3
SSHS-DW-3A-SUB-4-6	Chloroform	2.5	J,B	5.4	U	3
SSHS-DW-3A-SUB-6-8	Chloroform	2.8	J,B	5.7	U	3
SSHS-DW-3A-SUB-8-10	Chloroform	2.9	J,B	5.4	U	3
SSHS-DW-3B-SUB-10-12	Chloroform	2.9	J,B	5.1	U	3
SSHS-DW-3B-SUB-14-16	Chloroform	2.8	J,B	5.3	U	3
SSHS-DW-3B-SUB-4-6	Chloroform	2.5	J,B	5.3	U	3
SSHS-DW-3B-SUB-6-8	Chloroform	2.2	J,B	5.0	U	3

µg/kg-micrograms per kilogram
J-estimated concentration greater than or equal to the MDL and less than the RL
B-laboratory flag indicating the analyte was detected in both the sample and method blank

1.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported using sample SSHS-DW-3B-SUB-8-10. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCS duplicate (LCSD) pair were reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

DRAFT

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-02. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples SSHS-DW-3A-SUB-10-12 and SSHS-DW-06-SUB-6-8, respectively.

1.11 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3541/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC data reported in this SDG are considered to be usable for supporting project objectives, with the following exceptions. The non-detect results of 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol and benzaldehyde in sample SSHS-DW-3B-SUB-8-10 were R qualified as rejected due to MS/MSD recoveries less than 10%. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 99.8%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

DRAFT

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of bis(2-ethylhexyl) phthalate (22.0%), 2-nitroaniline (20.6%), and di-n-octyl phthalate (22.5%) in the CCV in batch 403706 were outside of the method specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The %D of di-n-octyl phthalate (34.3%) in the CCV in batch 403710 was outside of the method specified acceptance criteria with a high bias. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to the data.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 403617). SVOCs were not detected in the method blank above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-DW-3B-SUB-8-10. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of 2-nitrophenol, hexachloroethane and pentachlorophenol in the MS/MSD pair were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect results of 2-nitrophenol, hexachloroethane and pentachlorophenol in sample SSHS-DW-3B-SUB-8-10 were UJ qualified as estimated less than the MDLs.

DRAFT

The recoveries of 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol and benzaldehyde in the MS/MSD pair were less than 10% and outside of the QAPP specified acceptance criteria. Therefore, the non-detect results of 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol and benzaldehyde in sample SSHS-DW-3B-SUB-8-10 were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-DW-3B-SUB-8-10	2,4-Dinitrophenol	2100	U,F1	2100	R	4
SSHS-DW-3B-SUB-8-10	2-Nitrophenol	130	U,F1	130	UJ	4
SSHS-DW-3B-SUB-8-10	4,6-Dinitro-2-methylphenol	590	U,F1	590	R	4
SSHS-DW-3B-SUB-8-10	Benzaldehyde	43	U,F1	43	R	4
SSHS-DW-3B-SUB-8-10	Hexachloroethane	120	U,F1	120	UJ	4
SSHS-DW-3B-SUB-8-10	Pentachlorophenol	550	U,F1	550	UJ	4

µg/kg-micrograms per kilogram
U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside the acceptable limits

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

The recovery of surrogate terphenyl-d14 in sample SSHS-DW-3A-SUB-10-12 was high and outside of the laboratory specified acceptance criteria. Since the recoveries of the remaining two base-neutral extractable surrogates were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The recovery of surrogate 2,4,6-tribromophenol in sample SSHS-DW-3A-SUB-12-14 was high and outside of the laboratory specified acceptance criteria. Since the recoveries of the remaining two acid extractable surrogates were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

DRAFT

2.10 Field Duplicate

Two field duplicates were collected with the sample set, DUP-01 and DUP-02. Acceptable precision (RPD <50% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples SSHS-DW-3A-SUB-10-12 and SSHS-DW-06-SUB-6-8, respectively, with the following exceptions.

Acenaphthene, carbazole and fluorene were detected in SSHS-DW-06-SUB-6-8 at concentrations at or above the RLs and were detected in DUP-02 at estimated concentrations greater than or equal to the MDLs and less than the RLs, resulting in noncalculable RPDs. Therefore, based on professional and technical judgment the acenaphthene, carbazole and fluorene concentrations in field duplicate pair SSHS-DW-06-SUB-6-8/DUP-02 were J qualified as estimated.

Acenaphthylene and naphthalene were detected in SSHS-DW-06-SUB-6-8 at estimated concentrations greater than or equal to the MDLs and less than the RLs and were detected in DUP-02 at concentrations greater than or equal to the RLs, resulting in noncalculable RPDs. Therefore, the acenaphthylene and naphthalene concentrations in field duplicate pair SSHS-DW-06-SUB-6-8/DUP-02 were J qualified as estimated.

The RPDs of anthracene and phenanthrene in field duplicate pair SSHS-DW-06-SUB-6-8/DUP-02 were greater than 50%; therefore, the anthracene and phenanthrene concentrations in field duplicate pair SSHS-DW-06-SUB-6-8/DUP-02 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-DW-06-SUB-6-8	Acenaphthene	110	NA	NC	110	J	7
DUP-02	Acenaphthene	38	J		38	J	7
SSHS-DW-06-SUB-6-8	Acenaphthylene	51	J	NC	51	J	7
DUP-02	Acenaphthylene	84	NA		84	J	7
SSHS-DW-06-SUB-6-8	Anthracene	250	NA	63	250	J	7
DUP-02	Anthracene	130	NA		130	J	7
SSHS-DW-06-SUB-6-8	Carbazole	93	NA	NC	93	J	7
DUP-02	Carbazole	48	J		48	J	7
SSHS-DW-06-SUB-6-8	Fluorene	91	NA	NC	91	J	7
DUP-02	Fluorene	39	J		39	J	7
SSHS-DW-06-SUB-6-8	Naphthalene	61	J	NC	61	J	7
DUP-02	Naphthalene	79	NA		79	J	7

DRAFT

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-DW-06-SUB-6-8	Phenanthrene	930	NA	72	930	J	7
DUP-02	Phenanthrene	440	NA		440	J	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than or equal to the MDL and less than the RL
NA-not applicable
NC-not calculable
RPD-relative percent difference

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by US EPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ⊗ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the PCB analysis of a solid sample are one year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of peak 3 (24.4%) for PCB-1260 on GC column RTX-CLP2 in ICV 180-402772/16 was outside of the method specified acceptance criteria with a high bias. Since the overall %D of PCB-

DRAFT

1260 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peaks 4 (22.6%) and 5 (20.6%) for PCB-1260 on GC column RTX-CLP1 in CCV 180-403814/4 were outside of the method specified acceptance criteria with high biases. Since the overall %D of PCB-1248 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

3.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 403723). The PCBs were not detected in the method blank above the MDLs.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-DW-3B-SUB-8-10. The recovery and RPD results were within the QAPP specified acceptance criteria.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Duplicate

Two field duplicates were collected with the sample set; however, the field duplicates were not analyzed for PCBs.

3.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

3.11 Target Compound Identification

The target compound identifications were within the validation criteria.

DRAFT

3.12 Target Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

Sample SSHS-DW-3A-SUB-14-16 contains PCBs 1248 and 1254. There are peaks in 1248 and 1254 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248 and 1254 in sample SSHS-DW-3A-SUB-14-16 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-DW-3A-SUB-14-16	PCB-1248	60	NA	60	J	13
SSHS-DW-3A-SUB-14-16	PCB-1254	35	NA	35	J	13

µg/kg-micrograms per kilogram
NA-not applicable

3.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported due to the sample dilutions analyzed. Screening criteria was listed in Table 1 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 1 of the QAPP.

3.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 METALS

The samples were analyzed for metals per US EPA methods 3050B/6010C and 3050B/6020B. (Mercury was evaluated separately in Section 5.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ⊗ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Serial Dilution
- ✓ Laboratory Control Sample
- ✓ Internal Standard
- ✓ Field Duplicate
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

4.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding time for the total metals analysis of solid samples is 180 days from sample collection to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria, with the following exceptions.

Lead was detected in the ICSA in batch 403304 at a concentration greater than or equal to the RL. Therefore, the concentrations of lead greater than the RLs and less than ten times the ICSA concentration were J+ qualified as estimated with high biases.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier	Reason Code
SSHS-DW-06-SUB-14-16	Lead	6.1	NA	6.1	J+	13
SSHS-DW-3B-SUB-14-16	Lead	7.8	NA	7.8	J+	13

DRAFT

mg/kg-milligrams per kilogram
J-estimated concentration greater than or equal to the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NA-not applicable

4.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

4.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria, with the following exception.

Vanadium was detected in a bracketing CCB in batch 403304. Since only batch QC was bracketed by the CCB, no qualifications were applied to the data.

4.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 403069) was reported by US EPA Methods 6010C and 6020B. Metals was not detected in the method blank above the MDLs.

4.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

4.8 Serial Dilution

Serial dilutions were not reported.

4.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

4.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

4.11 Field Duplicate

Two field duplicates were collected with the sample set; however, the field duplicates were not analyzed for metals.

DRAFT

4.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

5.0 MERCURY

The samples were analyzed for mercury per US EPA method 7471B.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

5.2 Holding Times

The holding time for the total mercury analysis of solid samples is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

5.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 402942) was reported. Mercury was not detected in the method blank above the MDL.

5.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

5.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the QAPP specified acceptance criteria.

5.9 Field Duplicate

Two field duplicates were collected with the sample set; however, the field duplicates were not analyzed for mercury.

5.10 Target Compound Quantitation

The compound quantitations were within the validation criteria.

DRAFT

5.11 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

5.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

6.0 HEXAVALENT CHROMIUM

The samples were analyzed for hexavalent chromium per US EPA methods 3060A/7196A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

6.1 Overall Assessment

The hexavalent chromium data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

6.2 Holding Times

The holding times for the hexavalent chromium analysis of solid samples are 30 days from sample collection to preparation and 168 hours from preparation to analysis. The holding time was met for the sample analyses.

6.3 Initial Calibration

The method specified initial calibration requirements were met.

6.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

6.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank (batch 403282) was reported. Hexavalent chromium was not detected in the method blank above the MDL.

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One insoluble LCS and one soluble LCS were reported. The recovery results were within the laboratory specified acceptance criteria.

6.9 Field Duplicate

Two field duplicates were collected with the sample set; however, the field duplicates were not analyzed for hexavalent chromium.

6.10 Target Compound Quantitation

The compound quantitations were within the validation criteria.

DRAFT

6.11 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

6.12 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date: 17 October 2022

To: Ron Arcuri

From: Mary Tyler
Matthew Richardson
Amani Royce

CC: J. Caprio
K. Henderson

Subject: Stage 2A and Stage 4 Data Validations - Level II and Level IV Data Deliverables – Eurofins TestAmerica Job Number 180-141239-1

SITE: Former Sperry Remington - Groundwater

INTRODUCTION

This report summarizes the findings of the Stage 2A and Stage 4 data validations of six water samples, including one sample for matrix spike/matrix spike duplicate (MS/MSD) analyses, as well as one field duplicate sample, one trip blank, one field blank and one equipment blank, collected on 13 July 2022, as part of the Former Sperry Remington groundwater sampling event.

Eurofins Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C
- Semivolatile Organic Compounds (SVOCs) by US EPA Method 3520C/8270D
- Total and Dissolved Polychlorinated Biphenyls (PCBs) by US EPA Methods 3510C/8082A
- Total and Dissolved Metals by US EPA Methods 3005A/6010C
- Total and Dissolved Mercury by US EPA Method 7470A

Eurofins TestAmerica Canton, Barberton, Ohio analyzed the samples for the following analytical test:

- Diesel Range Organics (DRO) by US EPA Methods 3510C/8015D

Eurofins Edison, New Jersey analyzed the samples for the following analytical test:

- 1,4-Dioxane by US EPA Methods 3510C/8270E using selected ion monitoring (SIM)

DRAFT

Eurofins West Sacramento, California analyzed the samples for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by US EPA Methods 3535/537 (modified)

EXECUTIVE SUMMARY

Based on the Stage 2A and Stage 4 data validations covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

Because there were no M/MSD recoveries (0%) of hexachlorocyclopentadiene, the non-detect result of hexachlorocyclopentadiene in sample MW-59I was R qualified as rejected

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factors (RRFs) in the initial calibrations and based on technical and professional judgment. The 1,4-dioxane results analyzed by US EPA Method 8270D and 8270E using SIM are considered usable.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- US EPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016

DRAFT

- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- New York Department of Environmental Conservation (NY DEC), Guidelines for Sampling and Analysis of PFAS Under NYDEC's part 375 Remedial Programs, June 2021
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed and validated at Stage 2A and Stage 4 levels. The sample with footnote 1, MW-57, was validated at a Stage 4 levels for VOCs, and the samples with footnote 2 were validated at Stage 4 levels for PFAS, SVOCs, 1,4-dioxane, PCBs, DRO, metals and mercury. The remaining samples were validated at Stage 2A levels.

Laboratory ID	Client ID
180-141239-1	MW-57[1]
180-141239-2	MW-59S
180-141239-3	MW-59I[2]
180-141239-3 MS	MW-59I MS[2]
180-141239-3 MSD	MW-59I MSD[2]
180-141239-4	MW-60

Laboratory ID	Client ID
180-141239-5	MW-61
180-141239-6	MW-62
180-141239-7	DUP-01
180-141239-8	TRIP BLANK
180-141239-9	FIELD BLANK
180-141239-10	EQUIP BLANK

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

Collection times were not documented on the chain of custody (COC) for the field duplicate sample, DUP-01 and the trip blank, TRIP BLANK. The field duplicate sample and trip blank were logged in with collection times of 00:00.

The COC indicated samples MW-57 and MW-59I were to be used for the MS/MSD analyses; an additional note was included on the COC indicating sample MW-59I was to be used for the MS/MSD analyses.

The COC also included two notes from the laboratory: The field blank was not to be analyzed for dissolved metals and dissolved PCBs, as these sample aliquots were not collected and the equipment blank was only to be analyzed for bis-2-ethyl hexyl phthalate, per the client.

The narrative indicated that the samples for dissolved metals were field filtered, then preserved to pH <2 at the laboratory, the field blank was not to be analyzed for dissolved metals and dissolved PCBs, and the equipment blank was only to be analyzed for bis-2-ethyl hexyl phthalate.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5030C/8260C.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Time
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
⊗ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Trip Blank
✓ Equipment Blank
⊗ Field Blank
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
⊗ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane were R qualified as rejected due to the RRFs in the initial calibrations and based on technical and professional judgment.

Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this SDG is 98.1%.

1.2 Holding Time

The holding time for the VOC analysis of a preserved water sample is 14 days from collection to analysis. The holding times were met.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits. The average RRFs and the %RSDs of the target analytes and surrogates were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations, with the following exceptions.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; EPA method 8260C specifies minimum average RRFs range from 0.050-0.500. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs, however, 1,4-dioxane is not listed as a VOC. The average RRF for 1,4-dioxane in the initial calibrations were 0.0024 and 0.0012. Therefore, based on professional and technical judgment and the 1,4-dioxane average RRFs less than the method and validation minimum RRFs, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
DUP-01	1,4-Dioxane	43	U	43	R	9
FIELD BLANK	1,4-Dioxane	43	U	43	R	9
MW-57	1,4-Dioxane	43	U,*+	43	R	9
MW-59I	1,4-Dioxane	43	U	43	R	9
MW-59S	1,4-Dioxane	43	U,*+	43	R	9
MW-60	1,4-Dioxane	43	U	43	R	9
MW-61	1,4-Dioxane	43	U	43	R	9
MW-62	1,4-Dioxane	43	U	43	R	9
TRIP BLANK	1,4-Dioxane	43	U	43	R	9

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
*+- laboratory flag indicating the laboratory control sample (LCS) and/or LCS duplicate (LCSD) is outside acceptance limits, high biased
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.5 Initial and Continuing Calibration Verification (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRFs and based on professional and technical judgment, no additional qualifications were applied to the data.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds for the following analytes were high and outside the method specified acceptance criteria, with high biases, in the CCV in batch 405351: Chloromethane, trichlorofluoromethane, carbon disulfide and 1,2,3-trichlorobenzene. Therefore, because the %D was outside both the validation and method specified acceptance criteria, the estimated carbon disulfide concentration in the trip blank was J qualified as estimated. The other analytes were not detected in the associated samples, so no additional qualifications were applied to the data.

The %Ds for the following analytes were high and outside the method specified acceptance criteria, with low biases, in the CCV in batch 405351: Methyl tert butyl ether, cis-1,3-dichloropropene, trans-1,3-dichloropropene, bromoform and 1,2-dichloro-3-chloropropane. Since the methyl tert butyl ether, bromoform and 1,2-dichloro-3-chloropropane %Ds were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the methyl tert butyl ether, bromoform and 1,2-dichloro-3-chloropropane data. However, the non-detect cis-1,3-dichloropropene and trans-1,3-dichloropropene results in the associated samples were UJ qualified as estimated less than the MDLs.

The %Ds for the following analytes were high and outside the method specified acceptance criteria, with high biases, in the CCV in batch 405805: Chloromethane, trichlorofluoromethane, acetone, 2-butanone and 1,2,3-trichlorobenzene. Since these analytes were not detected in the associated sample, no qualifications were applied to the data.

The %Ds for the following analytes were high and outside the method specified acceptance criteria, with low biases, in the CCV in batch 4050805: Methyl tert butyl ether, trans-1,3-dichloropropene and 1,2-dichloro-3-chloropropane. Since the methyl tert butyl ether and 1,2-dichloro-3-chloropropane %Ds were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the methyl tert butyl ether and 1,2-dichloro-3-chloropropane data. However, the non-detect trans-1,3-dichloropropene result in the associated sample was UJ qualified as estimated less than the MDL.

DRAFT

The %Ds for the following analytes were high and outside the method specified acceptance criteria, with high biases, in the CCV in batch 405353. Since these analytes were not detected in the associated sample, no qualifications were applied to the data.

1,1,1-Trichloroethane	Bromoform	Dichlorodifluoromethane
1,1,2,2-Tetrachloroethane	Carbon tetrachloride	Methyl acetate
1,2-Dibromoethane	Chlorobromomethane	Methyl tert-butyl ether
1,2-Dichloroethane	Chlorodibromomethane	Trichlorofluoromethane
1,4-Dioxane	cis-1,3-Dichloropropene	

The %Ds for the following analytes were high and outside the method specified acceptance criteria, with low biases, in the CCV in batch 405353: Acetone, 2-butanone, methyl cyclohexane, tetrachloroethene, 2-hexanone, 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene. Since the methyl cyclohexane %D was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the methyl cyclohexane data. However, the acetone, 2-butanone, tetrachloroethene, 2-hexanone, 1,2,4-trichlorobenzene and 1,2,3-trichlorobenzene results in the associated samples were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
DUP-01	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
DUP-01	trans-1,3-Dichloropropene	0.58	U	0.58	UJ	9
FIELD BLANK	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
FIELD BLANK	trans-1,3-Dichloropropene	0.58	U	0.58	UJ	9
MW-57	1,2,3-Trichlorobenzene	1.1	U	1.1	UJ	9
MW-57	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
MW-57	2-Butanone (MEK)	2.6	U	2.6	UJ	9
MW-57	2-Hexanone	3.3	U	3.3	UJ	9
MW-57	Acetone	3.4	U	3.4	UJ	9
MW-57	Tetrachloroethene	0.47	U	0.47	UJ	9
MW-59I	trans-1,3-Dichloropropene	0.58	U	0.58	UJ	9
MW-59S	1,2,3-Trichlorobenzene	1.1	U	1.1	UJ	9
MW-59S	1,2,4-Trichlorobenzene	0.77	U	0.77	UJ	9
MW-59S	2-Butanone (MEK)	2.6	U	2.6	UJ	9
MW-59S	2-Hexanone	3.3	U	3.3	UJ	9
MW-59S	Acetone	3.4	U	3.4	UJ	9
MW-59S	Tetrachloroethene	0.47	U	0.47	UJ	9
MW-60	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
MW-60	trans-1,3-Dichloropropene	0.58	U	0.58	UJ	9
MW-61	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
MW-61	trans-1,3-Dichloropropene	0.58	U	0.58	UJ	9

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
MW-62	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
MW-62	trans-1,3-Dichloropropene	0.58	U	0.58	UJ	9
TRIP BLANK	Carbon disulfide	0.91	J	0.91	J	9
TRIP BLANK	cis-1,3-Dichloropropene	0.59	U	0.59	UJ	9
TRIP BLANK	trans-1,3-Dichloropropene	0.58	U	0.58	UJ	9

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
J- estimated concentration greater than the MDL and less than or equal to the reporting limit (RL)

1.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 405351, 405353 and 405805). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample MW-59I. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria.

1.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs and one LCS/LCSD pair were reported. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

One or both of the following LCS/LCSD recoveries were high and outside the QAPP specified acceptance criteria in batch 405353. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

1,1,2,2-Tetrachloroethane	Bromoform	Dichlorodifluoromethane
1,2-Dibromoethane	Chlorobromomethane	Methyl acetate
1,2-Dichloroethane	cis-1,3-Dichloropropene	Methyl tert-butyl ether
1,4-Dioxane	Dichlorobromomethane	Trichlorofluoromethane

In addition, the LCS/LCSD recoveries of toluene and the LCSD recovery of tetrachloroethene were low and outside the QAPP specified acceptance criteria in batch 405353. Therefore, the non-detect toluene and tetrachloroethene results in the associated samples were UJ qualified as estimated less than the MDLs.

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-57	Tetrachloroethene	0.47	U	0.47	UJ	5
MW-57	Toluene	0.46	U,*-	0.46	UJ	5
MW-59S	Tetrachloroethene	0.47	U	0.47	UJ	5
MW-59S	Toluene	0.46	U,*-	0.46	UJ	5

µg/L-micrograms per liter
U-laboratory flag indicating not detected at the MDL
(*-)-laboratory flag indicating the LCS and/or LCSD is outside acceptance limits, low biased

1.9 Surrogate

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Duplicate

One field duplicate sample was collected with the sample set, DUP-01. Acceptable precision (RPD ≤50% for results greater than five times the RL) was demonstrated between the field duplicate sample and the original sample MW-57, with the following exception.

Carbon disulfide not detected in the original sample and detected in the field duplicate sample at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD. However, since the carbon disulfide concentration in sample MW-57 was U qualified as not detected at the RL due to the field blank contamination, no additional qualifications were applied to the data.

1.11 Trip Blank

One trip blank was submitted with the sample set, TRIP Blank. VOCs were not detected in the trip blank above the MDLs.

1.12 Equipment Blank

One equipment blank was submitted with the sample set, but not analyzed for VOCs.

1.13 Field Blank

One field blank was submitted with the sample set, FIELD BLANK. VOCs were not detected in the field blank above the MDLs, with the following exception.

Carbon disulfide was detected in the field blank at an estimated concentration greater than the MDL and less than the RL. Therefore, the estimated carbon disulfide concentrations in the associated samples were U qualified as not detected at the RL and based on professional and

DRAFT

technical judgment, the concentrations in samples MW-60, MW-61 and MW-62 were U qualified as not detected at the reported concentrations.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-01	Carbon disulfide	0.95	J	1.0	U	3
MW-60	Carbon disulfide	1.2	NA	1.2	U	3
MW-61	Carbon disulfide	1.3	NA	1.3	U	3
MW-62	Carbon disulfide	1.2	NA	1.2	U	3

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than or equal to the RL
NA-not applicable

1.14 Internal Standard

The internal standard areas and retention times were within method specified acceptance criteria.

1.15 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

1.16 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.17 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

Analyte	Method Detection Limit (µg/L)	Screening Criteria (µg/L)
cis-1,3-Dichloropropene	0.59	0.4
1,2-Dibromo-3-Chloropropane	0.89	0.04
1,2-Dibromoethane	0.50	0.0006
1,2-Dichloroethane	0.57	0.6
trans-1,3-Dichloropropene	0.58	0.4

µg/L-micrograms per liter

1.18 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

2.0 1,4-DIOXANE

The samples were analyzed for 1,4-dioxane per US EPA Methods 3510C/8270E using SIM.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Equipment Blank
- ✓ Field Blank
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The 1,4-dioxane data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the 1,4-dioxane analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met.

DRAFT

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed. The laboratory calculated %RSD of the RRFs. The average RRFs and the %RSDs of the target analyte and surrogate were within the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verification

The ICV and CCV were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria. The %Ds between the RRFs in the ICV and CCV for the target analyte and surrogate were within the method and validation specified acceptance criteria.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 855568). 1,4-Dioxane was not detected in the method blank above the MDL.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One MS/MSD pair was reported, using sample MW-59I. The recovery and RPD results were within the QAPP specified acceptance criteria.

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair was reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

2.9 Surrogate

The surrogate recoveries were within the laboratory specified acceptance criteria.

DRAFT

2.10 Field Duplicate

One field duplicate sample was collected with the sample set, DUP-01. Acceptable precision (RPD ≤50% for results greater than five times the RL) was demonstrated between the field duplicate sample and the original sample MW-57.

2.11 Equipment Blank

One equipment blank was submitted with the sample set, but not analyzed for 1,4-dioxane.

2.12 Field Blank

One field blank was submitted with the sample set, but not analyzed for 1,4-dioxane.

2.13 Internal Standard

The internal standard areas and retention times were within method specified acceptance criteria.

2.14 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

2.15 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.16 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for 1,4-dioxane.

2.17 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3520C/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas

DRAFT

where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
✓ Equipment Blank
⊗ Field Blank
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
⊗ Sensitivity
✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The SVOC data reported in this SDG are considered to be usable for supporting project objectives, with the following exception. Because there were no MS/MSD recoveries (0%) of hexachlorocyclopentadiene, the non-detect result of hexachlorocyclopentadiene in sample MW-59I was R qualified as rejected.

Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this SDG is 99.9%.

3.2 Holding Times

The holding times for the SVOC analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met.

3.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

DRAFT

The analyses of standards to assess the GC column performance and injection port inertness resulted in acceptable results.

3.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte and surrogate. The laboratory calculated %RSD of the RRFs or used linear curve fits. The average RRFs and the %RSDs of the target analytes and surrogates were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.5 Initial and Continuing Calibration Verification

The ICV and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria. The %Ds between the RRFs in the ICV and CCVs for the target analytes and surrogates were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds for di-n-octyl phthalate were high and outside the method specified acceptance criteria, with high biases, in the CCVs in batches 406060, 406122 and 406293. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to the data.

3.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 405575 and 405758). SVOCs were not detected in the method blanks above the MDLs.

3.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample MW-59I. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The MS/MSD recoveries of the following analytes were low and outside of the QAPP specified acceptance criteria.

1,1-Biphenyl	2,4,6-Trichlorophenol	2-Chloronaphthalene
1,2,4,5-Tetrachlorobenzene	2,4-Dichlorophenol	2-Chlorophenol
1,4-Dioxane	2,4-Dimethylphenol	2-Methylnaphthalene
2,2-oxybis[1-chloropropane]	2,4-Dinitrophenol	2-Methylphenol
2,3,4,6-Tetrachlorophenol	2,4-Dinitrotoluene	2-Nitroaniline
2,4,5-Trichlorophenol	2,6-Dinitrotoluene	2-Nitrophenol

DRAFT

3,3-Dichlorobenzidine	Anthracene	Hexachloroethane
3-Nitroaniline	Bis(2-chloroethoxy)methane	Isophorone
4,6-Dinitro-2-methylphenol	Bis(2-chloroethyl)ether	Methylphenol, 3 & 4
4-Bromophenyl phenyl ether	Carbazole	Naphthalene
4-Chloro-3-methylphenol	Dibenzofuran	Nitrobenzene
4-Chloroaniline	Diethyl phthalate	N-Nitrosodi-n-propylamine
4-Chlorophenyl phenyl ether	Dimethyl phthalate	N-Nitrosodiphenylamine
4-Nitroaniline	Di-n-butyl phthalate	Pentachlorophenol
4-Nitrophenol	Fluoranthene	Phenanthrene
Acenaphthene	Fluorene	Phenol
Acenaphthylene	Hexachlorobenzene	Pyrene
Acetophenone	Hexachlorobutadiene	

Therefore, the non-detect results of these analytes in sample MW-59I were UJ qualified as estimated less than the MDLs and the phenanthrene estimated concentration was J qualified as estimated. Because there were no MS/MSD recoveries (0%) of hexachlorocyclopentadiene, the hexachlorocyclopentadiene non-detect result in sample MW-59I was R qualified as rejected.

In addition, the MS/MSD recoveries of bis(2-ethylhexyl) phthalate were high and outside of the QAPP specified acceptance criteria. Since bis(2-ethylhexyl) phthalate was not detected in sample MW-59I, no qualifications were applied to the data.

The recoveries of atrazine, benzaldehyde and benzo(a)pyrene, di-n-octyl phthalate in the MS/MSD pair were low and outside of the laboratory specified acceptance criteria. Since these recoveries were within the QAPP specified acceptance criteria and based on professional and technical judgement, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-59I	1,1'-Biphenyl	0.16	U,F1	0.16	UJ	4
MW-59I	1,2,4,5-Tetrachlorobenzene	0.17	U,F1	0.17	UJ	4
MW-59I	1,4-Dioxane	0.22	U,F1	0.22	UJ	4
MW-59I	2,2'-oxybis[1-chloropropane]	0.066	U,F1	0.066	UJ	4
MW-59I	2,3,4,6-Tetrachlorophenol	0.37	U,F1	0.37	UJ	4
MW-59I	2,4,5-Trichlorophenol	0.29	U,F1	0.29	UJ	4
MW-59I	2,4,6-Trichlorophenol	0.25	U,F1	0.25	UJ	4
MW-59I	2,4-Dichlorophenol	0.058	U,F1	0.058	UJ	4
MW-59I	2,4-Dimethylphenol	0.19	U,F1	0.19	UJ	4
MW-59I	2,4-Dinitrophenol	1.7	U	1.7	UJ	4
MW-59I	2,4-Dinitrotoluene	0.40	U,F1	0.40	UJ	4
MW-59I	2,6-Dinitrotoluene	0.20	U,F1	0.20	UJ	4

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-59I	2-Chloronaphthalene	0.067	U,F1	0.067	UJ	4
MW-59I	2-Chlorophenol	0.15	U,F1	0.15	UJ	4
MW-59I	2-Methylnaphthalene	0.07	U,F1	0.07	UJ	4
MW-59I	2-Methylphenol	0.34	U,F1	0.34	UJ	4
MW-59I	2-Nitroaniline	0.62	U,F1	0.62	UJ	4
MW-59I	2-Nitrophenol	0.22	U,F1	0.22	UJ	4
MW-59I	3,3'-Dichlorobenzidine	0.66	U,F1	0.66	UJ	4
MW-59I	3-Nitroaniline	0.50	U,F1	0.50	UJ	4
MW-59I	4,6-Dinitro-2-methylphenol	1.7	U,F1	1.7	UJ	4
MW-59I	4-Bromophenyl phenyl ether	0.36	U,F1	0.36	UJ	4
MW-59I	4-Chloro-3-methylphenol	0.32	U,F1	0.32	UJ	4
MW-59I	4-Chloroaniline	0.43	U,F1	0.43	UJ	4
MW-59I	4-Chlorophenyl phenyl ether	0.25	U,F1	0.25	UJ	4
MW-59I	4-Nitroaniline	0.41	U,F1	0.41	UJ	4
MW-59I	4-Nitrophenol	1.1	U	1.1	UJ	4
MW-59I	Acenaphthene	0.074	U,F1	0.074	UJ	4
MW-59I	Acenaphthylene	0.074	U,F1	0.074	UJ	4
MW-59I	Acetophenone	0.18	U,F1	0.18	UJ	4
MW-59I	Anthracene	0.056	U,F1	0.056	UJ	4
MW-59I	Bis(2-chloroethoxy)methane	0.17	U,F1	0.17	UJ	4
MW-59I	Bis(2-chloroethyl)ether	0.045	U,F1	0.045	UJ	4
MW-59I	Carbazole	0.058	U,F1	0.058	UJ	4
MW-59I	Dibenzofuran	0.22	U,F1	0.22	UJ	4
MW-59I	Diethyl phthalate	0.64	U,F1	0.64	UJ	4
MW-59I	Dimethyl phthalate	0.23	U,F1	0.23	UJ	4
MW-59I	Di-n-butyl phthalate	0.84	U,F1	0.84	UJ	4
MW-59I	Fluoranthene	0.068	U,F1	0.068	UJ	4
MW-59I	Fluorene	0.078	U,F1	0.078	UJ	4
MW-59I	Hexachlorobenzene	0.064	U,F1	0.064	UJ	4
MW-59I	Hexachlorobutadiene	0.078	U,F1	0.078	UJ	4
MW-59I	Hexachlorocyclopentadiene	0.56	U,F1	0.56	R	4
MW-59I	Hexachloroethane	0.15	U,F1	0.15	UJ	4
MW-59I	Isophorone	0.21	U,F1	0.21	UJ	4
MW-59I	Methylphenol, 3 & 4	0.42	U,F1	0.42	UJ	4
MW-59I	Naphthalene	0.067	U,F1	0.067	UJ	4
MW-59I	Nitrobenzene	0.57	U,F1	0.57	UJ	4
MW-59I	N-Nitrosodi-n-propylamine	0.081	U,F1	0.081	UJ	4
MW-59I	N-Nitrosodiphenylamine	0.14	U,F1	0.14	UJ	4

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-59I	Pentachlorophenol	0.96	U,F1	0.96	UJ	4
MW-59I	Phenanthrene	0.15	J,F1	0.22	J	4
MW-59I	Phenol	0.55	U,F1	0.55	UJ	4
MW-59I	Pyrene	0.061	U,F1	0.061	UJ	4

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than or equal to the RL
U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria

3.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCSD pair were reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

3.9 Surrogate

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.10 Field Duplicate

One field duplicate sample was collected with the sample set, DUP-01. Acceptable precision (RPD ≤50% for results greater than five times the RL) was demonstrated between the field duplicate sample and the original sample MW-57, with the following exceptions.

Caprolactam, bis(2-ethylhexyl) phthalate and di-n-butyl phthalate were detected in the field duplicate sample and not detected in the original sample, resulting in noncalculable RPDs. Because the caprolactam and di-n-butyl phthalate concentrations in sample DUP-01 were U qualified as not detected at the RLs due to the field blank contamination, no additional qualifications were applied to the caprolactam and di-n-butyl phthalate data. However, the bis(2-ethylhexyl) phthalate concentration in sample DUP-01 was J qualified as estimated and the non-detect result in sample MW-57 was UJ qualified estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-01	Bis(2-ethylhexyl) phthalate	13	NA	NC	13	J	7

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-57	Bis(2-ethylhexyl) phthalate	6.2	U		6.2	UJ	7

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable
RPD-relative percent difference

3.11 Equipment Blank

One equipment blank was submitted with the sample set, EQUIP BLANK and analyzed for bis(2-ethylhexyl) phthalate, which was not detected.

3.12 Field Blank

One field blank was submitted with the sample set, FIELD BLANK. SVOCs were not detected in the field blank, with the following exceptions.

The following SVOCs were detected in the field blank at estimated concentrations greater than the MDLs and less than the RLs:

Acetophenone
Benzo[b]fluoranthene
Benzo[g,h,i]perylene
Benzo[k]fluoranthene

Butyl benzyl phthalate
Caprolactam
Chrysene
Dibenz(a,h)anthracene

Di-n-butyl phthalate
Indeno[1,2,3-cd]pyrene
Phenanthrene

Therefore, the estimated concentrations of these analytes in the associated samples were U qualified as not detected at the RLs.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-01	Caprolactam	1.5	J	5.0	U	3
DUP-01	Di-n-butyl phthalate	0.87	J	1.0	U	3
DUP-01	Phenanthrene	0.14	J	0.19	U	3
MW-57	Phenanthrene	0.12	J	0.19	U	3
MW-59I	Caprolactam	0.91	J	5.7	U	3
MW-59I	Phenanthrene	0.15	J,F1	0.22	U	3
MW-59S	Phenanthrene	0.10	J	0.20	U	3
MW-60	Caprolactam	0.67	J	5.2	U	3
MW-60	Phenanthrene	0.11	J	0.20	U	3
MW-61	Benzo[b]fluoranthene	0.11	J	0.20	U	3

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-61	Benzo[g,h,i]perylene	0.11	J	0.20	U	3
MW-61	Benzo[k]fluoranthene	0.12	J	0.20	U	3
MW-61	Chrysene	0.12	J	0.20	U	3
MW-61	Dibenz(a,h)anthracene	0.13	J	0.20	U	3
MW-61	Indeno[1,2,3-cd]pyrene	0.11	J	0.20	U	3

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria

3.13 Internal Standard

The internal standard areas and retention times were within method specified acceptance criteria.

3.14 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

3.15 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.16 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

Analyte	Method Detection Limit (µg/L)	Screening Criteria (µg/L)
Bis(2-ethylhexyl) phthalate	6.2	5
Hexachlorobenzene	0.056	0.04

µg/L-micrograms per liter

3.17 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 DIESEL RANGE ORGANIC

The samples were analyzed for DRO (C10 – C28) per US EPA Methods 3510C/8015D.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogate
- ✓ Field Duplicate
- ✓ Equipment Blank
- ✓ Field Blank
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

4.1 Overall Assessment

The DRO (C10 – C28) data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this SDG is 100%.

4.2 Holding Times

The holding times for the DRO (C10 – C28) analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met.

4.3 Initial Calibration

Appropriate initial calibrations were performed for DRO (C10 – C28). The laboratory calculated %RSD of the calibration factors (CFs). The %RSD of DRO (C10 – C28) was within the method specified acceptance criteria.

DRAFT

4.4 Initial and Continuing Calibration Verification

The ICV and CCVs were performed at the required frequency. The %Ds between the CFs in the ICV and CCVs were within the method specified acceptance criteria.

4.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 535223). DRO (C10 – C28) was not detected in the method blank above the MDL.

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample MW-59I. The recovery and RPD results were within the laboratory specified acceptance criteria.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the laboratory specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

One field duplicate sample was collected with the sample set, DUP-01. Acceptable precision (RPD $\leq$50% for results greater than five times the RL) was demonstrated between the field duplicate sample and the original sample MW-57.

4.10 Equipment Blank

One equipment blank was submitted with the sample set, but not analyzed for DRO.

4.11 Field Blank

One field blank was submitted with the sample set, FIELD BLANK. DRO were not detected in the field blank above the MDL.

DRAFT

4.12 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

4.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

4.14 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for DRO.

4.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

5.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for total and dissolved PCBs by US EPA methods 3510C/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Equipment Blank
- ✓ Field Blank
- ✓ Internal Standard
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Total vs. Dissolved Assessment

DRAFT

✓ Electronic Data Deliverable Review

5.1 Overall Assessment

The PCB data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for these analyses, for this SDG is 100%.

5.2 Holding Times

The holding times for the PCB analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met.

5.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used linear curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

5.4 Initial and Continuing Calibration Verification

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exception.

The %D of peak 3 for PCB-1260 on gas chromatography (GC) column RTX-CLP2 in ICV 180-402772/16 was high and outside of the method specified acceptance criteria, with a high bias. Since the overall %D of PCB-1260 was within the method specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

5.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 405187). PCBs were not detected in the method blank above the MDLs.

5.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported,

DRAFT

both using sample MW-59I. The recovery and RPD results were within the QAPP specified acceptance criteria.

5.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

5.8 Surrogate

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recoveries of surrogate decachlorobiphenyl on both GC columns in the method blank in batch 405187 were high and outside of the laboratory specified acceptance criteria. Since the surrogate recoveries in the associated samples were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

5.9 Field Duplicate

One field duplicate sample was collected with the sample set, DUP-01. Acceptable precision (RPD $\leq$50% for results greater than five times the RL) was demonstrated between the field duplicate sample and the original sample, MW-57.

5.10 Equipment Blank

One equipment blank was submitted with the sample set, but not analyzed for PCBs.

5.11 Field Blank

One field blank was submitted with the sample set, FIELD BLANK. Total PCBs were not detected in the field blank above the MDLs.

5.12 Internal Standard

The internal standard areas and retention times were within the method specified acceptance criteria, with the following exception.

The areas of internal standard PCB-205 on one or both of the GC columns were above the laboratory specified acceptance criteria in sample MW-61 for filtered PCBs and in the MS/MSD total PCB analysis of sample MW-59I. Since the associated PCBs were not detected in sample

DRAFT

MW-61 and the MS/MSD recoveries were acceptable in MS/MSD pair using sample MW-59I, no qualifications were applied to the data.

5.13 Target Compound Identification

The target compound identifications were within the validation criteria.

5.14 Target Compound Quantitation

The compound quantitations were within the validation criteria.

5.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria was listed in Table 2 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 2 of the QAPP.

5.16 Total vs Dissolved Assessment

The samples were reported for total and dissolved PCBs. The total PCBs concentrations were greater than or equal to the dissolved PCBs concentrations.

5.17 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

6.0 PFAS

The samples were analyzed for PFAS per US EPA methods 3535/537 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA

DRAFT

Analyte	Acronym
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Equipment Blank
- ✓ Field Blank
- ✓ Isotope Dilution Standard
- ✓ Internal Standard
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

6.1 Overall Assessment

The PFAS data reported in this SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

6.2 Holding Time

The laboratory-specified holding times for the for the PFAS analysis of a water samples are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met.

6.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs to calculate the target compounds and isotope dilution standard concentrations. The %RSDs of the RRFs were within the method and laboratory specified acceptance criteria.

6.4 Initial and Continuing Calibration Verification

The ICVs and CCVs were performed at the required frequencies. The %Ds between the RRFs in the initial calibration and the ICVs and CCVs were within the method and laboratory specified acceptance criteria.

6.5 Initial and Continuing Calibration Blanks (ICB and CCB)

The ICBs and CCBs met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 604186 and 604447). PFAS were not detected in the methods blanks above the MDLs.

6.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample MW-59I. The recovery and RPD results were within the QAPP specified acceptance criteria.

DRAFT

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCSD pair were reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

6.9 Field Duplicate

One field duplicate sample was collected with the sample set, DUP-01. Acceptable precision (RPD ≤50% for results greater than five times the RL) was demonstrated between the field duplicate sample and the original sample MW-57.

6.10 Equipment Blank

One equipment blank was submitted with the sample set, but not analyzed for PFAS.

6.11 Field Blank

One field blank was submitted with the sample set, but not analyzed for PFAS.

6.12 Isotope Dilution Standard

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria.

6.13 Internal Standard

The internal standard areas and retention times were within the method specified acceptance criteria.

6.14 Target Compound Identification

The compound identifications were within the validation guidance.

6.15 Target Compound Quantitation

The compound quantitations were within the validation guidance.

6.16 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria were not listed in the QAPP for PFAS.

DRAFT

6.17 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

7.0 METALS

The samples were analyzed for total and dissolved metals per US EPA methods 3005A/6010C. Mercury was evaluated separately in Section 8.0, below.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Time
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
⊗ Initial and Continuing Calibration Blank
⊗ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Duplicate
✓ Equipment Blank
✓ Field Blank
✓ Target Compound Quantitation
✓ Sensitivity
⊗ Total vs Dissolved Assessment
✓ Electronic Data Deliverables Review

7.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

7.2 Holding Time

The holding times for the total and dissolved metals analyses of water samples are 180 days from sample collection to analysis. The holding times were met for the sample analyses.

7.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria, with the following exceptions.

Lead was detected in the ICSAs in batches 405608 and 4005786 at estimated concentration greater one half the RLs. Since lead was present in the standard as a contaminant and based on professional and technical judgment, no qualifications were applied to the data.

7.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

7.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria, with the following exception.

Vanadium was detected in bracketing CCB in batch 405608 at estimated concentrations greater than the MDL and less than the RL. Therefore, the estimated concentration of total vanadium in sample MW-57 was U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-57	Vanadium, total	6.0	J	50	U	3

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than or equal to the RL

7.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 405372 and 405580). Metals were not detected in the method blanks above the MDLs, with the following exception.

DRAFT

Zinc was detected in the method blank in batch 405372 at an estimated concentration greater than the MDL and less than the RL. Therefore, the estimated total zinc concentrations in the associated samples were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-01	Zinc, total	4.9	J,B	20	U	3
MW-57	Zinc, total	7.5	J,B	20	U	3

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
B-laboratory flag indicating the analyte was detected in the blank

7.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported, both using sample MW-59I. The recovery and RPD results were within the QAPP specified acceptance criteria.

7.8 Serial Dilution

Two sample set specific serial dilutions were reported, both using sample MW-59I. The %Ds were within the method specified acceptance criteria.

7.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

7.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

7.11 Field Duplicate

One field duplicate sample was collected with the sample set, DUP-01. Acceptable precision (RPD $\leq$50% for results greater than five times the RL) was demonstrated between the field duplicate sample and the original sample MW-57.

7.12 Equipment Blank

One equipment blank was collected with the sample set, but not analyzed for metals.

DRAFT

7.13 Field Blank

One field blank was submitted with the sample set, FIELD BLANK. Total metals were not detected in the field blank above the MDLs.

7.14 Target Compound Quantitation

The compound quantitations were within the validation criteria.

7.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exception.

The laboratory MDL for antimony, 6.2 µg/L, did not meet the screening criteria listed in the QAPP, 6 µg/L.

7.16 Total vs Dissolved Assessment

The samples were reported for total and dissolved metals. The total metals concentrations were greater than or equal to the dissolved metals concentrations or, for dissolved metals concentrations that were greater than the total metals concentrations, the RPDs were ≤ 30%, with the following exceptions.

Total zinc and iron were not detected in sample MW-60 and dissolved zinc and iron were detected. Therefore, based on professional and technical judgment, the total zinc and iron non-detect results in sample MW-60 were UJ qualified as estimated less than the MDLs and the concentrations of dissolved zinc and iron were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result	Validation Qualifier	Reason Code
MW-60	Dissolved Iron	120	NA	NC	120	J	13
MW-60	Total Iron	72	U		72	UJ	13
MW-60	Dissolved Zinc	2.7	J	NC	2.7	J	13
MW-60	Total Zinc	2.6	U		2.6	UJ	13

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than or equal to the RL
U-laboratory flag indicating not detected at MDL
NA-not applicable
NC-not calculable
RPD-relative percent difference

DRAFT

7.17 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

8.0 MERCURY

The samples were analyzed for total and dissolved mercury per US EPA method 7470A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Equipment Blank
- ✓ Field Blank
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Total vs Dissolved Assessment
- ✓ Electronic Data Deliverables Review

8.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for these analyses, for this SDG is 100%.

8.2 Holding Time

The holding time for the mercury analysis of a water sample is 28 days from sample collection to analysis. The holding times were met for the sample analyses.

DRAFT

8.3 Initial Calibration

The method specified initial calibration requirements were met.

8.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

8.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

8.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 406012). Mercury was not detected in the method blank above the MDL.

8.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported, both using sample MW-59I. The recovery and RPD results were within the QAPP specified acceptance criteria.

8.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the QAPP specified acceptance criteria.

8.9 Field Duplicate

One field duplicate sample was collected with the sample set, DUP-01. Acceptable precision (RPD $\leq$50% for results greater than five times the RL) was demonstrated between the field duplicate sample and the original sample MW-57.

8.10 Equipment Blank

One equipment blank was collected with the sample set, but not analyzed for mercury.

DRAFT

8.11 Field Blank

One field blank was submitted with the sample set, FIELD BLANK. Total mercury was not detected in the field blank above the MDL.

8.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

8.13 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 2 of the QAPP.

8.14 Total vs Dissolved Assessment

The samples were reported for total and dissolved mercury. The total mercury concentrations were greater than or equal to the dissolved mercury concentrations.

8.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	28 November 2023
To:	Ron Arcuri
From:	Matthew Richardson
CC:	Kris Henderson
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins Job Number 180-162460-2**

SITE: Former Sperry Remington Site

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of four groundwater samples analyses collected 12-13 September 2023, as part of the Former Sperry Remington Site sampling event.

The samples were analyzed by Eurofins Sacramento, West Sacramento, California for the following test:

- Per- and Polyfluroalkyl Substances (PFAS) by United States Environmental Protection Agency (USEPA) Methods 3535/537 Modified

EXECUTIVE SUMMARY

Overall, based on this Stage 4 data validation covering the quality control (QC) parameters listed below and based on the information provided, the data are usable for supporting project objectives.

The solids data, used to report the samples on a dry weight basis, were not validated.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- New York State Department of Environmental Conservation (NYSDEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

- NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs, April 2023.
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Scott Technologies Site, 1051 South Main Street, City of Elmira, Chemung County, New York, December 5, 2014, Updated June 2022.

The following samples were analyzed and validated in the data set:

Laboratory ID	Client ID
180-162460-1	SSHS-MW-95S-09122023
180-162460-2	SSHS-MW-95I-09122023

Laboratory ID	Client ID
180-162460-13	SSHS-MW-48R-09132023
180-162460-14	SSHS-MW-55-09132023

The samples were received at Eurofins Sacramento within the QAPP criteria of ≤ 6 degrees Celsius (ºC .

A discrepancy concerning the sample ID for SSHS-DUP-06-09122023 was clarified and resolved by the client.

Page 3 of the COC was not included in the laboratory report. According to the laboratory, the third page of the COC was inadvertently not included in the scan and the original hardcopy COCs are no longer available.

1.0 PFAS

The samples were analyzed for PFAS per USEPA Methods 3535/537 Modified. The following PFAS were reported:

Analyte	Acronym
Perfluorobutanoic acid	PFBA
Perfluoropentanoic acid	PFPeA
Perfluorohexanoic acid	PFHxA
Perfluoroheptanoic acid	PFHpA
Perfluorooctanoic acid	PFOA
Perfluorononanoic acid	PFNA
Perfluorodecanoic acid	PFDA
Perfluoroundecanoic acid	PFUnA
Perfluorododecanoic acid	PFDoA
Perfluorotridecanoic acid	PFTrDA
Perfluorotetradecanoic acid	PFTeDA

DRAFT

Analyte	Acronym
Perfluorobutanesulfonic acid	PFBS
Perfluorohexanesulfonic acid	PFHxS
Perfluoroheptanesulfonic Acid	PFHpS
Perfluorooctanesulfonic acid	PFOS
1H,1H,2H,2H-perfluorooctane sulfonic acid	6:2 FTS
1H,1H,2H,2H-perfluorodecane sulfonic acid	8:2 FTS
Perfluorooctanesulfonamide	PFOSA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Time
✓ Initial Calibration
✓ Initial and Continuing Calibration Verification
✓ Initial and Continuing Calibration Blank
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Field Duplicate
✓ Equipment Blank
✓ Field Blank
✓ Isotope Dilution Standards
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitation
✓ Sensitivity
⊗ Electronic Data Deliverable Review

1.1 Overall Assessment

The PFAS data reported in this data package are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to

DRAFT

the total number of analytical results requested on the samples submitted for this analysis, for this dataset is 100%.

1.2 Holding Time

The laboratory-specified holding times for the PFAS analysis of water samples are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample extractions and analyses.

1.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average response ratios (RRs) and response factors (RFs) or linear or quadratic curves to calculate the concentrations of each target analyte and isotopically labeled compound. The relative standard deviations (RSDs) of the RRs or RFs were within the method and laboratory specified acceptance criteria of ≤20% or the relative standard errors (RSEs) were within the method and laboratory specified acceptance criteria of ≤20% for analytes calibrated using linear or quadratic curves.

1.4 Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV)

The ICVs and CCVs were performed at the required frequencies. The percent differences (%Ds) for each target analyte and isotopically labeled compound in the ICVs and CCVs were within the method and laboratory specified acceptance criteria of ≤30%.

1.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method and laboratory specified acceptance criteria of no target analyte detections at or above the analyte's method detection limit (MDL).

1.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 707216). PFAS were not detected in the method blank at or above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were not reported for this analytical method.

DRAFT

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the laboratory specified acceptance criteria.

1.9 Field Duplicate

Field duplicates were not collected with the sample set.

1.10 Equipment Blank

Two equipment blanks, SSHS-EB-01-09122023 and SSHS-EB-02-09132023, were collected with the sample set and reported in laboratory report 180-162461-2. PFAS were not detected in the equipment blanks at or above the MDLs, with the following exception.

PFHxA was detected in the equipment blank, SSHS-EB-01-09122023, at an estimated concentration greater than the MDL and less than the RL. Since the PFHxA concentration in SSHS-EB-01-09122023 was U qualified as not detected at the RL due to method blank contamination, no additional qualifications were applied to the data.

1.11 Field Blank

Two field blanks, SSHS-FB-01-09122023 and SSHS-FB-02-09132023, were collected with the sample set and reported in laboratory report 180-162461-2. PFAS were not detected in the field blanks at or above the MDLs, with the following exception.

PFHxA was detected in the field blank, SSHS-FB-01-09122023, at an estimated concentration greater than the MDL and less than the RL. Since the PFHxA concentration in SSHS-FB-01-09122023 was U qualified as not detected at the RL due to method blank contamination, no additional qualifications were applied to the data.

1.12 Isotope Dilution Standards

The isotope dilution standard recoveries in the samples were within the laboratory specified acceptance criteria.

1.13 Internal Standards (ISTD)

The ISTD areas and retention times were within the method specified acceptance criteria.

DRAFT

1.14 Target Compound Identifications

The compound identifications were within the validation guidance.

1.15 Target Compound Quantitation

The compound quantitation was within the validation guidance.

1.16 Sensitivity

The samples were reported to the MDLs. No elevated non-detect results were reported. Screening criteria were not listed in the QAPP for PFAS.

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. It was noted that the sample IDs in the EDD included a suffix to indicate the date of collection; this suffix was not listed in the sample IDs on the COC or in the laboratory report. In this data validation report, the samples are referred to by the sample IDs provided in the laboratory report. No other discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

engineers | scientists | innovators

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected at or above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected at or above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	11 November 2023
To:	Ron Arcuri
From:	Matthew Richardson
CC:	K. Henderson
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins Job Number 180-162561-1**

SITE: Former Sperry Remington

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of eleven groundwater samples, two field blanks, one trip blank and two field duplicate samples, collected on 14-15 September 2023, as part of the Former Sperry Remington sampling event.

Eurofins Pittsburgh; Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260C
- Semivolatile Organic Compounds (SVOCs) by US EPA Method 3520C/8270D
- Polychlorinated Biphenyls (PCBs) by US EPA Methods 3510C/8082A
- Mercury by US EPA Method 7470A

Eurofins Edison; Edison, New Jersey analyzed the samples for the following analytical test:

- 1,4-Dioxane by US EPA Method 3510C/8270E using Selective Ion Monitoring (SIM)

Eurofins Cleveland, Barberton, Ohio analyzed the samples for the following analytical test:

- Metals by US EPA Methods 3005A/6010D

EXECUTIVE SUMMARY

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and based on the information provided, the data as qualified are usable for supporting project objectives. The qualified data should be used within the limitations of the qualifications. If there

DRAFT

are results with two or more different qualifications due to multiple QC failures, the final qualification is reconciled in the electronic data deliverable (EDD) with qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- New York Department of Environmental Conservation (NY DEC), Guidelines for Sampling and Analysis of PFAS Under NYDEC's part 375 Remedial Programs, June 2021
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

DRAFT

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-162561-1	SSHS-MW-50R-09142023
180-162561-2	SSHS-MW-54R-09142023
180-162561-3	SSHS-MW-56-09142023
180-162561-4	SSHS-MW-58-09142023
180-162561-5	SSHS-MW-62R-09142023
180-162561-6	SSHS-MW-100S-09142023
180-162561-7	SSHS-MW-100I-09142023
180-162561-8	SSHS-MW-102S-09142023

Laboratory ID	Client ID
180-162561-9	SSHS-MW-102I-09142023
180-162561-10	SSHS-MW-105I-09152023
180-162561-11	SSHS-DUP-01-09142023
180-162561-12	SSHS-DUP-02-09142023
180-162561-13	SSHS-MW-65R-09142023
180-162561-14	SSHS-FB-03-09142023
180-162561-16	SSHS-FB-04-09152023
180-162561-18	SSHS-TRIPBLANK-09142023

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

A collection time for the field duplicate sample was not documented on the chain of custody (COC). The field duplicate was logged in with a collection time of 00:00.

The laboratory narrative indicated that sample collection date changes were made to the COC by the laboratory. Additionally, the laboratory changed the sample ID of SSHS-TRIPBLANK-091423.

The laboratory narrative indicated sample containers for the metals and SVOC analyses were not received for sample SSHS-FB-03-09142023. Sample aliquots from an extra 1 L sample container were transferred to appropriate containers for the respective analyses.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5030C/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Time
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Field Duplicate
✓ Trip Blank
✓ Field Blank
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for these analyses, for this SDG is 100%.

1.2 Holding Time

The holding times for the VOC analysis of a solid sample collected as a Terracore are 48 hours from collection to frozen (water preserved) and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs) or used curve fits. The average RRFs and the %RSDs of the target analytes and surrogates were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations, with the following exceptions.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be UJ qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were UJ qualified as estimated less than the method detection limits (MDLs).

DRAFT

The RSDs for 1,4-dioxane in the initial calibrations 41295 (22.2%) and 51105 (31.0%) were high and outside of the method specified acceptance criteria. Therefore, the non-detect results of 1,4-dioxane in the associated samples were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-50R-09142023	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-105I-09152023	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-65R-09142023	1,4-Dioxane	43	U	43	UJ	9
SSHS-FB-03-09142023	1,4-Dioxane	43	U	43	UJ	9
SSHS-FB-04-09152023	1,4-Dioxane	43	U	43	UJ	9
SSHS-TRIPBLANK-09142023	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-54R-09142023	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-56-09142023	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-62R-09142023	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-100I-09142023	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-102S-09142023	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-102I-09142023	1,4-Dioxane	43	U	43	UJ	9

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.5 Initial and Continuing Calibration Verification (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of chloroethane (31.1%) in the ICV in batch 288152 were high and outside the method specified acceptance criteria. Since chloroethane was not detected in the associated samples, no qualifications were applied to the data.

The %Ds of vinyl chloride (21.9%), bromomethane (50.9%) and chloroethane (28.8%) in the CCV in batch 447090 were high and outside the method specified acceptance criteria. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of 2-hexanone (-47.2%), 1,1,2,2-tetrachloroethane (-31.0%), 4-methyl-2-pentanone (-51.4%), methyl acetate (-45.0%), 1,2-dibromo-3-chloropropane (-33.7%), acetone (-30.2%), and 2-butanone (-39.9%) in the CCV standard in batch 447090 were low and outside the method specified acceptance criteria. Since the %Ds of 1,2-dibromo-3-chloropropane, 2-butanone and acetone were within the validation criteria, no qualifications were applied to the 1,2-dibromo-3-chloropropane, 2-butanone and acetone data. However, the non-detect results of 1,1,2,2-tetrachloroethane, methyl acetate, 2-hexanone and 4-methyl-2-pentanone in the associated samples were UJ qualified as estimated less than the MDLs.

The %Ds of 2-hexanone (-25.7%), 4-methyl-2-pentanone (-24.9%), and dichlorodifluoromethane (-20.2%) in the CCV standard in batch 447191 were low and outside the method specified acceptance criteria. Since the %Ds of 2-hexanone, 14-methyl-2-pentanone and dichlorodifluoromethane were within the validation criteria, no qualifications were applied to the data.

The %Ds of bromomethane (52.1%), 1,4-dioxane (41.4%), bromoform (26.5%), and chloroethane (24.8%) in the CCV in batch 447191 were high and outside the method specified acceptance criteria. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-FB-03-09142023	1,1,2,2-Tetrachloroethane	0.60	U	0.60	UJ	9
SSHS-FB-03-09142023	2-Hexanone	3.3	U	3.3	UJ	9
SSHS-FB-03-09142023	Methyl Acetate	1.7	U	1.7	UJ	9
SSHS-FB-03-09142023	4-Methyl-2-Pentanone	3.1	U	3.1	UJ	9
SSHS-MW-100S-09142023	1,1,2,2-Tetrachloroethane	0.60	U	0.60	UJ	9
SSHS-MW-100S-09142023	2-Hexanone	3.3	U	3.3	UJ	9
SSHS-MW-100S-09142023	Methyl Acetate	1.7	U	1.7	UJ	9
SSHS-MW-100S-09142023	4-Methyl-2-Pentanone	3.1	U	3.1	UJ	9
SSHS-MW-50R-09142023	1,1,2,2-Tetrachloroethane	0.60	U	0.60	UJ	9

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-50R-09142023	2-Hexanone	3.3	U	3.3	UJ	9
SSHS-MW-50R-09142023	Methyl Acetate	1.7	U	1.7	UJ	9
SSHS-MW-50R-09142023	4-Methyl-2-Pentanone	3.1	U	3.1	UJ	9
SSHS-MW-54R-09142023	1,1,2,2-Tetrachloroethane	0.60	U	0.60	UJ	9
SSHS-MW-54R-09142023	2-Hexanone	3.3	U	3.3	UJ	9
SSHS-MW-54R-09142023	Methyl Acetate	1.7	U	1.7	UJ	9
SSHS-MW-54R-09142023	4-Methyl-2-Pentanone	3.1	U	3.1	UJ	9
SSHS-MW-56-09142023	1,1,2,2-Tetrachloroethane	0.60	U	0.60	UJ	9
SSHS-MW-56-09142023	2-Hexanone	3.3	U	3.3	UJ	9
SSHS-MW-56-09142023	Methyl Acetate	1.7	U	1.7	UJ	9
SSHS-MW-56-09142023	4-Methyl-2-Pentanone	3.1	U	3.1	UJ	9
SSHS-MW-58-09142023	1,1,2,2-Tetrachloroethane	0.60	U	0.60	UJ	9
SSHS-MW-58-09142023	2-Hexanone	3.3	U	3.3	UJ	9
SSHS-MW-58-09142023	Methyl Acetate	1.7	U	1.7	UJ	9
SSHS-MW-58-09142023	4-Methyl-2-Pentanone	3.1	U	3.1	UJ	9
SSHS-MW-62R-09142023	1,1,2,2-Tetrachloroethane	0.60	U	0.60	UJ	9
SSHS-MW-62R-09142023	2-Hexanone	3.3	U	3.3	UJ	9
SSHS-MW-62R-09142023	Methyl Acetate	1.7	U	1.7	UJ	9
SSHS-MW-62R-09142023	4-Methyl-2-Pentanone	3.1	U	3.1	UJ	9
SSHS-TRIPBLANK-09142023	1,1,2,2-Tetrachloroethane	0.60	U	0.60	UJ	9
SSHS-TRIPBLANK-09142023	2-Hexanone	3.3	U	3.3	UJ	9
SSHS-TRIPBLANK-09142023	Methyl Acetate	1.7	U	1.7	UJ	9

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-TRIPBLANK-09142023	4-Methyl-2-Pentanone	3.1	U	3.1	UJ	9

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 447090 and 447191). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-MW-102I-09142023. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria, with the following exceptions.

The MS recovery of bromomethane in the MS/MSD pair using sample SSHS-MW-102I-09142023 was high and outside of the QAPP specified acceptance criteria. Since bromomethane was not detected in sample SSHS-MW-102I-09142023, no qualifications were applied to data.

The MSD recovery of tetrachloroethene in the MS/MSD pair using sample SSHS-MW-102I-09142023 was low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect tetrachloroethene result in sample SSHS-MW-102I-09142023 was UJ qualified as estimated less than the MDL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-102I-09142023	Tetrachloroethylene	0.47	U	0.47	UJ	4

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria, with the following exception.

The LCS recovery of bromomethane in batch 447191 was high and outside of the QAPP specified acceptance criteria. Since bromomethane was not detected in the associated samples, no qualifications were applied to data.

1.9 Surrogate

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Duplicate

Two field duplicate samples, SSHS-DUP-01-09142023 and SSHS-DUP-02-09142023, were collected with the sample set. Acceptable precision [RPD <30% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicate samples and the original samples, SSHS-MW-58-09142023 and SSHS-MW-100S-09142023, respectively.

1.11 Trip Blank

One trip blank, SSHS-TRIPBLANK-09142023, accompanied the sample shipment. VOCs were not detected in the trip blank above the MDLs.

1.12 Field Blank

Two field blanks, SSHS-FB-03-09142023 and SSHS-FB-04-09152023, were submitted with the sample set. VOCs were not detected in the field blanks above the MDLs.

1.13 Internal Standard

The internal standard areas and retention times were within method specified acceptance criteria, with the following exceptions.

The internal standard responses of tert butyl alcohol-d9 in samples SSHS-TRIPBLANK-09142023, SSHS-FB-03-09142023, SSHS-MW-50R-09142023, SSHS-MW-56-09142023, SSHS-MW-58-09142023, SSHS-MW-62R-09142023, SSHS-MW-100S-09142023, SSHS-DUP-01-09142023, SSHS-MW-102I-09142023, SSHS-DUP-02-09142023, SSHS-MW-100I-09142023, SSHS-MW-102S-09142023 and SSHS-MW-65R-09142023 were low and outside of the method specified acceptance criteria. Since the analytes associated with the internal standard were not reported in the samples, no qualifications were applied to the data.

DRAFT

1.14 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

1.15 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.16 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.17 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3520C/8270D and 1,4-dioxane per US EPA Methods 3510C/8270E SIM.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Duplicate
⊗ Field Blank
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation

DRAFT

- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC and 1,4-dioxane data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this SDG is 100%.

2.2 Holding Times

The holding times for the SVOC and 1,4-dioxane analyses of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the GC column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte and surrogate. The laboratory calculated %RSD of the RRFs or used linear curve fits. The average RRFs and the %RSDs of the target analytes and surrogates were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

2.5 Initial and Continuing Calibration Verification

The ICV and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria. The %Ds between the RRFs in the ICV and CCVs for the target analytes and surrogates were within the method and validation specified acceptance criteria, with the following exceptions.

DRAFT

The %D of di-n-octyl phthalate in the CCVs in batch 447676 and 447721 were high and outside the method specified acceptance criteria. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to the data.

The %D of hexachlorocyclopentadiene (-28.1%) in the CCV in batch 447676 was low and outside the method specified acceptance criteria. Since the %D of hexachlorocyclopentadiene was within the validation criteria, no qualifications were applied to the data.

2.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batch 447256, 447332 and 933261). SVOCs and 1,4-dioxane were not detected in the method blanks above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-MW-102I-09142023. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

One or both of the recoveries of the following compounds in the MS/MSD pair using sample SSHS-MW-102I-09142023 were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect results of these analytes in sample SSHS-MW-102I-09142023 were UJ qualified as estimated less than the MDLs, and the concentration of caprolactam in sample SSHS-MW-102I-09142023 was J qualified as estimated.

1,1-Biphenyl	3,3-Dichlorobenzidine	Bis(2-chloroethyl)ether
1,2,4,5-Tetrachlorobenzene	3-Nitroaniline	Butyl benzyl phthalate
1,4-Dioxane	4,6-Dinitro-2-methylphenol	Caprolactam
2,2-oxybis[1-chloropropane]	4-Bromophenyl phenyl ether	Carbazole
2,3,4,6-Tetrachlorophenol	4-Chloro-3-methylphenol	Chrysene
2,4,5-Trichlorophenol	4-Chloroaniline	Dibenz(a,h)anthracene
2,4,6-Trichlorophenol	4-Chlorophenyl phenyl ether	Dibenzofuran
2,4-Dichlorophenol	4-Nitroaniline	Diethyl phthalate
2,4-Dimethylphenol	Acenaphthene	Dimethyl phthalate
2,4-Dinitrophenol	Acenaphthylene	Di-n-butyl phthalate
2,4-Dinitrotoluene	Acetophenone	Fluoranthene
2,6-Dinitrotoluene	Anthracene	Fluorene
2-Chloronaphthalene	Benzo[a]anthracene	Hexachlorobenzene
2-Chlorophenol	Benzo[a]pyrene	Hexachlorobutadiene
2-Methylnaphthalene	Benzo[b]fluoranthene	Hexachloroethane
2-Methylphenol	Benzo[g,h,i]perylene	Indeno[1,2,3-cd]pyrene
2-Nitroaniline	Benzo[k]fluoranthene	Isophorone
2-Nitrophenol	Bis(2-chloroethoxy)methane	Methylphenol, 3 & 4

DRAFT

Naphthalene	N-Nitrosodiphenylamine	Phenol
Nitrobenzene	Pentachlorophenol	Pyrene
N-Nitrosodi-n-propylamine	Phenanthrene	

The RPDs for the following compounds in the MS/MSD pair using sample SSHS-MW-102I-09142023 were outside of the QAPP specified acceptance criteria. The non-detect results of these analytes in sample SSHS-MW-102I-09142023 were not qualified. However, the concentrations of butyl benzyl phthalate, di-n-butyl phthalate and phenanthrene in sample SSHS-MW-102I-09142023 were J qualified as estimated.

1,1'-Biphenyl	4-Chlorophenyl phenyl ether	Dibenz(a,h)anthracene
1,2,4,5-Tetrachlorobenzene	4-Nitroaniline	Dibenzofuran
2,4,6-Trichlorophenol	Acenaphthene	Diethyl phthalate
2,4-Dimethylphenol	Anthracene	Dimethyl phthalate
2,4-Dinitrophenol	Atrazine	Di-n-butyl phthalate
2,4-Dinitrotoluene	Benzo[a]anthracene	Di-n-octyl phthalate
2,6-Dinitrotoluene	Benzo[a]pyrene	Fluoranthene
2-Chloronaphthalene	Benzo[g,h,i]perylene	Hexachlorobenzene
2-Nitroaniline	Benzo[k]fluoranthene	Indeno[1,2,3-cd]pyrene
3,3'-Dichlorobenzidine	Bis(2-ethylhexyl) phthalate	N-Nitrosodiphenylamine
3-Nitroaniline	Butyl benzyl phthalate	Pentachlorophenol
4,6-Dinitro-2-methylphenol	Carbazole	Phenanthrene
4-Bromophenyl phenyl ether	Chrysene	Pyrene

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-102I-09142023	1,2,4,5-Tetrachlorobenzene	0.14	U,F2,F1	0.14	UJ	4
SSHS-MW-102I-09142023	1,4-Dioxane (P-Dioxane)	0.19	U	0.19	UJ	4
SSHS-MW-102I-09142023	2,3,4,6-Tetrachlorophenol	0.31	U,F2,F1	0.31	UJ	4
SSHS-MW-102I-09142023	2,4,5-Trichlorophenol	0.24	U F1	0.24	UJ	4
SSHS-MW-102I-09142023	2,4,6-Trichlorophenol	0.22	U F1	0.22	UJ	4
SSHS-MW-102I-09142023	2,4-Dichlorophenol	0.049	U F1	0.049	UJ	4
SSHS-MW-102I-09142023	2,4-Dimethylphenol	0.16	U,F2,F1	0.16	UJ	4
SSHS-MW-102I-09142023	2,4-Dinitrophenol	1.5	U,F2,F1	1.5	UJ	4

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-102I-09142023	2,4-Dinitrotoluene	0.34	U,F2,F1	0.34	UJ	4
SSHS-MW-102I-09142023	2,6-Dinitrotoluene	0.17	U,F2,F1	0.17	UJ	4
SSHS-MW-102I-09142023	2-Chloronaphthalene	0.057	U,F2,F1	0.057	UJ	4
SSHS-MW-102I-09142023	2-Chlorophenol	0.12	U F1	0.12	UJ	4
SSHS-MW-102I-09142023	2-Methylnaphthalene	0.060	U F1	0.060	UJ	4
SSHS-MW-102I-09142023	2-Methylphenol (O-Cresol)	0.29	U F1	0.29	UJ	4
SSHS-MW-102I-09142023	2-Nitroaniline	0.53	U,F2,F1	0.53	UJ	4
SSHS-MW-102I-09142023	2-Nitrophenol	0.19	U F1	0.19	UJ	4
SSHS-MW-102I-09142023	3-Nitroaniline	0.42	U,F2,F1	0.42	UJ	4
SSHS-MW-102I-09142023	3,3'-Dichlorobenzidine	0.56	U,F2,F1	0.56	UJ	4
SSHS-MW-102I-09142023	4,6-Dinitro-2-Methylphenol	1.4	U,F2,F1	1.4	UJ	4
SSHS-MW-102I-09142023	4-Bromophenyl Phenyl Ether	0.31	U,F2,F1	0.31	UJ	4
SSHS-MW-102I-09142023	4-Chloro-3-Methylphenol	0.27	U F1	0.27	UJ	4
SSHS-MW-102I-09142023	4-Chloroaniline	0.36	U F1	0.36	UJ	4
SSHS-MW-102I-09142023	4-Chlorophenyl Phenyl Ether	0.21	U,F2,F1	0.21	UJ	4
SSHS-MW-102I-09142023	4-Methylphenol (P-Cresol)	0.36	U F1	0.36	UJ	4
SSHS-MW-102I-09142023	4-Nitroaniline	0.35	U,F2,F1	0.35	UJ	4
SSHS-MW-102I-09142023	Acenaphthene	0.063	U,F2,F1	0.063	UJ	4
SSHS-MW-102I-09142023	Acenaphthylene	0.063	U F1	0.063	UJ	4
SSHS-MW-102I-09142023	Acetophenone	0.15	U F1	0.15	UJ	4
SSHS-MW-102I-09142023	Anthracene	0.047	U,F2,F1	0.047	UJ	4
SSHS-MW-102I-09142023	Benzo(a)anthracene	0.072	U,F2,F1	0.072	UJ	4
SSHS-MW-102I-09142023	Benzo(a)pyrene	0.051	U,F2,F1	0.051	UJ	4
SSHS-MW-102I-09142023	Benzo(b)fluoranthene	0.093	U F1	0.093	UJ	4

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-102I-09142023	Benzo(g,h,i)perylene	0.066	U,F2,F1	0.066	UJ	4
SSHS-MW-102I-09142023	Benzo(k)fluoranthene	0.085	U,F2,F1	0.085	UJ	4
SSHS-MW-102I-09142023	Benzyl Butyl Phthalate	0.64	J F1, F2	0.64	J	4
SSHS-MW-102I-09142023	Biphenyl (Diphenyl)	0.14	U,F2,F1	0.14	UJ	4
SSHS-MW-102I-09142023	Bis(2-Chloroethoxy) Methane	0.15	U F1	0.15	UJ	4
SSHS-MW-102I-09142023	Bis(2-Chloroethyl) Ether (2-Chloroethyl Ether)	0.038	U F1	0.038	UJ	4
SSHS-MW-102I-09142023	Caprolactam	0.95	J F1	0.95	J	4
SSHS-MW-102I-09142023	Carbazole	0.049	U,F2,F1	0.049	UJ	4
SSHS-MW-102I-09142023	Chrysene	0.078	U,F2,F1	0.078	UJ	4
SSHS-MW-102I-09142023	Dibenz(a,h)Anthracene	0.069	U,F2,F1	0.069	UJ	4
SSHS-MW-102I-09142023	Dibenzofuran	0.18	U,F2,F1	0.18	UJ	4
SSHS-MW-102I-09142023	Diethyl Phthalate	0.55	U,F2,F1	0.55	UJ	4
SSHS-MW-102I-09142023	Dimethyl Phthalate	0.19	U,F2,F1	0.19	UJ	4
SSHS-MW-102I-09142023	Di-N-Butyl Phthalate	0.92	J F1, F2	0.92	J	4
SSHS-MW-102I-09142023	Fluoranthene	0.058	U,F2,F1	0.058	UJ	4
SSHS-MW-102I-09142023	Fluorene	0.066	U F1	0.066	UJ	4
SSHS-MW-102I-09142023	Hexachlorobenzene	0.054	U,F2,F1	0.054	UJ	4
SSHS-MW-102I-09142023	Hexachlorobutadiene	0.066	U F1	0.066	UJ	4
SSHS-MW-102I-09142023	Hexachloroethane	0.13	U F1	0.13	UJ	4
SSHS-MW-102I-09142023	Indeno(1,2,3-c,d)Pyrene	0.082	U,F2,F1	0.082	UJ	4
SSHS-MW-102I-09142023	Isophorone	0.18	U F1	0.18	UJ	4
SSHS-MW-102I-09142023	Naphthalene	0.057	U F1	0.057	UJ	4
SSHS-MW-102I-09142023	Nitrobenzene	0.48	U F1	0.48	UJ	4
SSHS-MW-102I-09142023	N-Nitrosodi-N-Propylamine	0.068	U F1	0.068	UJ	4

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-102I-09142023	N-Nitrosodiphenylamine	0.11	U,F2,F1	0.11	UJ	4
SSHS-MW-102I-09142023	Pentachlorophenol	0.81	U,F2,F1	0.81	UJ	4
SSHS-MW-102I-09142023	Phenanthrene	0.10	J F1, F2	0.10	J	4
SSHS-MW-102I-09142023	Phenol	0.47	U F1	0.47	UJ	4
SSHS-MW-102I-09142023	Pyrene	0.052	U,F2,F1	0.052	UJ	4

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
J-estimated concentration greater than or equal to the MDL and less than the RL
F1-laboratory flag indicating MS and/or MSD recovery exceeds control limits.
F2- laboratory flag indicating MS/MSD RPD exceeds control limits
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs and one LCS/laboratory control sample duplicate (LCSD) pair was reported. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exception.

The LCS recovery of di-n-octyl phthalate in batch 447256 was high and outside of the QAPP specified acceptance criteria. Since di-n-octyl phthalate was not detected in the associated samples, no qualifications were applied to data.

2.9 Surrogate

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recovery of the nitrobenzene-d5 in sample SSHS-MW-105I-09152023 was high and outside of the QAPP specified acceptance criteria. Since 1,4-dioxane was not detected in sample SSHS-MW-105I-09152023, no qualifications were applied to the data.

2.10 Field Duplicate

Two field duplicate samples, SSHS-DUP-01-09142023 and SSHS-DUP-02-09142023, were collected with the sample set. Acceptable precision (RPD <30% for results greater than five times

DRAFT

the RL) was demonstrated between the field duplicate samples and the original samples, SSHS-MW-58-09142023 and SSHS-MW-100S-09142023, respectively, with the following exception.

The RPD for di-n-butyl phthalate in the field duplicate pair SSHS-DUP-01-09142023/SSHS-MW-58-09142023 was greater than 30%. Therefore, the di-n-butyl phthalate concentrations in samples SSHS-MW-58-09142023 and SSHS-DUP-01-09142023 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-DUP-01-09142023	Di-n-Butyl Phthalate	1.2	NA	34	1.2	J	7
SSHS-MW-58-09142023	Di-n-Butyl Phthalate	1.7	NA		1.7	J	7

µg/L-micrograms per liter
NA-not applicable
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

2.11 Field Blank

Two field blanks, SSHS-FB-03-09142023 and SSHS-FB-04-09152023, were submitted with the sample set. SVOCs and 1,4-dioxane were not detected in the field blanks above the MDLs, with the following exceptions.

Di-n-butyl phthalate, phenanthrene and benzyl butyl phthalate were detected in the field blank SSHS-FB-03-09142023 at estimated concentrations greater than the MDLs and less than the RLs. Therefore, the estimated concentrations of fluoranthene, phenanthrene and pyrene in the associated samples were U qualified as not detected at the RL, and the di-n-butyl phthalate concentrations in samples SSHS-DUP-01-09142023, SSHS-MW-58-09142023 and SSHS-MW-62R-09142023 were J+ qualified as estimated with a high bias.

Di-n-butyl phthalate (3.5 µg/L) was detected in the field blank SSHS-FB-04-09152023 at a concentration greater than the RL. Therefore, the di-n-butyl phthalate concentration in sample SSHS-MW-105I-09152023 was J+ qualified as estimated with a high bias.

Phenanthrene was detected in the field blank SSHS-FB-04-09152023 at an estimated concentration greater than the MDL and less than the RL. Therefore, the estimated phenanthrene concentration in sample SSHS-MW-105I-09152023 was U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-50R-09142023	Benzyl Butyl Phthalate	0.99	J	1.1	U	3

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-DUP-01-09142023	Benzyl Butyl Phthalate	0.83	J	1.2	U	3
SSHS-DUP-02-09142023	Benzyl Butyl Phthalate	0.73	J	1.1	U	3
SSHS-MW-54R-09142023	Benzyl Butyl Phthalate	0.70	J	1.0	U	3
SSHS-MW-58-09142023	Benzyl Butyl Phthalate	0.78	J	1.2	U	3
SSHS-MW-62R-09142023	Benzyl Butyl Phthalate	0.72	J	1.1	U	3
SSHS-MW-100S-09142023	Benzyl Butyl Phthalate	0.68	J	1.0	U	3
SSHS-MW-100I-09142023	Benzyl Butyl Phthalate	0.74	J	1.2	U	3
SSHS-MW-102S-09142023	Benzyl Butyl Phthalate	0.64	J	1.0	U	3
SSHS-MW-102I-09142023	Benzyl Butyl Phthalate	0.64	J F1	0.96	U	3
SSHS-MW-105I-09152023	Di-N-Butyl Phthalate	3.9	NA	3.9	J+	3
SSHS-DUP-01-09142023	Di-N-Butyl Phthalate	1.2	NA	1.2	J	3
SSHS-DUP-02-09142023	Di-N-Butyl Phthalate	0.85	J	1.1	U	3
SSHS-MW-56-09142023	Di-N-Butyl Phthalate	0.98	J	1.0	U	3
SSHS-MW-58-09142023	Di-N-Butyl Phthalate	1.7	NA	1.7	J	3
SSHS-MW-62R-09142023	Di-N-Butyl Phthalate	1.2	NA	1.2	J+	3
SSHS-MW-100S-09142023	Di-N-Butyl Phthalate	0.80	J	1.0	U	3
SSHS-MW-100I-09142023	Di-N-Butyl Phthalate	1.1	J	1.2	U	3
SSHS-MW-102S-09142023	Di-N-Butyl Phthalate	0.89	J	1.0	U	3
SSHS-MW-102I-09142023	Di-N-Butyl Phthalate	0.92	J F1	0.96	U	3
SSHS-MW-50R-09142023	Phenanthrene	0.081	J	0.22	U	3
SSHS-MW-105I-09152023	Phenanthrene	0.082	J	0.19	U	3
SSHS-DUP-01-09142023	Phenanthrene	0.097	J	0.23	U	3
SSHS-DUP-02-09142023	Phenanthrene	0.074	J	0.22	U	3
SSHS-MW-65R-09142023	Phenanthrene	0.072	J	0.20	U	3

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-54R-09142023	Phenanthrene	0.12	J	0.20	U	3
SSHS-MW-58-09142023	Phenanthrene	0.092	J	0.23	U	3
SSHS-MW-62R-09142023	Phenanthrene	0.10	J	0.21	U	3
SSHS-MW-100S-09142023	Phenanthrene	0.068	J	0.19	U	3
SSHS-MW-100I-09142023	Phenanthrene	0.10	J	0.23	U	3
SSHS-MW-102S-09142023	Phenanthrene	0.11	J	0.19	U	3
SSHS-MW-102I-09142023	Phenanthrene	0.10	J F1	0.18	U	3

µg/L-micrograms per liter
J-estimated concentration greater than or equal to the MDL and less than the RL
F1-laboratory flag indicating MS and/or MSD recovery exceeds control limits.
NA-not applicable
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

2.12 Internal Standard

The internal standard areas and retention times were within method specified acceptance criteria.

2.13 Target Compound Identification

The target compound identifications were within the validation specified acceptance criteria.

2.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.16 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

3.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by US EPA methods 3510C/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Field Blank
- ✓ Internal Standard
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

3.1 Overall Assessment

The PCB data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for these analyses, for this SDG is 100%.

3.2 Holding Times

The holding times for the PCB analysis of a solid sample are one year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used linear curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.4 Initial and Continuing Calibration Verification

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The CCVs analyzed in batch 180-446939 (CCVIS 180-446939/5 and CCVIS 180-446939/26) were above criteria for aroclor 1260 on column RTX-CLP1. Associated positive sample results for aroclor 1260 were reported from column RTX-CLP2 which met criteria. No qualifications were applied to the data.

The CCV 180-447062 (CCV 180-447062/1) was above criteria for aroclor 1221 on column RTX-CLP2. As the CCV was high and aroclor 1221 was not detected in the associated sample on either column. No qualifications were applied to the data.

The CCVs analyzed in batch 180-447062 (CCVIS 180-447062/5) and CCVIS 180-447062/47 were above criteria for surrogate tetrachloro-m-xylene on column RTX-CLP2. No qualifications were applied to the data.

3.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 446889 and 447023). PCBs were not detected in the method blanks above the MDLs.

3.6 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-MW-102I-09142023. The recovery and RPD results were within the QAPP specified acceptance criteria.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

DRAFT

3.8 Surrogate

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recovery of tetrachloro-m-xylene on RTX-CLP2 in sample SSHS-MW-103I-09122023 was high and outside of the laboratory specified acceptance criteria. Since the recovery of decachlorobiphenyl was acceptable, no qualifications were applied to the data.

3.9 Field Duplicate

Two field duplicate samples, SSHS-DUP-01-09142023 and SSHS-DUP-02-09142023, were collected with the sample set. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate samples and the original samples, SSHS-MW-58-09142023 and SSHS-MW-100S-09142023, respectively.

3.10 Field Blank

Two field blanks, SSHS-FB-03-09142023 and SSHS-FB-04-09152023, were submitted with the sample set. PCBs were not detected in the field blanks above the MDLs.

3.11 Internal Standard

The internal standard areas and retention times were within the method specified acceptance criteria.

3.12 Target Compound Identification

The target compound identifications were within the validation criteria.

3.13 Target Compound Quantitation

The compound quantitations were within the validation criteria.

3.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria was listed in Table 1 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 1 of the QAPP.

DRAFT

3.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 METALS

The samples were analyzed for metals per US EPA methods 3005A/6010D. Mercury was evaluated separately in Section 5.0, below.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Time
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
⊗ Initial and Continuing Calibration Blank
⊗ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Duplicate
✓ Field Blank
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverables Review

4.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for these analyses, for this SDG is 100%.

DRAFT

4.2 Holding Time

The holding time for the total metals analysis of solid samples is 180 days from sample collection to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria, with the following exceptions.

The beryllium and thallium results were more negative than the MDLs and less than the RLs in the ICSA in batches 588197 and 588635. Therefore, the non-detect results of beryllium and thallium in the associated samples were UJ qualified as estimated less than the MDLs, and the thallium concentration in sample SSHS-MW-102I-09142023 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-50R-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-50R-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-MW-105I-09152023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-105I-09152023	Thallium	2.7	U	2.7	UJ	13
SSHS-DUP-01-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-DUP-01-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-DUP-02-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-DUP-02-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-MW-65R-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-65R-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-FB-03-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-FB-03-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-FB-04-09152023	Beryllium	0.60	U	0.60	UJ	13
SSHS-FB-04-09152023	Thallium	2.7	U	2.7	UJ	13

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-54R-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-54R-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-MW-56-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-56-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-MW-58-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-58-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-MW-62R-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-62R-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-MW-100S-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-100S-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-MW-100I-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-100I-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-MW-102S-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-102S-09142023	Thallium	2.7	U	2.7	UJ	13
SSHS-MW-102I-09142023	Beryllium	0.60	U	0.60	UJ	13
SSHS-MW-102I-09142023	Thallium	3.1	J	3.1	J	13

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
J-estimated concentration greater than or equal to the MDL and less than the RL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

4.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria, with the following exceptions.

The %Ds of cadmium (111%) and zinc (114%) in the CCV in batch 588197 were high and outside the method specified acceptance criteria. Since cadmium and zinc were not detected in the associated samples, no qualifications were applied to the data.

4.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria, with the following exceptions.

Arsenic, aluminum, and vanadium were detected in the CCB in batch 588197 at estimated concentrations greater than the MDLs and less than the RLs. Since vanadium was not detected in the associated samples and aluminum was U qualified as not detected at the RL due to method blank contamination, no qualifications were applied to the vanadium and aluminum data. However, the estimated concentrations of arsenic in the associated samples were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-58-09142023	Arsenic	4.5	J	4.5	U	3
SSHS-FB-04-09152023	Arsenic	4.4	J	4.4	U	3
SSHS-MW-100I-09142023	Arsenic	4.5	J	4.5	U	3
SSHS-MW-102S-09142023	Arsenic	5.5	J	5.5	U	3
SSHS-DUP-02-09142023	Arsenic	4.9	J	4.9	U	3
SSHS-MW-62R-09142023	Arsenic	4.5	J	4.5	U	3

µg/L-micrograms per liter
J-estimated concentration greater than or equal to the MDL and less than the RL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

4.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 587856 and 588465). Metals were not detected in the method blanks above the MDLs, with the following exceptions.

Aluminum was detected in the method blank in batch 587856 at an estimated concentration greater than the MDL and less than the RL. Therefore, the estimated concentrations of aluminum in the associated samples were U qualified as not detected at the RL.

Silver was detected in the method blank in batch 588465 at an estimated concentration greater than the MDL and less than the RL. Since silver was not detected in the associated samples, no qualifications were applied to the data.

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
SSHS-MW-105I-09152023	Aluminum	190	J B	200	U	3
SSHS-MW-54R-09142023	Aluminum	55	J B	200	U	3
SSHS-MW-56-09142023	Aluminum	140	J B	200	U	3
SSHS-MW-58-09142023	Aluminum	90	J B	200	U	3
SSHS-MW-62R-09142023	Aluminum	68	J B	200	U	3
SSHS-MW-100S-09142023	Aluminum	71	J B	200	U	3
SSHS-MW-100I-09142023	Aluminum	64	J B	200	U	3
SSHS-MW-102S-09142023	Aluminum	54	J B	200	U	3

µg/L-micrograms per liter
J-estimated concentration greater than or equal to the MDL and less than the RL
B-laboratory flag indicating the analyte was detected in the blank
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

4.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-MW-102I-09142023. The recovery and RPD results were within the QAPP specified acceptance criteria.

4.8 Serial Dilution

One sample set specific serial dilution was reported, using sample SSHS-MW-102I-09142023. The %D results were within the laboratory specified acceptance criteria.

4.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

4.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

4.11 Field Duplicate

Two field duplicate samples, SSHS-DUP-01-09142023 and SSHS-DUP-02-09142023, were collected with the sample set. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate samples and the original samples, SSHS-MW-58-09142023 and SSHS-MW-100S-09142023, respectively, with the following exceptions.

DRAFT

Aluminum, arsenic and chromium were detected in a parent sample SSHS-MW-58-09142023 at estimated concentrations greater than the MDLs and less than the RLs and not detected in field duplicate sample SSHS-DUP-01-09142023, resulting in noncalculable RPDs. Since the aluminum and arsenic concentrations in sample SSHS-MW-58-09142023 were U qualified as not detected at the RLs due to blank contamination, no qualifications were applied to the aluminum and arsenic data. However, the non-detect result of chromium in sample SSHS-DUP-01-09142023 was UJ qualified as estimated less than the MDL, and the concentrations of chromium in sample SSHS-MW-58-09142023 was J qualified as estimated.

Lead was detected in a field duplicate sample SSHS-DUP-01-09142023 at an estimated concentration greater than the MDL and less than the RL and not detected in parent sample SSHS-MW-58-09142023, resulting in a noncalculable RPD. Therefore, the non-detect lead result in sample SSHS-MW-58-09142023 was UJ qualified as estimated less than the MDL, and the lead concentration in sample SSHS-DUP-01-09142023 was J qualified as estimated.

Aluminum was detected in a parent sample SSHS-MW-100S-09142023 at an estimated concentration greater than the MDL and less than the RL and not detected in field duplicate sample SSHS-DUP-02-09142023, resulting in a noncalculable RPD. Since the aluminum concentration in sample SSHS-MW-100S-09142023 was U qualified as not detected at the RL due to blank contamination, no qualifications were applied to the data.

Arsenic was detected in a field duplicate sample SSHS-DUP-02-09142023 at an estimated concentration greater than the MDL and less than the RL and not detected in parent sample SSHS-MW-100S-09142023, resulting in a noncalculable RPD. Since the arsenic concentration in sample SSHS-DUP-02-09142023 was U qualified as not detected at the RL due to blank contamination, no qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
SSHS-DUP-01-09142023	Arsenic	4.1	U	NC	4.1	NA***	NA***
SSHS-MW-58-09142023	Arsenic	4.5	J		4.5	NA***	NA***
SSHS-DUP-01-09142023	Chromium, Total	0.76	U	NC	0.76	UJ	7
SSHS-MW-58-09142023	Chromium, Total	0.99	J		0.99	J	7
SSHS-DUP-01-09142023	Lead	2.9	J	NC	2.9	J	7
SSHS-MW-58-09142023	Lead	2.8	U		2.8	UJ	7
SSHS-DUP-01-09142023	Aluminum	47	U	NC	47	NA***	NA***

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
SSHS-MW-58-09142023	Aluminum	47	J B		47	NA***	NA***
SSHS-DUP-02-09142023	Aluminum	47	U	NC	47	NA***	NA***
SSHS-MW-100S-09142023	Aluminum	47	J B		47	NA***	NA***
SSHS-DUP-02-09142023	Arsenic	4.9	J	NC	4.9	NA***	NA***
SSHS-MW-100S-09142023	Arsenic	4.1	U		4.1	NA***	NA***

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
B-laboratory flag indicating the analyte was detected in the blank
J-estimated concentration greater than or equal to the MDL and less than the RL
NC-noncalculable
***See description above

4.12 Field Blank

Two field blanks, SSHS-FB-03-09142023 and SSHS-FB-04-09152023, were submitted with the sample set. Metals were not detected in the field blanks above the MDLs, with the following exceptions.

Arsenic and copper were detected in the field blank SSHS-FB-04-09152023 at estimated concentrations greater than the MDLs and less than the RLs. Since arsenic and copper were not detected in the associated samples, no qualifications were applied to the data.

4.13 Target Compound Quantitation

The compound quantitations were within the validation criteria.

4.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

5.0 MERCURY

The samples were analyzed for mercury per US EPA method 7470A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Field Blank
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for these analyses, for this SDG is 100%.

5.2 Holding Time

The holding time for the total mercury analysis of solid samples is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

DRAFT

5.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 446997 and 447593). Mercury was not detected in the method blanks above the MDL.

5.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-MW-102I-09142023. The recovery and RPD results were within the QAPP specified acceptance criteria.

5.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

5.9 Field Duplicate

Two field duplicate samples, SSHS-DUP-01-09142023 and SSHS-DUP-02-09142023, were collected with the sample set. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicate samples and the original samples, SSHS-MW-58-09142023 and SSHS-MW-100S-09142023, respectively.

5.10 Field Blank

Two field blanks, SSHS-FB-03-09142023 and SSHS-FB-04-09152023, were submitted with the sample set. Mercury was not detected in the field blanks above the MDL.

5.11 Target Compound Quantitation

The compound quantitations were within the validation criteria.

5.12 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

DRAFT

5.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	26 February 2024
To:	Ron Arcuri
From:	Matthew Richardson
CC:	Kristoffer Henderson
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins Job Number 180-165447-1**

SITE: Former Sperry Remington-GW IG Monitoring

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of four groundwater samples, two field duplicate samples, one field blank and one trip blank collected on 15 November 2023, as part of the Former Sperry Remington-GW IG Monitoring sampling event.

Eurofins Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260D
- Semivolatile Organic Compounds (SVOCs) by US EPA Methods 3520C/8270E
- Polychlorinated Biphenyls (PCBs) by US EPA Methods 3510C/8082A
- Metals by US EPA Methods 3005A/6010D
- Mercury by US EPA Method 7470A

Eurofins Edison, New Jersey analyzed the samples for the following analytical test:

- 1,4-Dioxane by US EPA Method 3510C/8270E using Selective Ion Monitoring (SIM)

EXECUTIVE SUMMARY

Overall, based on this Stage 4 data validation covering the quality control (QC) parameters listed below and based on the information provided, the data as qualified are usable for supporting project objectives, with the following exception.

The non-detect result of hexachlorocyclopentadiene in sample SSHS-MW-55-11152023 was R qualified as rejected due to less than 10% matrix spike (MS) recovery.

DRAFT

The qualified data should be used within the limitations of the qualifications. If there are results with two or more different qualifications due to multiple QC failures, the final qualification is reconciled in the electronic data deliverable (EDD) with qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005);
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006);
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014;
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010;
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015;
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016;
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016; and
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

DRAFT

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-165447-1	SSHS-MW-55-11152023
180-165447-2	SSHS-MW-55-11152023
180-165447-3	SSHS-MW-48R-11152023
180-165447-4	SSHS-MW-48R-11152023

Laboratory ID	Client ID
180-165447-5	SSHS-DUP-01-11152023
180-165447-6	SSHS-DUP-01-11152023
180-165447-7	SSHS-FB-03-11152023
180-165447-9	SSHS-TRIP-BLANK-11152023

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

Sample collection times for the trip blank and field duplicate were not documented on the chain of custody (COC). The trip blank and field duplicate were logged in with a collection time of 00:00.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5030C/8260D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
⊗ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identifications
✓ Target Compound Quantitations
✓ Sensitivity
✓ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

The VOC data reported in this sample delivery group (SDG) considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

1.2 Holding Times

The holding time for the VOC analysis of a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed prior to the initial calibration. The initial calibration was analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs) or used curve fits. The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations, with the following exceptions.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be UJ qualified if the RRF is < 0.010, based on professional and technical judgment. The average RRF for 1,4-dioxane in the initial calibration was less than 0.010. Therefore, based on professional and technical judgment and average RRFs less than 0.010, the non-detect results of 1,4-dioxane in the samples were UJ qualified as estimated less than the method detection limit (MDL).

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-DUP-01-11152023-20231115	1,4-Dioxane	43	U	43	UJ	9
SSHS-FB-03-11152023-20231115	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-48R-11152023-20231115	1,4-Dioxane	43	U	43	UJ	9
SSHS-MW-55-11152023-20231115	1,4-Dioxane	43	U	43	UJ	9
SSHS-TRIP-BLANK-11152023-20231115	1,4-Dioxane	43	U	43	UJ	9

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.5 Initial and Continuing Calibration Verifications (ICVs and CCVs)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of 4-methyl-2-pentanone (25.6%) and 1,2,3-trichlorobenzene (21.8%) in the CCV in batch 452500 were outside the method specified acceptance criteria with a high bias. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

The %Ds of dichlorodifluoromethane (-62.4%), chloromethane (-34.8%), chloroethane (-20.3%), carbon disulfide (-33.9%), vinyl chloride (-31.8%), bromomethane (-31.5%), 1,2-dibromo-3-chloropropane (-21.1%), and 1,1,1-trichloroethane (-20.7%) in the CCV standard in batch 452500 were outside the method specified acceptance criteria with a low bias. Since the %Ds of chloroethane, bromomethane and 1,2-dibromo-3-chloropropane were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the chloroethane, bromomethane and 1,2-dibromo-3-chloropropane data. However, the non-detect results of dichlorodifluoromethane, chloromethane, carbon disulfide, vinyl chloride and 1,1,1-trichloroethane in the associated samples were UJ qualified as estimated less than the MDLs.

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-DUP-01-11152023-20231115	1,1,1-Trichloroethane	0.60	U	0.60	UJ	9
SSHS-FB-03-11152023-20231115	1,1,1-Trichloroethane	0.60	U	0.60	UJ	9
SSHS-MW-48R-11152023-20231115	1,1,1-Trichloroethane	0.60	U	0.60	UJ	9
SSHS-MW-55-11152023-20231115	1,1,1-Trichloroethane	0.60	U	0.60	UJ	9
SSHS-TRIP-BLANK-11152023-20231115	1,1,1-Trichloroethane	0.60	U	0.60	UJ	9
SSHS-DUP-01-11152023-20231115	Carbon Disulfide	0.88	U	0.88	UJ	9
SSHS-FB-03-11152023-20231115	Carbon Disulfide	0.88	U	0.88	UJ	9
SSHS-MW-48R-11152023-20231115	Carbon Disulfide	0.88	U	0.88	UJ	9
SSHS-MW-55-11152023-20231115	Carbon Disulfide	0.88	U	0.88	UJ	9
SSHS-TRIP-BLANK-11152023-20231115	Carbon Disulfide	0.88	U	0.88	UJ	9

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-DUP-01-11152023-20231115	Chloromethane	0.90	U	0.90	UJ	9
SSHS-FB-03-11152023-20231115	Chloromethane	0.90	U	0.90	UJ	9
SSHS-MW-48R-11152023-20231115	Chloromethane	0.90	U	0.90	UJ	9
SSHS-MW-55-11152023-20231115	Chloromethane	0.90	U	0.90	UJ	9
SSHS-TRIP-BLANK-11152023-20231115	Chloromethane	0.90	U	0.90	UJ	9
SSHS-DUP-01-11152023-20231115	Dichlorodifluoromethane	0.83	U	0.83	UJ	9
SSHS-FB-03-11152023-20231115	Dichlorodifluoromethane	0.83	U	0.83	UJ	9
SSHS-MW-48R-11152023-20231115	Dichlorodifluoromethane	0.83	U	0.83	UJ	9
SSHS-MW-55-11152023-20231115	Dichlorodifluoromethane	0.83	U	0.83	UJ	9
SSHS-TRIP-BLANK-11152023-20231115	Dichlorodifluoromethane	0.83	U	0.83	UJ	9
SSHS-DUP-01-11152023-20231115	Vinyl Chloride	0.41	U	0.41	UJ	9
SSHS-FB-03-11152023-20231115	Vinyl Chloride	0.41	U	0.41	UJ	9
SSHS-MW-48R-11152023-20231115	Vinyl Chloride	0.41	U	0.41	UJ	9
SSHS-MW-55-11152023-20231115	Vinyl Chloride	0.41	U	0.41	UJ	9
SSHS-TRIP-BLANK-11152023-20231115	Vinyl Chloride	0.41	U	0.41	UJ	9

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

DRAFT

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 452500). VOCs were not detected in the method blank at or above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate (MSD)

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using

sample SSHS-MW-55-11152023. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Trip Blank

One trip blank, SSHS-TRIP-BLANK-11152023, accompanied the sample shipment. VOCs were not detected in the trip blank at or above the MDLs, with the following exception.

Methylene chloride (0.99 µg/L) was detected in the trip blank SSHS-TRIP-BLANK-11152023 at a concentration greater than the RL. Since methylene chloride was not detected in the associated samples, no qualifications were applied to the data.

1.11 Field Blank

One field blank, SSHS-FB-03-11152023, accompanied the sample shipment. VOCs were not detected in the field blank at or above the MDLs.

1.12 Field Duplicate

One field duplicate, SSHS-DUP-01-11152023, was collected with the sample set. Acceptable precision (RPD ≤30%) was demonstrated between the field duplicate and the original sample, SSHS-MW-48R-11152023.

1.13 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.14 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

DRAFT

1.15 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.16 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.17 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3510C/8270E and 1,4-dioxane per US EPA Methods 3510C/8270E SIM.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Blank
✓ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

2.1 Overall Assessment

DRAFT

The SVOC and 1,4-dioxane data reported in this SDG are considered to be usable for supporting project objectives, with the following exception. The non-detect result of hexachlorocyclopentadiene in sample SSHS-MW-55-11152023 was R qualified as rejected due to less than 10% MS recovery. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 99.6%.

2.2 Holding Times

The holding times for the SVOC and 1,4-dioxane analyses of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria.

DRAFT

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 452586 and 945933). SVOCs and 1,4-dioxane were not detected in the method blanks at or above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported, with both using sample SSHS-MW-55-11152023. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

One or both of the recoveries of the following compounds in the MS/MSD pair using sample SSHS-MW-55-11152023 were low and outside of the QAPP specified acceptance criteria. Additionally, the MS recovery of hexachlorocyclopentadiene was less than 10%. Therefore, the non-detect result of hexachlorocyclopentadiene in sample SSHS-MW-55-11152023 was R qualified as rejected, the non-detect results of the remaining analytes listed in the table below in sample SSHS-MW-55-11152023 were UJ qualified as estimated less than the MDLs.

1,2,4,5-Tetrachlorobenzene	2-Chlorophenol	Atrazine
1,4-Dioxane	3,3-Dichlorobenzidine	Hexachlorocyclopentadiene
2,4-Dimethylphenol	4-Chloroaniline	Naphthalene

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-55-11152023-20231115	1,2,4,5-Tetrachlorobenzene	0.15	U F1	0.15	UJ	4
SSHS-MW-55-11152023-20231115	1,4-Dioxane	0.19	U	0.19	UJ	4
SSHS-MW-55-11152023-20231115	2,4-Dimethylphenol	0.17	U F1	0.17	UJ	4
SSHS-MW-55-11152023-20231115	2-Chlorophenol	0.13	U F1	0.13	UJ	4
SSHS-MW-55-11152023-20231115	3,3'-Dichlorobenzidine	0.58	U	0.58	UJ	4
SSHS-MW-55-11152023-20231115	4-Chloroaniline	0.38	U F1	0.38	UJ	4
SSHS-MW-55-11152023-20231115	Atrazine	0.63	U F1	0.63	UJ	4
SSHS-MW-55-11152023-20231115	Hexachlorocyclopentadiene	0.50	U F1	0.50	R	4

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-55-11152023-20231115	Naphthalene	0.059	U F1	0.059	UJ	4

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
F1-laboratory flag indicating MS and/or MSD recovery exceeds control limits
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCS duplicate (LCSD) pair and one LCS were reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Blank

One field blank, SSHS-FB-03-11152023, accompanied the sample shipment. SVOCs and 1,4-dioxane were not detected in the field blank at or above the MDLs, with the following exception.

Butyl benzyl phthalate (0.74 µg/L), di-n-butyl phthalate (3.5 µg/L) and phenanthrene (0.062 µg/L) were detected in the field blank SSHS-FB-03-11152023 at concentrations greater than the RLs. Therefore, the estimated concentrations of these analytes in the associated samples were U qualified as not detected at the RLs, and the concentrations of di-n-butyl phthalate in the associated samples that were less than the blank contamination were U qualified as not detected at the sample results. Additionally, the concentrations of these analytes in the associated samples that were less than ten times the blank contamination were J+ qualified as estimated with a high bias.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-DUP-01-11152023-20231115	Benzyl Butyl Phthalate	0.77	J	1.1	U	3
SSHS-MW-48R-11152023-20231115	Benzyl Butyl Phthalate	0.84	J	1.1	U	3
SSHS-DUP-01-11152023-20231115	Di-n-Butyl Phthalate	3.0	NA	3.0	U	3
SSHS-MW-48R-11152023-20231115	Di-n-Butyl Phthalate	3.7	NA	3.7	J+	3

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-55-11152023-20231115	Di-n-Butyl Phthalate	2.9	NA	2.9	U	3
SSHS-DUP-01-11152023-20231115	Phenanthrene	0.064	J	0.22	U	3
SSHS-MW-48R-11152023-20231115	Phenanthrene	0.069	J	0.22	U	3

µg/L-micrograms per liter
NA-not applicable
J-estimated concentration greater than or equal to the MDL and less than the RL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

2.11 Field Duplicate

One field duplicate, SSHS-DUP-01-11152023, was collected with the sample set. Acceptable precision (RPD <30%) was demonstrated between the field duplicate and the original sample, SSHS-MW-48R-11152023.

2.12 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.16 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

3.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by US EPA methods 3520C/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The PCBs data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

3.2 Holding Times

The holding times for the PCB analysis of water samples are one year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and

DRAFT

validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

3.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of peak 5 (-26.8%) for PCB-1254 on GC column RTX-CLP1 in CCV 180-452215/1 was outside of the method specified acceptance criteria with a low bias. Since the PCB-1254 data in the associated samples were reported from RTX-CLP1 with acceptable bracketing CCVs and based on professional and technical judgment, no qualifications were applied to the data.

The %D of peak 4 (-22.3%) for PCB-1254 on GC column RTX-CLP2 in CCV 180-452215/1 was outside of the method specified acceptance criteria with a low bias. Since the PCB-1254 data in the associated samples were reported from RTX-CLP1 and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of peak 4 (-34.5%) and peak 5 (-22.2%) for PCB-1248 on GC column RTX-CLP1 in CCV 180-452215/4 were outside of the method specified acceptance criteria with a low bias. Since the PCB-1248 data in the associated samples were reported from RTX-CLP1 with acceptable bracketing CCVs and based on professional and technical judgment, no qualifications were applied to the data.

The %D of peak 4 (-33.0%) for PCB-1248 on GC column RTX-CLP2 in CCV 180-452215/4 was outside of the method specified acceptance criteria with a low bias. Since the PCB-1248 data in the associated samples were reported from RTX-CLP1 and based on professional and technical judgment, no qualifications were applied to the data.

3.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 452207). The PCBs were not detected in the method blank at or above the MDLs.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-MW-55-11152023. The recovery and RPD results were within the QAPP specified acceptance criteria.

DRAFT

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

The recovery of decachlorobiphenyl on column RTX-CLP1 in CCVIS 180-452215/26 in batch 452215 was high and outside the laboratory specified acceptance criteria. Since the recovery of decachlorobiphenyl in the associated samples was acceptable and based on professional and technical judgment, no qualifications were applied to the data.

3.9 Field Blank

One field blank, SSHS-FB-03-11152023, accompanied the sample shipment. PCBs were not detected in the field blank at or above the MDLs.

3.10 Field Duplicate

One field duplicate, SSHS-DUP-01-11152023, was collected with the sample set. Acceptable precision (RPD <30%) was demonstrated between the field duplicate and the original sample, SSHS-MW-48R-11152023.

3.11 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

3.12 Target Compound Identification

The target compound identifications were within the validation criteria.

3.13 Target Compound Quantitation

The compound quantitations were within the validation criteria

3.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. Screening criteria was listed in Table 1 of the QAPP for total PCBs; total PCBs was not reported in the

DRAFT

laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 1 of the QAPP.

3.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 METALS

The samples were analyzed for metals per US EPA methods 3005A/6010D. (Mercury was evaluated separately in Section 5.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
⊗ Field Blank
✓ Field Duplicate
✓ Laboratory Duplicate
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverables Review

4.1 Overall Assessment

The metals data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

DRAFT

4.2 Holding Times

The holding time for the total metals analysis of a water sample is 180 days from sample collection to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria, with the following exceptions.

Arsenic (17.7 µg/L) was detected in the ICSA in batch 452599 at a concentration greater than the RL. Since arsenic was not detected in the associated samples, no qualifications were applied to the data.

The selenium result was more negative than the MDL and less than the RL in the ICSA in batch 452599. Therefore, the non-detect results of selenium in the associated samples were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-DUP-01-11152023-20231115	Selenium	3.7	U	3.7	UJ	9
SSHS-FB-03-11152023-20231115	Selenium	3.7	U	3.7	UJ	9
SSHS-MW-48R-11152023-20231115	Selenium	3.7	U	3.7	UJ	9
SSHS-MW-55-11152023-20231115	Selenium	3.7	U	3.7	UJ	9

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

4.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

4.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria, with the following exceptions.

DRAFT

Manganese was detected in the CCB (CCB1 180-452599/12) in batch 452599 at estimated concentration greater than the MDL and less than the RL. Since manganese was reported in the associated samples with acceptable bracketing CCBs, no qualifications were applied to the data.

4.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (both from batch 452455). Metals were not detected in the method blanks at or above the MDLs.

4.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported, using sample SSHS-MW-55-11152023. The recovery and RPD results were within the QAPP specified acceptance criteria.

However, the recoveries in the MS/MSD pair that were flagged with 4 indicated the sample concentrations were greater than four times the spike concentrations. Therefore, the recovery limits were not applicable and no qualifications were applied to the data.

4.8 Serial Dilution

Serial dilutions were not reported.

4.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

4.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

4.11 Field Blank

One field blank, SSHS-FB-03-11152023, accompanied the sample shipment. Metals were not detected in the field blank at or above the MDLs, with the following exception.

Manganese (0.0035 mg/L) was detected in the field blank SSHS-FB-03-11152023 at a concentration greater than the RL. Therefore, the estimated concentration of manganese in the associated sample was U qualified as not detected at the RL, and the manganese concentration in the associated sample that was greater than the blank contamination and less than ten times the blank contamination were J+ qualified as estimated with a high bias.

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-DUP-01-11152023-20231115	Manganese	3.2	J	15	U	3
SSHS-MW-55-11152023-20231115	Manganese	19	NA	19	J+	3

µg/L-micrograms per liter
NA-not applicable
J-estimated concentration greater than or equal to the MDL and less than the RL
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

4.12 Field Duplicate

One field duplicate, SSHS-DUP-01-11152023, was collected with the sample set. Acceptable precision (RPD <30%) was demonstrated between the field duplicate and the original sample, SSHS-MW-48R-11152023, with the following exceptions.

Manganese was detected in the field duplicate sample SSHS-DUP-01-11152023 at an estimated concentration greater than the MDL and less than the RL and not detected in the parent sample SSHS-MW-48R-11152023, resulting in a noncalculable RPD. Since the estimated manganese concentration in sample SSHS-DUP-01-11152023 was U qualified as not detected at the RL due to field blank contamination and based on professional and technical judgment, no additional qualifications were applied to the data.

4.13 Laboratory Duplicate

Laboratory duplicates were not reported.

4.14 Target Compound Quantitation

The compound quantitations were within the validation criteria.

4.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

4.16 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

5.0 MERCURY

The samples were analyzed for mercury per US EPA method 7470A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Initial and Continuing Calibration Blank
✓ Method Blank
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Field Blank
⊗ Field Duplicate
✓ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverables Review

5.1 Overall Assessment

The mercury data reported in this SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for this SDG is 100%.

5.2 Holding Times

The holding time for the total mercury analysis of a water sample is 28 days from sample collection to analysis. The holding time was met for the sample analyses.

5.3 Initial Calibration

The method specified initial calibration requirements were met.

5.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

DRAFT

5.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

5.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks (batches 452654 and 453030) was reported. Mercury was not detected in the method blanks at or above the MDL.

5.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported, using samples SSHS-DUP-01-11152023 and SSHS-MW-55-11152023. The recovery and RPD results were within the QAPP specified acceptance criteria, with the following exceptions.

The MSD recovery and RPD for mercury in the MS/MSD pair using sample SSHS-MW-55-11152023 were high and outside of the laboratory specified acceptance criteria. Therefore, the mercury concentration in sample SSHS-MW-55-11152023 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-MW-55-11152023-20231115	Mercury	0.44	F1 F2	0.44	J	4

µg/L-micrograms per liter
F1-laboratory flag indicating MS and/or MSD recovery exceeds control limits
F2-laboratory flag indicating MS/MSD RPD exceeds control limits
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

5.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery result was within the QAPP specified acceptance criteria.

5.9 Field Blank

One field blank, SSHS-FB-03-11152023, accompanied the sample shipment. Mercury was not detected in the field blank at or above the MDL.

DRAFT

5.10 Field Duplicate

One field duplicate, SSHS-DUP-01-11152023, was collected with the sample set. Acceptable precision (RPD <30%) was not demonstrated between the field duplicate and the original sample, SSHS-MW-48R-11152023. The RPD for mercury was noncalculable due to a detection in the parent sample and non-detect result in the parent sample. Therefore, the non-detect result of mercury in sample SSHS-DUP-01-11152023-20231115 was UJ qualified as estimated less than the MDL, and the mercury concentration in sample SSHS-MW-48R-11152023-20231115 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
SSHS-DUP-01-11152023-20231115	Mercury	0.13	U	NC	0.13	UJ	7
SSHS-MW-48R-11152023-20231115	Mercury	0.20	NA		0.20	J	7

µg/L-micrograms per liter
U-not detected at a concentration greater than or equal to the MDL
NA-not applicable
NC-noncalculable
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

5.11 Target Compound Quantitation

The compound quantitations were within the validation criteria.

5.12 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 1 of the QAPP.

5.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	6 March 2024
To:	Ron Arcuri
From:	Matthew Richardson
CC:	Kris Henderson
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins Job Number 180-165447-2**

SITE: Former Sperry Remington Site

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of two groundwater samples, one field duplicate sample one field blank and one equipment blank analyses collected 15 November 2023, as part of the Former Sperry Remington Site sampling event.

The samples were analyzed by Eurofins Sacramento, West Sacramento, California for the following test:

- Per- and Polyfluroalkyl Substances (PFAS) by United States Environmental Protection Agency (USEPA) Methods 3535/537 Modified

EXECUTIVE SUMMARY

Overall, based on this Stage 4 data validation covering the quality control (QC) parameters listed below and based on the information provided, the data are usable for supporting project objectives.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- USEPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- New York State Department of Environmental Conservation (NYSDEC) Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs, April 2023.

DRAFT

- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Scott Technologies Site, 1051 South Main Street, City of Elmira, Chemung County, New York, December 5, 2014, Updated June 2022.

The following samples were analyzed and validated in the data set:

Laboratory ID	Client ID
180-165447-1	SSHS-MW-55-11152023
180-165447-3	SSHS-MW-48R-11152023
180-165447-5	SSHS-DUP-01-11152023

Laboratory ID	Client ID
180-165447-7	SSHS-FB-03-11152023
180-165447-8	SSHS-EB-03-11152023

The samples were received at Eurofins Sacramento within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

1.0 PFAS

The samples were analyzed for PFAS per USEPA Methods 3535/537 Modified. The following PFAS were reported:

Analyte	Acronym
Perfluorobutanoic acid	PFBA
Perfluoropentanoic acid	PFPeA
Perfluorohexanoic acid	PFHxA
Perfluoroheptanoic acid	PFHpA
Perfluorooctanoic acid	PFOA
Perfluorononanoic acid	PFNA
Perfluorodecanoic acid	PFDA
Perfluoroundecanoic acid	PFUnA
Perfluorododecanoic acid	PFDoA
Perfluorotridecanoic acid	PFTriA
Perfluorotetradecanoic acid	PFTeA
Perfluorobutanesulfonic acid	PFBS
Perfluorohexanesulfonic acid	PFHxS
Perfluoroheptanesulfonic Acid	PFHpS
Perfluorooctanesulfonic acid	PFOS
Perfluorodecanesulfonic acid	PFDS
1H,1H,2H,2H-perfluorooctane sulfonic acid	6:2 FTS

DRAFT

Analyte	Acronym
1H,1H,2H,2H-perfluorodecane sulfonic acid	8:2 FTS
Perfluorooctanesulfonamide	FOSA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Duplicate
- ✓ Equipment Blank
- ✓ Field Blank
- ✓ Isotope Dilution Standards
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ⊗ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

The PFAS data reported in this data package are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this dataset is 100%.

1.2 Holding Time

The laboratory-specified holding times for the PFAS analysis of water samples are 14 days from collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample extractions and analyses.

1.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average response ratios (RRs) and response factors (RFs) or linear or quadratic curves to calculate the concentrations of each target analyte and isotopically labeled compound. The relative standard deviations (RSDs) of the RRs or RFs were within the method and laboratory specified acceptance criteria of ≤20% or the relative standard errors (RSEs) were within the method and laboratory specified acceptance criteria of ≤20% for analytes calibrated using linear or quadratic curves.

1.4 Initial Calibration Verification (ICV) and Continuing Calibration Verification (CCV)

The ICVs and CCVs were performed at the required frequencies. The percent differences (%Ds) for each target analyte and isotopically labeled compound in the ICVs and CCVs were within the method and laboratory specified acceptance criteria of ≤30%.

1.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICBs and CCBs met the method and laboratory specified acceptance criteria of no target analyte detections at or above the analyte's method detection limit (MDL).

1.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 723174). PFAS were not detected in the method blank at or above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported, using sample SSHS-MW-55-11152023. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria.

DRAFT

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCS duplicate (LCSD) pair was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

1.9 Field Duplicate

One field duplicate, SSHS-DUP-01-11152023, was collected with the sample set. Acceptable precision (RPD ≤30%) was demonstrated between the field duplicate and the original sample, SSHS-MW-48R-11152023.

1.10 Equipment Blank

One equipment blank, SSHS-EB-03-11152023, accompanied the sample shipment. PFAS were not detected in the equipment blank at or above the MDLs.

1.11 Field Blank

One field blank, SSHS-FB-03-11152023, accompanied the sample shipment. PFAS were not detected in the field blank at or above the MDLs.

1.12 Isotope Dilution Standards

The isotope dilution standard recoveries in the samples were within the laboratory specified acceptance criteria.

1.13 Internal Standards (ISTD)

The ISTD areas and retention times were within the method specified acceptance criteria.

1.14 Target Compound Identifications

The compound identifications were within the validation guidance.

1.15 Target Compound Quantitation

The compound quantitation was within the validation guidance.

1.16 Sensitivity

The samples were reported to the MDLs. No elevated non-detect results were reported. Screening criteria were not listed in the QAPP for PFAS.

DRAFT

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. It was noted that the sample IDs in the EDD included a suffix to indicate the date of collection; this suffix was not listed in the sample IDs on the COC or in the laboratory report. In this data validation report, the samples are referred to by the sample IDs provided in the laboratory report. No other discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected at or above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected at or above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	October 21, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverables – Eurofins TestAmerica Job Numbers 180-123398-1 Revision 1 and 180-124670-1**

SITE: Former Sperry Remington Site RI

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of seventeen solid samples and one field duplicate collected on 17 June 2021 and 19 July 2021, as part of the Former Sperry Remington Site RI sampling event.

Eurofins TestAmerica, North Canton, Ohio analyzed the samples for the following analytical test:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5035/8260C

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Semivolatile Organic Compounds (SVOCs) by US EPA 3541/8270D
- Polychlorinated Biphenyls (PCBs) by US EPA Methods 3541/8082A
- Percent Moisture by Standard Method 2540G

Eurofins TestAmerica, North Canton, Ohio analyzed the samples for the following analytical test:

- Diesel Range Organics (DRO) by US EPA Methods 3540C/8015D

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives.

Qualified data should be used within the limits of the qualifications.

DRAFT

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-123398-1	SSHS-B3927-SUB-4-6
180-123398-2	SSHS-B3927-SUB-6-8
180-123398-3	SSHS-B3927-SUB-8-10
180-123398-4	SSHS-B3927-SUB-10-12
180-123398-5	SSHS-B3927-SUB-12-14
180-123398-6	SSHS-B3927-SUB-14-16
180-123398-8	SSHS-B3017A-SUB-10-12
180-123398-9	SSHS-B3017A-SUB-12-14
180-123398-10	SSHS-B3017A-SUB-14-16

Laboratory ID	Client ID
180-123398-12	DUP-74
180-124670-1	SSHS-B3343A-SUB-10-12
180-124670-2	SSHS-B3343A-SUB-14-16
180-124670-3	SSHS-B3602-SUB-16-18
180-124670-5	SSHS-B3096A-SUB-2-4
180-124670-8	SSHS-B3665-SUB-12-14
180-124670-11	SSHS-B3663-SUB-12-14
180-124670-13	SSHS-B3075A-SUB-10-12
180-124670-14	SSHS-B3075A-SUB-14-16

DRAFT

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

A collection time was not documented on the chain of custody (COC) for the field duplicate, DUP-74. The field duplicate was logged in with the collection time of 00:00.

180-123398-1: Samples SSHS-B3927-SUB-16-18 and SSHS-B3017A-SUB-16-18 were received on hold per the COC and were not reported.

180-123398-1: The field duplicate, DUP-74, was received with VOCs requested on the COC. Terracores were not received by the laboratory and the field duplicate was analyzed for PCBs.

180-124670-1: Samples SSHS-B3343A-SUB-10-12 and SSHS-B3343A-SUB-14-16 were listed as SSHS-B3443A-SUB-10-12 and SSHS-B3443A-SUB-14-16 on the COC. The boring ID of B3443A in the sample ID was changed to B3343A per the client's request.

Laboratory report 180-123398-1 was revised on October 21, 2021 to include missing ICV data. The revised report was identified as 180-123398-1 Revision 1.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5035/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

1.1 Overall Assessment

The VOC data reported in this data set are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this data set is 100%.

1.2 Holding Times

The holding times for the VOC analysis of a solid sample are 48 hours from collection to freezing and 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the relative response factors (RRFs) or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

The average RRFs for target analytes met the method and validation specified acceptance criteria.

1.5 Initial and Continuing Calibration Verifications (ICV and CCV)

ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria.

The percent differences or percent drifts (%Ds) of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %Ds of bromomethane (40.4%), chloroethane (25.4%) and 1,4-dioxane (49.6%) in the CCV in batch 144204 were outside of the laboratory specified acceptance criteria with high biases. Since these analytes were not detected in the associated samples, no qualifications were applied to the data.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 144204). VOCs were not detected in the method blank above the method detection limits (MDLs).

1.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD pairs were not reported.

DRAFT

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/laboratory control sample duplicate (LCSD) pair was reported. The recovery and relative percent difference (RPD) results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of 1,4-dioxane in the LCS/LCSD pair were high and outside of the QAPP specified acceptance criteria. Since 1,4-dioxane was not detected in the associated samples, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Field Duplicate

One field duplicate was collected with the sample set, DUP-74; however, per the COC the field duplicate was not analyzed for VOCs.

1.11 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported for sample SSHS-B3017A-SUB-12-14 due to dilution analyzed. The MDLs met the screening criteria listed in Table 1 of the QAPP.

1.15 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

DRAFT

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3541/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Instrument Performance Check
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Internal Standards
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The SVOC data reported in this sample set are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this sample set is 100%.

2.2 Holding Times

The holding times for the SVOC analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

DRAFT

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 362028 and 365646). SVOCs were not detected in the method blanks above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

DRAFT

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

The recoveries of acid extractable surrogates 2-fluorophenol and phenol-d5 and base-neutral extractable surrogate terphenyl-d14 in the method blank in batch 365646 were high and outside of the laboratory specified acceptance criteria. Since the surrogate recoveries in the method blank were high and SVOCs were not detected in the method blank and since the surrogate recoveries in the associated sample were within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

2.10 Field Duplicate

One field duplicate was collected with the sample set, DUP-74; however, per the COC the field duplicate was not analyzed for SVOCs.

2.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

2.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.14 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP.

2.15 Electronic Data Deliverable Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

3.0 DIESEL RANGE ORGANIC

The samples were analyzed for DRO (C10 – C28) per US EPA Methods 3541/8015D.

DRAFT

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ⊗ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The DRO (C10 – C28) data reported in this sample set are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this sample set is 100%.

3.2 Holding Times

The holding times for the DRO (C10 – C28) analysis of a solid sample are 14 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

DRAFT

3.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for the target analytes were within the method and validation specified acceptance criteria.

3.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 496139). DRO (C10 – C28) was not detected in the method blank above the MDL.

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample SSHS-B3075A-SUB-10-12.

180-124670-1: The MS recovery was within the laboratory specified acceptance criteria; however, the MSD and RPD recoveries were high and outside of the laboratory specified acceptance criteria. Therefore, the DRO concentration in sample SSHS-B3075A-SUB-10-12 was J qualified as estimated.

Sample	Analyte	Laboratory Result (mg/kg)	Laboratory Flag	Validation Result (mg/kg)	Validation Qualifier*	Reason Code**
SSHS-B3075A-SUB-10-12	DRO (C10-C28)	160	F1,F2	160	J	4

mg/kg-milligrams per kilogram
F1-laboratory flag indicating MS and/or MSD recovery was outside the laboratory specified acceptance criteria
F2- laboratory flag indicating MS/MSD RPD was outside the laboratory specified acceptance criteria
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery result was within the laboratory specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exception.

DRAFT

The recovery of surrogate o-terphenyl in sample SSHS-B3343A-SUB-14-16 was high and outside the laboratory specified acceptance criteria. Based on the sample dilution and professional and technical judgment, no qualifications were applied to the data.

3.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-74; however, per the COC the field duplicate was not analyzed for DRO.

3.10 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

3.11 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.12 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed the QAPP for DRO.

3.13 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 POLYCHLORINATED BIPHENYLS

The samples were analyzed for PCBs by US EPA methods 3541/8082A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample

DRAFT

✓ Surrogates
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
⊗ Target Compound Quantitation
✓ Sensitivity
✓ Electronic Data Deliverable Review

4.1 Overall Assessment

The PCBs data reported in this sample set are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the samples submitted for this analysis, for this sample set is 100%.

4.2 Holding Times

The holding times for the PCB analysis of a solid sample are 1 year from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

4.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exception.

The %D of PCB-1268 on GC column RTX-CLP2 in the ICV in batch 357315 was outside of the laboratory specified acceptance criteria with low bias. Since the PCB-1268 results for the associated samples were reported from GC column RTX-CLP1 with an ICV within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of PCB-1260 on both GC columns in the CCV in batch 365185 were outside of the laboratory specified acceptance criteria with high biases. Since PCB-1260 was not detected in the associated sample, no qualifications were applied to the data.

DRAFT

4.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks were reported (batches 361481, 361535 and 365164). The PCBs were not detected in the method blanks above the MDLs.

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Duplicate

One field duplicate was collected with the sample set, DUP-74. Acceptable precision [RPD <50% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicate and the original sample SSHS-B3927-SUB-4-6, with the following exceptions.

180-132398-1: PCB-1248 and PCB-1254 were detected in DUP-74 at concentrations greater than the MDLs and were not detected in SSHS-B3927-SUB-4-6, resulting in noncalculable RPDs. Therefore, based on professional and technical judgment the PCB-1248 and PCB-1254 concentrations in DUP-74 were J qualified as estimated and the non-detect results of PCB-1248 and PCB-1254 in SSHS-B3927-SUB-4-6 were UJ qualified as estimated less than the MDLs.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	RPD	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3927-SUB-4-6	PCB-1248	4.3	U	NC	4.3	UJ	7
DUP-74	PCB-1248	30	NA		30	J	7
SSHS-B3927-SUB-4-6	PCB-1254	5.3	U	NC	5.3	UJ	7
DUP-74	PCB-1254	14	J		14	J	7

µg/kg-micrograms per kilogram
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NA-not applicable
NC-not calculable

DRAFT

4.10 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

4.11 Target Compound Identification

The target compound identifications were within the validation criteria.

4.12 Target Compound Quantitation

The compound quantitations were within the validation criteria.

The samples contain mixtures of PCBs 1248, 1254 and 1260. There are peaks in 1248 and 1254 that are in both of these PCBs and peaks in 1254 and 1260 that are in both of these PCBs; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. Based on professional and technical judgment, the concentrations of PCBs 1248, 1254 and 1260 in these samples were J qualified as estimated.

The %D between the concentrations on the GC columns for PCB-1260 in sample SSHS-B3927-SUB-6-8 was greater than 25%. Therefore, the PCB-1260 concentration in sample SSHS-B3927-SUB-6-8 was J qualified as estimated, based on professional and technical judgment.

Sample	Analyte	Laboratory Result (µg/kg)	Laboratory Flag	Validation Result (µg/kg)	Validation Qualifier	Reason Code
SSHS-B3927-SUB-6-8	PCB-1248	210	NA	210	J	13
SSHS-B3927-SUB-6-8	PCB-1254	80	NA	80	J	13
SSHS-B3927-SUB-6-8	PCB-1260	8.3	J	8.3	J	13
SSHS-B3927-SUB-10-12	PCB-1248	210	NA	210	J	13
SSHS-B3927-SUB-10-12	PCB-1254	98	NA	98	J	13
SSHS-B3927-SUB-10-12	PCB-1260	32	NA	32	J	13
SSHS-B3927-SUB-12-14	PCB-1248	310	NA	310	J	13
SSHS-B3927-SUB-12-14	PCB-1254	140	NA	140	J	13
SSHS-B3927-SUB-12-14	PCB-1260	41	NA	41	J	13
SSHS-B3927-SUB-14-16	PCB-1248	38	NA	38	J	13
SSHS-B3927-SUB-14-16	PCB-1254	17	J	17	J	13
SSHS-B3017A-SUB-12-14	PCB-1248	130	NA	130	J	13
SSHS-B3017A-SUB-12-14	PCB-1254	56	NA	56	J	13
SSHS-B3017A-SUB-12-14	PCB-1260	14	J	14	J	13
SSHS-B3017A-SUB-14-16	PCB-1248	170	NA	170	J	13
SSHS-B3017A-SUB-14-16	PCB-1254	80	NA	80	J	13
SSHS-B3017A-SUB-14-16	PCB-1260	24	NA	24	J	13
DUP-74	PCB-1248	30	NA	30	J	13
DUP-74	PCB-1254	14	J	14	J	13

µg/kg-micrograms per kilogram

DRAFT

J-estimated concentration greater than the MDL and less than the RL
NA-not applicable

4.13 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. A screening criterion was listed in Table 1 of the QAPP for total PCBs; total PCBs was not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 1 of the QAPP.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDDs were reviewed against the information provided by the associated level IV reports at a minimum of 20%. No discrepancies were identified between the level IV reports and the EDDs.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	November 11, 2021
To:	Ron Arcuri
From:	Kristoffer Henderson
CC:	J. Caprio
Subject:	**Stage 4 Data Validation - Level IV Data Deliverable – Eurofins TestAmerica Job Number 180-126905-1 Revision 1**

SITE: Former Sperry Remington Site RI

INTRODUCTION

This report summarizes the findings of the Stage 4 data validation of ten water samples including one sample for matrix spike/matrix spike duplicate (MS/MSD) analysis, as well as two field duplicates, one trip blank and one field blank collected on 9 September 2021, as part of the Former Sperry Remington Site RI sampling event.

Eurofins TestAmerica, Pittsburgh, Pennsylvania analyzed the samples for the following analytical tests:

- Semivolatile Organic Compounds (SVOCs) by United States (US) Environmental Protection Agency (EPA) 3520C/8270D
- Total and Dissolved Polychlorinated Biphenyls (PCBs) by US EPA Methods 3510C/8082A
- Total and Dissolved Metals by US EPA Methods 3005A/6010C
- Total and Dissolved Mercury by US EPA Method 7470A

Eurofins TestAmerica, Edison, New Jersey analyzed the samples for the following analytical test:

- 1,4-Dioxane by US EPA 3510C/8270E Using Selected Ion Monitoring (SIM)

Eurofins TestAmerica, West Sacramento, California analyzed the samples for the following analytical test:

- Per- and Polyfluoroalkyl Substances (PFAS) by US EPA Methods 3535/537 (modified) and 537 (modified)

Eurofins TestAmerica, North Canton, Ohio analyzed the samples for the following analytical tests:

- Volatile Organic Compounds (VOCs) by US EPA Methods 5030C/8260C

DRAFT

- Diesel Range Organics (DRO) by US EPA Methods 3510C/8015D

EXECUTIVE SUMMARY

Based on this Stage 4 data validation covering the quality control (QC) parameters listed below, the data as qualified are usable for supporting project objectives, with the following exceptions.

The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low relative response factor (RRF) in the initial calibration and based on technical and professional judgment.

The non-detect hexachlorocyclopentadiene result in sample MW-84S was R qualified as rejected due to MS/MSD recoveries less than 10%.

Qualified data that were not rejected should be used within the limits of the qualifications.

The data were reviewed based on the pertinent methods referenced in the data package, professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- US EPA National Functional Guidelines for High Resolution Superfund Methods Data Review, November 2020 (EPA-542-B-20-007)
- US EPA Region 2 Hazardous Waste Support Section, SOP NO. HW-24 Revision 4, Validating Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8260B & 8260C, September 2014
- US EPA Region 2 Hazardous Waste Support Branch, Validating Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270D, December 2010
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-37A Revision 0, SOM02.2, Polychlorinated Biphenyl (PCB) Aroclor Data Validation, June 2015
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3a Revision 1, ISM02.2, ICP-AES Data Validation, September 2016
- US EPA Region 2 Hazardous Waste Support Section, SOP No. HW-3c Revision 1, ISM02.2, Mercury and Cyanide Data Validation, September 2016
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 770 South Main Street, City of Elmira, Chemung County, New York, September 2018.

DRAFT

The following samples were analyzed in the data set.

Laboratory ID	Client ID
180-126905-1	FB 20210909
180-126905-2	TRIP BLANK -2
180-126905-3	MW-94I
180-126905-4	MW-94S
180-126905-5	MW-91I
180-126905-6	MW-91S
180-126905-7	MW-75I
180-126905-8	MW-75S

Laboratory ID	Client ID
180-126905-9	MW-84S
180-126905-9 MS	MW-84S MS
180-126905-9 MSD	MW-84S MSD
180-126905-10	MW-93I
180-126905-11	DUP-4
180-126905-12	MW-93S
180-126905-13	MW-68S
180-126905-14	DUP-2

The samples were received within the QAPP criteria of ≤ 6 degrees Celsius (ºC).

Collection times were not documented on the chain of custody (COC) for the field blank, FB 20210909, field duplicates, DUP-2 and DUP-4, and trip blank, TRIP BLANK-2. The field blank, field duplicates and trip blank were logged in with the collection time of 00:00.

The laboratory report was revised on November 1, 2021 to add a missing initial calibration verification (ICV) for the DRO data. The revised report was identified as 180-126905-1 Revision 1.

1.0 VOLATILE ORGANIC COMPOUNDS

The samples were analyzed for VOCs per US EPA Methods 5030C/8260C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
✓ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
✓ Trip Blank
✓ Field Blank
✓ Field Duplicate
✓ Internal Standards

DRAFT

✓ Target Compound Identifications
✓ Target Compound Quantitations
⊗ Sensitivity
✓ Electronic Data Deliverable Review

1.1 Overall Assessment

The VOC data reported in the sample delivery group (SDG) are considered usable for supporting project objectives, with the following exceptions. The non-detect results for 1,4-dioxane in the VOC analyses were R qualified as rejected due to low RRFs in the initial calibrations and based on technical and professional judgment. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for the SDG is 98.1%.

1.2 Holding Times

The holding time for the VOC analysis of a preserved water sample is 14 days from collection to analysis. The holding times were met for the sample analyses.

1.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for bromofluorobenzene (BFB).

1.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated percent relative standard deviation (%RSD) of the RRFs or used curve fits.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

There are no method or validation minimum average RRF criteria listed for 1,4-dioxane for method 8260C; past validation guidance [National Functional Guidance (NFG), June 2008] had the following acceptance criteria: RRF $\geq$ 0.0050 for 1,4-dioxane, $\geq$ 0.010 for compounds exhibiting poor response and $\geq$ 0.050 for all other target analytes. The current validation guidance (NFG, January 2020) lists minimum RRFs from 0.01-0.700 for VOCs and 1,4-dioxane is not listed as a VOC. Therefore, based on the review of the documents, when 1,4-dioxane is analyzed as a VOC, the compound will be R qualified if the RRF is < 0.010, based on professional and technical

DRAFT

judgment. The average RRF for 1,4-dioxane in the initial calibration was 0.0024, less than 0.010. Therefore, based on professional and technical judgment and average RRF less than 0.010, the non-detect results of 1,4-dioxane in the samples were R qualified as rejected.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier*	Reason Code**
DUP-2	1,4-Dioxane	13	U	13	R	9
DUP-4	1,4-Dioxane	13	U	13	R	9
FB 20210909	1,4-Dioxane	13	U	13	R	9
MW-68S	1,4-Dioxane	13	U	13	R	9
MW-75I	1,4-Dioxane	13	U	13	R	9
MW-75S	1,4-Dioxane	13	U	13	R	9
MW-84S	1,4-Dioxane	13	U	13	R	9
MW-91I	1,4-Dioxane	13	U	13	R	9
MW-91S	1,4-Dioxane	13	U	13	R	9
MW-93I	1,4-Dioxane	13	U	13	R	9
MW-93S	1,4-Dioxane	13	U	13	R	9
MW-94I	1,4-Dioxane	13	U	13	R	9
MW-94S	1,4-Dioxane	13	U	13	R	9
TRIP BLANK -2	1,4-Dioxane	13	U	13	R	9

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the method detection limit (MDL)
* Validation qualifiers are defined in Attachment 1 at the end of this report
**Reason codes are defined in Attachment 2 at the end of this report

1.5 Initial and Continuing Calibration Verifications (CCV)

ICV and CCVs were performed at the required frequency. The ICV and CCV RRFs met the method and validation specified acceptance criteria, with the following exceptions.

The ICV and CCV RRFs for 1,4-dioxane were less than 0.010. Since the 1,4-dioxane results in the samples were rejected based on the initial calibration average RRFs, no additional qualifications were applied to the data, based on professional and technical judgment.

The percent differences or percent drifts (%Ds) of the ICV and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of chloroethane (20.6%) in the CCV in batch 504203 was outside of the laboratory specified acceptance criteria with a low bias. Since the %D of chloroethane in the CCV was within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The %Ds of bromomethane (23.4%) and chloroethane (23.5%) in the CCV in batch 504294 were outside of the laboratory specified acceptance criteria with low biases. Since the %Ds of

DRAFT

bromomethane and chloroethane in the CCV were within the validation specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

1.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 504203 and 504294). VOCs were not detected in the method blanks above the MDLs.

1.7 Matrix Spike/Matrix Spike Duplicate

One sample set specific MS/MSD pair was reported using sample MW-84S. The recovery and relative percent difference (RPD) results were within the laboratory specified acceptance criteria, with the following exception.

The recovery of 2-butanone in the MSD was high and outside of the QAPP specified acceptance criteria. Since 2-butanone was not detected in sample MW-84S, no qualifications were applied to the data.

1.8 Laboratory Control Sample (LCS)

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria, with the following exception.

The recovery of 2-butanone in the LCS in batch 504203 was high and outside of the QAPP specified acceptance criteria. Since 2-butanone was not detected in the associated samples, no qualifications were applied to the data.

1.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

1.10 Trip Blank

One trip blank was shipped with the sample set, TRIP BLANK -2. VOCs were not detected in the trip blank above the MDLs.

1.11 Field Blank

One field blank was collected with the sample set, FB 20210909. VOCs were not detected in the field blank above the MDLs.

DRAFT

1.12 Field Duplicate

Two field duplicates were collected with the sample set, DUP-2 and DUP-4. Acceptable precision [RPD <30% for results greater than five times the reporting limit (RL)] was demonstrated between the field duplicates and the original samples MW-68S and MW-93I, respectively.

1.13 Internal Standards (ISTD)

The ISTD areas and retention times were within method specified acceptance criteria.

1.14 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

1.15 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

1.16 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

The MDLs of the following compounds did not meet the screening criteria listed in Table 2 of the QAPP.

Analyte	Method Detection Limit (MDL) (µg/L)	Screening Criteria (µg/L)
cis-1,3-Dichloropropene	0.61	0.4
1,2-Dibromo-3-Chloropropane	0.91	0.04
1,2-Dibromoethane	0.41	0.0006
trans-1,3-Dichloropropene	0.67	0.4

µg/L-micrograms per liter

1.17 Electronic Data Deliverable (EDD) Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The samples were analyzed for SVOCs per US EPA Methods 3520C/8270D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas

DRAFT

where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

⊗ Overall Assessment
✓ Holding Times
✓ Instrument Performance Check
✓ Initial Calibration
✓ Initial and Continuing Calibration Verifications
✓ Method Blanks
⊗ Matrix Spike/Matrix Spike Duplicate
✓ Laboratory Control Sample
✓ Surrogates
⊗ Field Blank
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
✓ Target Compound Quantitation
⊗ Sensitivity
✓ Electronic Data Deliverable Review

2.1 Overall Assessment

The VOC data reported in the SDG are considered usable for supporting project objectives, with the following exceptions. The non-detect hexachlorocyclopentadiene result in sample MW-84S was R qualified as rejected due to MS/MSD recoveries less than 10%. Therefore, the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for the SDG is 99.9%.

2.2 Holding Times

The holding times for the SVOC analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

2.3 Instrument Performance Check

An instrument performance check sample (tune standard) was analyzed at the beginning of each 12-hour period during sample analysis. The samples were analyzed within the 12-hour period. The ion abundance criteria were met for decafluorotriphenylphosphine (DFTPP).

The analyses of standards to assess the gas chromatography (GC) column performance and injection port inertness resulted in acceptable results.

DRAFT

2.4 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRFs and the %RSDs of the target analytes were within the method and validation specified acceptance criteria. The average RRFs for target analytes were above the method and validation specified acceptance criteria.

2.5 Initial and Continuing Calibration Verifications

The ICV and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICV and CCVs for the target analytes were within the method and validation specified acceptance criteria.

2.6 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 371384). SVOCs were not detected in the method blank above the MDLs.

2.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One MS/MSD pair was reported using sample MW-84S. The recovery results were within the QAPP specified acceptance criteria, with the following exceptions.

The recoveries of hexachlorocyclopentadiene in the MS/MSD pair were less than 10% and outside of the QAPP specified acceptance criteria. Therefore, the non-detect hexachlorocyclopentadiene result in sample MW-84S was R qualified as rejected.

One or both the recoveries of the following analytes in the MS/MSD pair were low and outside of the QAPP specified acceptance criteria. Therefore, the non-detect results of these analytes in sample MW-84S were UJ qualified as estimate less than the MDLs.

1,1-Biphenyl	2,4,6-Trichlorophenol	2-Methylnaphthalene
1,2,4,5-Tetrachlorobenzene	2,4-Dichlorophenol	2-Methylphenol
1,4-Dioxane	2,4-Dimethylphenol	2-Nitrophenol
2,2-oxybis[1-chloropropane]	2-Chloronaphthalene	3,3-Dichlorobenzidine
2,3,4,6-Tetrachlorophenol	2-Chlorophenol	3-Nitroaniline

DRAFT

4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Nitroaniline
Acenaphthene
Acenaphthylene
Acetophenone
Benzo[a]pyrene

Benzo[b]fluoranthene
Benzo[k]fluoranthene
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl)ether
Dibenzofuran
Fluorene
Hexachlorobutadiene

Hexachloroethane
Methylphenol, 3 & 4
Naphthalene
Nitrobenzene
N-Nitrosodi-n-propylamine
N-Nitrosodiphenylamine
Phenol

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-84S	1,1'-Biphenyl	0.34	U	0.34	UJ	4
MW-84S	1,2,4,5-Tetrachlorobenzene	0.33	U,F1	0.33	UJ	4
MW-84S	1,4-Dioxane	0.47	U	0.47	UJ	4
MW-84S	2,2'-oxybis[1-chloropropane]	0.088	U,F1	0.088	UJ	4
MW-84S	2,3,4,6-Tetrachlorophenol	0.54	U,F1	0.54	UJ	4
MW-84S	2,4,6-Trichlorophenol	0.35	U	0.35	UJ	4
MW-84S	2,4-Dichlorophenol	0.066	U,F1	0.066	UJ	4
MW-84S	2,4-Dimethylphenol	0.25	U,F1	0.25	UJ	4
MW-84S	2-Chloronaphthalene	0.054	U,F1	0.054	UJ	4
MW-84S	2-Chlorophenol	0.24	U,F1	0.24	UJ	4
MW-84S	2-Methylnaphthalene	0.079	U,F1	0.079	UJ	4
MW-84S	2-Methylphenol	0.34	U,F1	0.34	UJ	4
MW-84S	2-Nitrophenol	0.39	U,F1	0.39	UJ	4
MW-84S	3,3'-Dichlorobenzidine	0.84	U,F1	0.84	UJ	4
MW-84S	3-Nitroaniline	0.45	U	0.45	UJ	4
MW-84S	4-Chloroaniline	0.34	U	0.34	UJ	4
MW-84S	4-Chlorophenyl phenyl ether	0.46	U,F1	0.46	UJ	4
MW-84S	4-Nitroaniline	0.43	U	0.43	UJ	4
MW-84S	Acenaphthene	0.067	U	0.067	UJ	4
MW-84S	Acenaphthylene	0.055	U	0.055	UJ	4
MW-84S	Acetophenone	0.76	U,F1	0.76	UJ	4
MW-84S	Benzo[a]pyrene	0.038	U,F1	0.038	UJ	4
MW-84S	Benzo[b]fluoranthene	0.068	U,F1	0.068	UJ	4
MW-84S	Benzo[k]fluoranthene	0.063	U,F1	0.063	UJ	4
MW-84S	Bis(2-chloroethoxy)methane	0.36	U,F1	0.36	UJ	4
MW-84S	Bis(2-chloroethyl)ether	0.096	U,F1	0.096	UJ	4
MW-84S	Dibenzofuran	0.41	U	0.41	UJ	4
MW-84S	Fluorene	0.078	U	0.078	UJ	4
MW-84S	Hexachlorobutadiene	0.095	U,F1	0.095	UJ	4
MW-84S	Hexachlorocyclopentadiene	0.39	U,F1	0.39	R	4
MW-84S	Hexachloroethane	0.32	U,F1	0.32	UJ	4
MW-84S	Methylphenol, 3 & 4	0.3	U,F1	0.3	UJ	4
MW-84S	Naphthalene	0.095	U,F1	0.095	UJ	4
MW-84S	Nitrobenzene	0.41	U,F1	0.41	UJ	4

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-84S	N-Nitrosodi-n-propylamine	0.13	U,F1	0.13	UJ	4
MW-84S	N-Nitrosodiphenylamine	0.26	U,F1	0.26	UJ	4
MW-84S	Phenol	0.25	U,F1	0.25	UJ	4

µg/L-micrograms per liter
U-laboratory flag indicating not detected at or above the MDL
F1-laboratory flag indicating MS and/or MSD recoveries were outside the laboratory specified acceptance criteria

2.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS was reported. The recovery results were within the QAPP specified acceptance criteria.

2.9 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

2.10 Field Blank

One field blank was collected with the sample set, FB 20210909. SVOCs were not detected in the field blank above the MDLs, with the following exceptions.

2-Chloronaphthalene, 2-methylnaphthalene, naphthalene and phenanthrene were detected in FB 20210909 at estimated concentrations greater than the MDLs and less than the RLs. Since 2-Chloronaphthalene, 2-methylnaphthalene and naphthalene were not detected in the associated samples, no qualifications were applied to the 2-chloronaphthalene, 2-methylnaphthalene and naphthalene data. However, the estimated phenanthrene concentrations in the associated samples were U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-2	Phenanthrene	0.19	J	0.20	U	3
MW-68S	Phenanthrene	0.15	J	0.20	U	3
MW-75I	Phenanthrene	0.12	J	0.18	U	3
MW-84S	Phenanthrene	0.13	J	0.18	U	3
MW-91I	Phenanthrene	0.12	J	0.18	U	3
MW-93I	Phenanthrene	0.13	J	0.19	U	3
MW-93S	Phenanthrene	0.16	J	0.22	U	3
MW-94I	Phenanthrene	0.12	J	0.18	U	3
MW-94S	Phenanthrene	0.11	J	0.18	U	3

µg/L-micrograms per liter

DRAFT

J-estimated concentration greater than the MDL and less than the RL

2.11 Field Duplicate

Two field duplicates were collected with the sample set, DUP-2 and DUP-4. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-68S and MW-93I, respectively, with the following exceptions.

Bis(2-ethylhexyl) phthalate and caprolactam were not detected in MW-68S and were detected in DUP-2 at estimated concentrations greater than the MDLs and less than the RLs, resulting in noncalculable RPDs. Therefore, based on professional and technical judgment the non-detect results of bis(2-ethylhexyl) phthalate and caprolactam in MW-68S were UJ qualified as estimated less than the MDLs and the bis(2-ethylhexyl) phthalate and caprolactam concentrations in DUP-2 were J qualified as estimated.

Phenanthrene was detected in MW-93I at an estimated concentration greater than the MDL and less than the RL and was not detected in DUP-4, resulting in a noncalculable RPD. Since the phenanthrene concentration in MW-93I was U qualified due to field blank contamination and based on professional and technical judgment, no additional qualifications were applied to the data.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-68S	Bis(2-ethylhexyl) phthalate	5.5	U	NC	5.5	UJ	7
DUP-2	Bis(2-ethylhexyl) phthalate	5.6	J		5.6	J	7
MW-68S	Caprolactam	1.6	U	NC	1.6	UJ	7
DUP-2	Caprolactam	2.8	J		2.8	J	7
MW-93I	Phenanthrene	0.13	J	NC*	NA	NA	NA
DUP-4	Phenanthrene	0.12	U		NA	NA	NA

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL
NC-not calculable
*no qualifications, see explanation above

2.12 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

2.13 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

engineers | scientists | innovators

DRAFT

2.14 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

2.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP, with the following exceptions.

The MDLs of the following compounds did not meet the screening criteria listed in Table 2 of the QAPP.

Analyte	Method Detection Limit (MDL) (µg/L)	Screening Criteria (µg/L)
Bis(2-ethylhexyl) phthalate	6.3	5.0
Hexachlorobenzene	0.075	0.04

µg/L-micrograms per liter

2.16 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

3.0 1,4-DIOXANE

The samples were analyzed for 1,4-dioxane per US EPA Methods 3510C/8270E using SIM.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Field Duplicate
- ✓ Internal Standards

DRAFT

- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

3.1 Overall Assessment

The 1,4-dioxane data reported in the SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for the SDG is 100%.

3.2 Holding Times

The holding times for the 1,4-dioxane analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

3.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated %RSD of the RRFs.

The average RRF and the %RSD for 1,4-dioxane were within the method and validation specified acceptance criteria. The average RRF for 1,4-dioxane was above the method and validation specified acceptance criteria.

3.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICV and CCV for 1,4-dioxane were within the method and validation specified acceptance criteria.

3.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 801263). 1,4-Dioxane was not detected in the method blank above the MDL.

DRAFT

3.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

3.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCS duplicate (LCSD) pair was reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

3.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

3.9 Field Blank

One field blank was collected with the sample set; however, the field blank was not analyzed for 1,4-dioxane per the COC.

3.10 Field Duplicate

Field duplicates were collected with the sample set; however, the field duplicates were not analyzed for 1,4-dioxane per the COC.

3.11 Internal Standards

The ISTD areas and retention times were within method specified acceptance criteria.

3.12 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

3.13 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

3.14 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed in the QAPP for 1,4-dioxane.

DRAFT

3.15 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

4.0 DIESEL RANGE ORGANIC

The samples were analyzed for DRO (C10 – C28) per US EPA Methods 3510C/8015D.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blanks
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Surrogates
- ✓ Field Blank
- ✓ Field Duplicate
- ✓ Target Compound Identification
- ✓ Target Compound Quantitation
- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

DRAFT

4.1 Overall Assessment

The DRO (C10 – C28) data reported in the SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for the SDG is 100%.

4.2 Holding Times

The holding times for the DRO (C10 – C28) analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

4.3 Initial Calibration

Appropriate initial calibrations were performed for DRO (C10 – C28). The laboratory calculated %RSD of the RRFs.

The average RRF and the %RSD of DRO (C10 – C28) were within the method and validation specified acceptance criteria. The average RRF for DRO (C10 – C28) was above the method and validation specified acceptance criteria.

4.4 Initial and Continuing Calibration Verifications

The ICVs and CCVs were performed at the required frequency. The ICV and CCV RRFs met the validation specified acceptance criteria.

The %Ds between the RRFs in the ICVs and CCVs for DRO (C10 – C28) were within the method and validation specified acceptance criteria.

4.5 Method Blanks

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 503328 and 503574). DRO (C10 – C28) was not detected in the method blanks above the MDL.

4.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One sample set specific MS/MSD pair was reported using sample MW-84S. The recovery and RPD results were within the laboratory specified acceptance criteria.

4.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the laboratory specified acceptance criteria.

4.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria.

4.9 Field Blank

DRAFT

One field blank was collected with the sample set; however, the field blank was not analyzed for DRO (C10 - C28) per the COC.

4.10 Field Duplicate

Two field duplicates were collected with the sample set, DUP-2 and DUP-4. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-68S and MW-93I, respectively.

4.11 Target Compound Identifications

The target compound identifications were within the validation specified acceptance criteria.

4.12 Target Compound Quantitation

The compound quantitations were within the validation specified acceptance criteria.

4.13 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. Screening criteria was not listed the QAPP for DRO.

4.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

5.0 TOTAL AND DISSOLVED POLYCHLORINATED BIPHENYLS

The samples were analyzed for total and dissolved PCBs by US EPA methods 3510C.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample

DRAFT

⊗ Surrogates
✓ Field Blank
⊗ Field Duplicate
✓ Internal Standards
✓ Target Compound Identification
⊗ Target Compound Quantitation
✓ Total vs Dissolved Assessment
✓ Sensitivity
✓ Electronic Data Deliverable Review

5.1 Overall Assessment

The PCBs data reported in the SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for the SDG is 100%.

5.2 Holding Times

The QAPP specified holding times for the PCB analysis of a water sample are 7 days from sample collection to extraction and 40 days from extraction to analysis. The holding times were met for the sample analyses.

5.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory calculated the %RSD of the RRFs or used curve fits; the %RSDs of the RRFs were within the method and validation criteria or the coefficients of determination (r^2) were greater than or equal to 0.990 for the curve fit calibrations.

5.4 Initial and Continuing Calibration Verifications

ICVs and CCVs were performed at the required frequency. The %Ds of the ICVs and CCVs were within the method and validation specified acceptance criteria, with the following exceptions.

The %D of PCB-1260 on GC column RTX-CLP2 in a bracketing CCV in batch 371804 was outside of the laboratory specified acceptance criteria with a high bias. Since PCB-1260 was not detected in the associated sample, no qualifications were applied to the data.

The %D of PCB-1268 on GC column RTX-CLP2 in the ICV in batch 357315 was outside of the laboratory specified acceptance criteria with a low bias. Since PCB-1268 was reported from GC column RTX-CLP1 with the CCV within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

DRAFT

5.5 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two method blanks were reported (batches 371355 and 371696). The PCBs were not detected in the method blanks above the MDLs.

5.6 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported for dissolved and total PCBs using samples MW-84S. The recovery and RPD results were within the QAPP specified acceptance criteria.

5.7 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS and one LCS/LCSD pair were reported. The recovery and RPD results were within the QAPP specified acceptance criteria.

5.8 Surrogates

The surrogate recoveries were within the laboratory specified acceptance criteria, with the following exceptions.

The recovery of decachlorobiphenyl on GC column RTX-CLP2 for the total PCB analysis of sample MW-68S was high and outside of the laboratory specified acceptance criteria. Since the PCBs were reported from GC column RTX-CLP1 with surrogates within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

The recoveries of decachlorobiphenyl on both GC columns and tetrachloro-m-xylene on GC column RTX-CLP2 for the total PCB analysis of sample DUP-2 were high and outside of the laboratory specified acceptance criteria. Therefore, the total PCB-1248 concentration in sample DUP-2 was J+ qualified as estimated with high bias.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-2	Total PCB-1248	9.0	NA	9.0	J+	6

µg/L-micrograms per liter
NA-not applicable

DRAFT

5.9 Field Blank

One field blank was collected with the sample set, FB 20210909. PCBs were not detected in the field blank above the MDLs.

5.10 Field Duplicate

Two field duplicates were collected with the sample set, DUP-2 and DUP-4. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-68S and MW-93I, respectively, with the following exception.

The RPD of total PCB-1248 in field duplicate pair MW-68S/DUP-2 was greater than 30%; therefore, the total PCB-1248 concentrations in field duplicate pair MW-68S/DUP-2 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-68S	Total PCB-1248	5.7	NA	45	5.7	J	7
DUP-2	Total PCB-1248	9.0	NA		9.0	J	7

µg/L-micrograms per liter
NA-not applicable

5.11 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria, with the following exception.

The response of ISTD 1-bromo-2-nitrobenzene (159%) on GC column RTX-CLP1 for the dissolved PCB analysis of sample MW-93S was high and outside of the method specified acceptance criteria. Since the PCBs were not detected in sample MW-93S, no qualifications were applied to the data.

5.12 Target Compound Identification

The target compound identifications were within the validation criteria.

5.13 Target Compound Quantitation

The compound quantitations were within the validation criteria, with the following exceptions.

PCB 1248 was detected in the unfiltered and filtered samples for MW-68S and DUP-2; however, the spectrum was a poor match for the PCB standards. Therefore, based on professional and

DRAFT

technical judgment the dissolved and total PCB-1248 concentrations in samples MW-68S and DUP-2 were J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-2	Dissolved PCB-1248	0.11	NA	0.11	J	13
DUP-2	Total PCB-1248	9.0	NA	9.0	J	13
MW-68S	Dissolved PCB-1248	0.12	NA	0.12	J	13
MW-68S	Total PCB-1248	5.7	NA	5.7	J	13

µg/L-micrograms per liter
NA-not applicable

5.14 Total vs Dissolved Assessment

The samples were analyzed for both total and dissolved PCBs. The total PCB concentrations were greater than the dissolved PCB concentrations or the dissolved PCB concentrations were greater than the total PCB concentrations and the RPDs were ≤ 30%.

5.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were reported for DUP-2 and MW-68S due to dilutions analyzed. A screening criterion was listed in Table 2 of the QAPP for total PCBs; total PCBs were not reported in the laboratory report; however, the MDLs for the reported PCBs met the screening criteria listed in Table 2 of the QAPP.

5.16 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

6.0 PFAS

The samples were analyzed for PFAS per US EPA methods 3535/537 (modified). The following PFAS were reported:

Analyte	Acronym
6:2 Fluorotelomer Sulfonate	6:2 FTS
8:2 Fluorotelomer Sulfonate	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA

DRAFT

Analyte	Acronym
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	FOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

- ✓ Overall Assessment
- ✓ Holding Time
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verification
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Blank
- ✓ Field Duplicate
- ✓ Isotope Dilution Standards
- ✓ Internal Standards
- ✓ Target Compound Identifications
- ✓ Target Compound Quantitations

DRAFT

- ✓ Sensitivity
- ✓ Electronic Data Deliverable Review

6.1 Overall Assessment

The PFAS data reported in the SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for the SDG is 100%.

6.2 Holding Time

The laboratory-specified holding times for the PFAS analysis of water samples are 14 days from collection to extraction and 28 days from extraction to analysis. The holding times were met for the sample analyses.

6.3 Initial Calibration

Appropriate initial calibrations were performed for each analyte. The laboratory used average RRFs or linear curves to calculate the target compounds' concentrations. The %RSDs of the RRF were within the method and laboratory specified acceptance criteria and the correlation coefficients for the linear curves were greater than or equal to 0.99.

6.4 Initial Calibration Verification and Continuing Calibration Verification

The ICV and CCVs were performed at the required frequencies. The %Ds between the calculated concentrations in the initial calibration and the ICV and CCVs for the target analytes were within the method and laboratory specified acceptance criteria.

The laboratory noted the transition mass ratio for 8:2 FTS was outside of the established ratio limits for the CCV in batch 526594. Since the %D of 8:2 FTS in the CCV in batch 526594 was within the laboratory specified acceptance criteria and based on professional and technical judgment, no qualifications were applied to the data.

6.5 Initial and Continuing Calibration Blanks (ICBs and CCBs)

The ICB and CCB met the method specified acceptance criteria.

6.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One method blank was reported (batch 526555). PFAS were not detected in the method blank above the MDLs.

DRAFT

6.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were not reported.

6.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). One LCS/LCSD pair were reported. The recovery and RPD results were within the laboratory specified acceptance criteria.

6.9 Field Blank

One field blank was collected with the sample set; however, the field blank was not analyzed for PFAS per the COC.

6.10 Field Duplicate

Field duplicates were collected with the sample set; however, the field duplicates were not analyzed for PFAS per the COC.

6.11 Isotope Dilution Standards

The isotope dilution standard recoveries in the sample were within the laboratory specified acceptance criteria.

6.12 Internal Standards

The ISTD areas and retention times were within the method specified acceptance criteria.

6.13 Target Compound Identifications

The compound identifications were within the validation guidance.

6.14 Target Compound Quantitation

The compound quantitations were within the validation guidance.

6.15 Sensitivity

The sample was reported to the MDL. Elevated non-detect results were not reported. Screening criteria were not listed in the QAPP for PFAS.

DRAFT

6.16 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

7.0 TOTAL AND DISSOLVED METALS

The samples were analyzed for total and dissolved metals per US EPA methods 3005A/6010C. (Mercury was evaluated separately in Section 8.0, below).

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

✓ Overall Assessment
✓ Holding Times
⊗ Initial Calibration
✓ Initial and Continuing Calibration Verifications
⊗ Initial and Continuing Calibration Blank
✓ Method Blank
✓ Matrix Spike/Matrix Spike Duplicate
✓ Serial Dilution
✓ Laboratory Control Sample
✓ Internal Standard
✓ Field Blank
⊗ Field Duplicate
✓ Target Compound Quantitation
⊗ Total vs Dissolved Assessment
✓ Sensitivity
✓ Electronic Data Deliverables Review

7.1 Overall Assessment

The metals data reported in the SDG are considered to be usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for the SDG is 100%.

DRAFT

7.2 Holding Times

The holding time for the total metals analysis of water samples is 180 days from sample collection to analysis. The holding times for the dissolved metals analysis of water samples are 15 minutes from sample collected to filtration and 180 days from sample collection to analysis. The holding time was met for the sample analyses.

7.3 Initial Calibration

The method specified initial calibration requirements were met.

The interference check standards (ICSA and ICSAB) met the method specified acceptance criteria, with the following exceptions.

Arsenic, cobalt and nickel were detected in the ICSA in batch 372341 at estimated concentrations greater than the MDLs and less than the RLs. Since dissolved and total arsenic and nickel were not detected in the associated samples, no qualifications were applied to the dissolved and total arsenic and nickel data, based on professional and technical judgment. However, the dissolved and total cobalt concentrations in the associated samples less than ten times the ICSA concentration were J qualified as estimated.

The thallium result in the ICSA in batch 372341 was more negative than the MDL and less than the RL. Therefore, the non-detect results of dissolved and total thallium in the associated samples were UJ qualified as estimated less than the MDL.

Barium, lead, nickel and selenium were detected in the ICSA in batch 372676 at estimated concentrations greater than the MDLs and less than the RLs. Since dissolved and total lead and nickel were not detected in the associated samples, no qualifications were applied to the dissolved and total lead and nickel data, based on professional and technical judgment. However, the dissolved and total barium and selenium concentrations in the associated samples less than ten times the ICSA concentrations were J qualified as estimated.

The antimony and thallium results in the ICSA in batch 372676 were more negative than the MDLs and less than the RLs. Therefore, the non-detect results of dissolved and total antimony and thallium in the associated samples were UJ qualified as estimated less than the MDL and the estimated total antimony concentration was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-91I	Dissolved Cobalt	0.58	J	0.58	J	13
MW-91S	Dissolved Cobalt	0.65	J	0.65	J	13
MW-94I	Total Cobalt	0.73	J	0.73	J	13

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
FB 20210909	Total Thallium	3.3	U	3.3	UJ	13
MW-75I	Total Thallium	3.3	U	3.3	UJ	13
MW-75I	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-91I	Total Thallium	3.3	U	3.3	UJ	13
MW-91I	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-91S	Total Thallium	3.3	U	3.3	UJ	13
MW-91S	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-94I	Total Thallium	3.3	U	3.3	UJ	13
MW-94I	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-94S	Total Thallium	3.3	U	3.3	UJ	13
MW-94S	Dissolved Thallium	3.3	U	3.3	UJ	13
DUP-2	Total Antimony	3.4	U	3.4	UJ	13
DUP-2	Dissolved Antimony	3.4	U	3.4	UJ	13
DUP-4	Total Antimony	3.7	J	3.7	J	13
DUP-4	Dissolved Antimony	3.4	U	3.4	UJ	13
MW-68S	Total Antimony	3.4	U	3.4	UJ	13
MW-68S	Dissolved Antimony	3.4	U	3.4	UJ	13
MW-75S	Total Antimony	3.4	U	3.4	UJ	13
MW-75S	Dissolved Antimony	3.4	U	3.4	UJ	13
MW-84S	Total Antimony	3.4	U	3.4	UJ	13
MW-84S	Dissolved Antimony	3.4	U	3.4	UJ	13
MW-93I	Total Antimony	3.4	U	3.4	UJ	13
MW-93I	Dissolved Antimony	3.4	U	3.4	UJ	13
MW-93S	Total Antimony	3.4	U	3.4	UJ	13
MW-93S	Dissolved Antimony	3.4	U	3.4	UJ	13
DUP-2	Total Barium	170	J	170	J	13
DUP-2	Dissolved Barium	170	J	170	J	13
DUP-4	Total Barium	93	J	93	J	13
DUP-4	Dissolved Barium	94	J	94	J	13
MW-68S	Total Barium	170	J	170	J	13
MW-68S	Dissolved Barium	170	J	170	J	13
MW-75S	Total Barium	92	J	92	J	13
MW-75S	Dissolved Barium	91	J	91	J	13
MW-84S	Total Barium	100	J	100	J	13
MW-84S	Dissolved Barium	100	J	100	J	13
MW-93I	Total Barium	92	J	92	J	13
MW-93I	Dissolved Barium	93	J	93	J	13
MW-93S	Total Barium	72	J	72	J	13
MW-93S	Dissolved Barium	70	J	70	J	13
MW-84S	Dissolved Selenium	4.0	J	4.0	J	13
DUP-2	Total Thallium	3.3	U	3.3	UJ	13
DUP-2	Dissolved Thallium	3.3	U	3.3	UJ	13

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
DUP-4	Total Thallium	3.3	U	3.3	UJ	13
DUP-4	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-68S	Total Thallium	3.3	U	3.3	UJ	13
MW-68S	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-75S	Total Thallium	3.3	U	3.3	UJ	13
MW-75S	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-84S	Total Thallium	3.3	U	3.3	UJ	13
MW-84S	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-93I	Total Thallium	3.3	U	3.3	UJ	13
MW-93I	Dissolved Thallium	3.3	U	3.3	UJ	13
MW-93S	Total Thallium	3.3	U	3.3	UJ	13
MW-93S	Dissolved Thallium	3.3	U	3.3	UJ	13

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-laboratory flag indicating not detected at or above the MDL

7.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance criteria.

7.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria, with the following exceptions.

Magnesium, sodium and vanadium were detected at estimated concentrations greater than the MDLs and less than the RLs in the bracketing CCBs in batch 372676. Since dissolved and total magnesium and sodium were detected above the RLs in the associated samples, no qualifications were applied to the dissolved and total magnesium and sodium data. However, the estimated concentration of dissolved vanadium in the associated sample was U qualified as not detected at the RL.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-75S	Dissolved Vanadium	4.2	J	50	U	3

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL

DRAFT

7.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks (batches 372114, 372252 and 372253) were reported. Metals were not detected in the method blanks above the MDLs.

7.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported for dissolved and total metals using sample MW-84S. The recovery and RPD results were within the QAPP specified acceptance criteria.

For metals concentrations greater than four times the spiked concentration no qualifications were applied based on the MS/MSD recovery results.

7.8 Serial Dilution

Two sample set specific serial dilutions were reported for dissolved and total metals using samples MW-84S. The %D results were within the method specified acceptance criteria.

7.9 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

7.10 Internal Standard

The internal standard responses were within the laboratory specified acceptance criteria.

7.11 Field Blank

One field blank was collected with the sample set, FB 20210909. Metals were not detected in the field blank above the MDLs.

7.12 Field Duplicate

Two field duplicates were collected with the sample set, DUP-2 and DUP-4. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-68S and MW-93I, respectively, with the following exceptions.

DRAFT

Dissolved cobalt was detected in MW-68S at an estimated concentration greater than the MDL and less than the RL and was not detected in DUP-2, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment the dissolved cobalt concentration in MW-68S was J qualified as estimated and the non-detect result of dissolved cobalt in DUP-2 was UJ qualified as estimated less than the MDL

Total antimony was not detected in MW-93I and was detected in DUP-4 at an estimated concentration greater than the MDL and less than the RL, resulting in a noncalculable RPD. Therefore, based on professional and technical judgment the non-detect result of total antimony in MW-68S was UJ qualified as estimated less than the MDL and the total antimony concentration in DUP-4 was J qualified as estimated.

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-68S	Dissolved Cobalt	0.56	J	NC	0.56	J	7
DUP-2	Dissolved Cobalt	0.55	U		0.55	UJ	7
MW-93I	Total Antimony	3.4	U	NC	3.4	UJ	7
DUP-4	Total Antimony	3.7	J		3.7	J	7

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NC-not calculable

7.13 Target Compound Quantitation

The compound quantitations were within the validation criteria.

7.14 Total vs Dissolved Assessment

The samples were analyzed for both total and dissolved metals. The total metals concentrations were greater than the dissolved metal concentrations or the dissolved metal concentrations were greater than the total metal concentrations and the RPDs were ≤ 30%, with the following exceptions.

For samples with both a dissolved metals concentration and a non-detect total metals result, based on professional and technical judgment the dissolved metal concentration was J qualified as estimated and the non-detect total metals result was UJ qualified as estimated less than the MDL, with the following exception.

Since the dissolved vanadium concentration in MW-75 was U qualified due to CCB contamination and based on professional and technical judgment, no additional qualifications were applied to the data.

DRAFT

Sample	Analyte	Laboratory Result (µg/L)	Laboratory Flag	RPD	Validation Result (µg/L)	Validation Qualifier	Reason Code
MW-68S	Dissolved Cobalt	0.56	J	NC	0.56	J	13
MW-68S	Total Cobalt	0.55	U		0.55	UJ	13
MW-91I	Dissolved Cobalt	0.58	J	NC	0.58	J	13
MW-91I	Total Cobalt	0.55	U		0.55	UJ	13
MW-91S	Dissolved Cobalt	0.65	J	NC	0.65	J	13
MW-91S	Total Cobalt	0.55	U		0.55	UJ	13
MW-84S	Dissolved Selenium	4.0	J	NC	4.0	J	13
MW-84S	Total Selenium	3.6	U		3.6	UJ	13
MW-75S	Dissolved Vanadium	4.2	J	NC*	NA	NA	NA
MW-75S	Total Vanadium	3.7	U		NA	NA	NA

µg/L-micrograms per liter
J-estimated concentration greater than the MDL and less than the RL
U-not detected at or above the MDL
NC-not calculable

7.15 Sensitivity

The samples were reported to the MDLs. Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 2 of the QAPP.

7.16 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

8.0 TOTAL AND DISSOLVED MERCURY

The samples were analyzed for total and dissolved mercury per US EPA methods 7470A.

The areas of data review are listed below. A leading check mark (✓) indicates an area of review in which the data were acceptable or not applicable. A preceding crossed circle (⊗) signifies areas where issues were raised during the course of the validation review and should be considered to determine any impact on data quality and usability.

DRAFT

- ✓ Overall Assessment
- ✓ Holding Times
- ✓ Initial Calibration
- ✓ Initial and Continuing Calibration Verifications
- ✓ Initial and Continuing Calibration Blank
- ✓ Method Blank
- ✓ Matrix Spike/Matrix Spike Duplicate
- ✓ Laboratory Control Sample
- ✓ Field Blank
- ✓ Field Duplicate
- ✓ Target Compound Quantitation
- ✓ Total vs Dissolved Assessment
- ✓ Sensitivity
- ✓ Electronic Data Deliverables Review

8.1 Overall Assessment

The mercury data reported in the SDG are considered usable for supporting project objectives. The results are considered valid; the analytical completeness, defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on the sample submitted for this analysis, for the SDG is 100%.

8.2 Holding Times

The holding times for the dissolved mercury analysis of water samples are 15 minutes from sample collected to filtration and 28 days from sample collection to analysis. The holding time was met for the sample analyses.

8.3 Initial Calibration

The method specified initial calibration requirements were met.

8.4 Initial and Continuing Calibration Verifications

The percent recoveries in the ICVs and CCVs were within the method specified acceptance limits.

8.5 Initial and Continuing Calibration Blanks

The ICBs and CCBs met the method specified acceptance criteria.

DRAFT

8.6 Method Blank

Method blanks were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Three method blanks (batches 371900, 371903 and 366722) were reported. Mercury was not detected in the method blanks above the MDL.

8.7 Matrix Spike/Matrix Spike Duplicate

MS/MSD pairs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two sample set specific MS/MSD pairs were reported for dissolved and total metals using sample MW-84S.

8.8 Laboratory Control Sample

LCSs were analyzed at the proper frequency for the number and types of samples analyzed (one per batch of 20 samples). Two LCSs were reported. The recovery results were within the QAPP specified acceptance criteria.

8.9 Field Blank

One field blank was collected with the sample set, FB 20210909. Mercury was not detected in the field blank above the MDL.

8.10 Field Duplicate

Two field duplicates were collected with the sample set, DUP-2 and DUP-4. Acceptable precision (RPD <30% for results greater than five times the RL) was demonstrated between the field duplicates and the original samples MW-68S and MW-93I, respectively.

8.11 Target Compound Quantitation

The compound quantitations were within the validation criteria.

8.12 Total vs Dissolved Assessment

The samples were analyzed for both total and dissolved mercury. The total mercury concentrations were greater than the dissolved mercury concentrations or the dissolved mercury concentrations were greater than the total mercury concentrations and the RPDs were ≤ 30%.

8.13 Sensitivity

The samples were reported to the MDL. Elevated non-detect results were not reported. The MDL met the screening criteria listed in Table 2 of the QAPP.

DRAFT

8.14 Electronic Data Deliverable Review

Results and sample IDs in the EDD were reviewed against the information provided by the associated level IV report at a minimum of 20%. No discrepancies were identified between the level IV report and the EDD.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for, but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result".

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside of limits
5	LCS recovery outside of limits
6	Surrogate recovery outside of limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed or modified: no validation qualification required
NV	Not validated

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	12 December 2025
To:	Aron Krasnopoler
	Dave Towsey
From:	Matthew Richardson
CC:	Kristoffer Henderson
Subject:	Eurofins Pittsburgh Laboratory Job ID 180-197473-1 Revision 2, Stage 2A Data Validation

---

Twelve soil samples were submitted to Eurofins Pittsburgh for analysis. The samples were collected on 21 October 2025 at the Former Sperry Remington site located in Elmira, New York. Eurofins Pittsburgh analyzed the samples for the following analyses:

- Semivolatile Organic Compounds (SVOCs) by United States (US) Environmental Protection Agency (EPA) Methods 3541/8270E
- Polychlorinated Biphenyls (PCBs) by US EPA Methods 3541/8082A
- Solids by Standard Method (SM) 2540G

Eurofins Lancaster analyzed the samples for the following analyses:

- Volatile Organic Compounds (VOCs) by US EPA Methods 5035/8260D
- Metals by US EPA Methods 3050B/6010D
- Mercury by US EPA Method 7471B
- Per- and Polyfluoroalkyl Substances (PFAS) by US EPA Method 1633

The data were validated at a US EPA Stage 2A data validation level, based on the pertinent methods referenced by the data package, as well as professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010

DRAFT

- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 771 South Main Street, City of Elmira, Chemung County, New York, September 2018; updated May 2024 (Agency Review Draft).

The following samples were validated at a Stage 2A level:

Laboratory ID	Client ID
180-197473-1	SSHS-B5639-0-0.17
180-197473-2	SSHS-B5639-0.17-1
180-197473-3	SSHS-B5639-1-1.17
180-197473-4	SSHS-B5640-0-0.17
180-197473-5	SSHS-B5640-0.17-1
180-197473-6	SSHS-B5640-1-1.25

Laboratory ID	Client ID
180-197473-7	SSHS-B5641-0-0.17
180-197473-8	SSHS-B5641-0.17-1
180-197473-9	SSHS-B5641-1-1.25
180-197473-10	SSHS-B5642-0-0.17
180-197473-11	SSHS-B5642-0.17-1
180-197473-12	SSHS-B5642-1-1.33

The samples were received at the laboratory within the criteria of 0-6.0ºC. No sample preservation issues were noted by the laboratory.

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and based on the information provided, the data as qualified are usable for supporting project objectives. The qualified data should be used within the limitations of the qualifications.

The samples were prepared and analyzed within the method specified holding times.

The solids data, used to report the samples on a dry weight basis, was verified to be analyzed within holding time.

The laboratory report was revised twice. The first revision was provided on 24 November 2025 to update sample IDs per client request. The second revision was provided on 15 December 2025 to remove unnecessary laboratory narrative statement. The revised laboratory report was identified as 180-197473-1 Revision 2.

The samples were reported to the method detection limits (MDLs). Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP/FSP.

Results and sample IDs in the electronic data deliverable (EDD) were reviewed against the information provided by the associated level II report at a minimum of 20%. It was noted that the sample IDs in the EDD included the date of collection in the suffix; this suffix was not listed on the COC. No other discrepancies were identified between the level II report and the EDD.

DRAFT

The results for the laboratory and field QC samples; which include method blanks, the trip blank, laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) pairs, matrix spike/matrix spike duplicate (MS/MSD) pairs, field duplicates, laboratory duplicates, and surrogates; were validated using automation. The data quality exceedances were qualified using automation and in accordance with Table 1 in the project QAPP/FSP. See automated verification log for details on the data quality exceedances. The automation was verified by the data validator in development and inspected periodically for functionality during the data validation. The automated validation qualifiers were reviewed by the data validator. The QC issues listed below were not validated using automation.

1.0 VOLATILE ORGANIC COMPOUNDS

The following continuing calibration verification (CCV) issues were noted in the laboratory narrative:

- The percent differences (%Ds) of 1,2,3-trichlorobenzene (-23.0%), 1,2-dibromo-3-chloropropane (-23.0%), 4-methyl-2-pentanone (-21.0%), bromoform (-21.0%) and methyl tert-butyl ether (-27.0%) in the CCV standard in batch 718664 were outside of the laboratory specified acceptance criteria with low bias. Therefore, the non-detect results of 1,2,3-trichlorobenzene, 1,2-dibromo-3-chloropropane, 4-methyl-2-pentanone, bromoform and methyl tert-butyl ether in the associated samples were UJ qualified as estimated less than the MDLs.

The VOC data were qualified using automated validation and manually reviewed by the data validator. See verification log for more details.

2.0 SEMIVOLATILE ORGANIC COMPOUNDS

The laboratory narrative indicated there was a surrogate recovery exceedance in sample SSHS-B5639-0-0.17 and its MSD. Upon review of the data, the surrogate recoveries were reported as within the laboratory specified acceptance criteria. Based on professional and technical judgment, no qualifications were applied to the data.

3.0 POLYCHLORINATED BIPHENYLS

The PCBs data were qualified using automated validation and manually reviewed by the data validator. See verification log for more details.

Multiple PCBs that share peaks were detected in the samples; therefore, there is contribution between PCBs when more than one PCB is detected in a sample. These PCBs were J qualified as estimated, based on professional and technical judgment.

DRAFT

The PCB-1248 concentration in sample SSHS-B5639-0-0.17 was flagged with "p", indicating that the relative percent difference (RPD) between the primary and confirmation gas chromatography (GC) columns were greater than 40%, and the lower values were reported. Therefore, based on professional and technical judgment, the PCB-1248 concentration in sample SSHS-B5639-0-0.17 was J qualified as estimated.

4.0 METALS

The metals data were qualified using automated validation and manually reviewed by the data validator. See verification log for more details.

The rejected non-detected antimony result in sample SSHS-B5640-1-1.25 was rejected during the automated validation due to less than 30% MS/MSD recoveries. However, since the post digestion spike recovery of antimony was acceptable, the non-detected antimony result in sample SSHS-B5640-1-1.25 was UJ qualified as estimated less than the MDL by the data validator.

The RPDs for barium, calcium, lead, and magnesium in the laboratory duplicate using sample SSHS-B5640-1-1.25 were high and outside of the laboratory specified acceptance criteria. Therefore, the concentrations of barium, calcium, lead, and magnesium in sample SSHS-B5640-1-1.25 were J qualified as estimated.

The RPD for sodium in the laboratory duplicate using sample SSHS-B5640-1-1.25 was high and outside of the laboratory specified acceptance criteria. Since the absolute difference between the results was less than the reporting limit (RL), no qualifications were applied to the data.

5.0 MERCURY

The mercury data were qualified using automated validation and manually reviewed by the data validator. See verification log for more details.

6.0 PFAS

The samples were analyzed for PFAS per US EPA Method 1633. The following PFAS compounds were reported:

Analyte	Acronym
1H,1H,2H,2H-Perfluorohexane sulfonic acid	4:2 FTS
1H,1H,2H,2H-Perfluorooctane sulfonic acid	6:2 FTS
1H,1H,2H,2H-Perfluorodecane sulfonic acid	8:2 FTS
N-ethylperfluorooctanesulfonamidoacetic acid	NEtFOSAA

DRAFT

Analyte	Acronym
N-methylperfluorooctanesulfonamidoacetic acid	NMeFOSAA
Perfluorobutanesulfonic acid	PFBS
Perfluorobutanoic acid	PFBA
Perfluorodecanesulfonic acid	PFDS
Perfluorodecanoic acid	PFDA
Perfluorododecanoic acid	PFDoA
Perfluoroheptanesulfonic Acid	PFHpS
Perfluoroheptanoic acid	PFHpA
Perfluorohexanesulfonic acid	PFHxS
Perfluorohexanoic acid	PFHxA
Perfluorononanoic acid	PFNA
Perfluorooctanesulfonamide	PFOSA
Perfluorooctanesulfonic acid	PFOS
Perfluorooctanoic acid	PFOA
Perfluoropentanoic acid	PFPeA
Perfluorotetradecanoic acid	PFTeA
Perfluorotridecanoic acid	PFTriA
Perfluoroundecanoic acid	PFUnA
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA
Perfluoro-3-methoxypropanoic acid	PFMPA
Perfluoro-4-methoxybutanoic acid	PFMBA
Perfluorododecanesulfonic acid	PFDoS
Perfluorononanesulfonic acid	PFNS
Perfluoropentanesulfonic acid	PFPeS
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS
3-Perfluoropentylpropanoic acid	5:3FTCA
3-Perfluoroheptyl propanoic acid	7:3FTCA
3-Perfluoropropyl propanoic acid	3:3FTCA
4,8-Dioxa-3H-perfluorononanoic acid	ADONA
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	9Cl-PF3ONS
Hexafluoropropylene oxide dimer acid	HFPO-DA
N-ethyl perfluorooctanesulfonamide	NEtFOSA

DRAFT

Analyte	Acronym
N-ethyl perfluorooctanesulfonamidoethanol	NEtFOSE
N-methylperfluorooctane sulfonamidoethanol	NMeFOSE
N-methyl perfluorooctanesulfonamide	NMeFOSA
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA

The recovery of isotope dilution standard $^{13}C_3$-HFPO-DA in the LCS in batch 718837 was high and outside of the laboratory specified acceptance criteria. Since the recovery of the associated target analytes, HFPO-DA, was acceptable, no qualifications were applied to the data.

The laboratory narrative indicated that the analyte PFNA was marked as non-detect for sample SSHS-B5641-1-1.25 due to a detection below RL and failing ion ratio. Based on professional and technical judgment, no qualifications were applied to the data.

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Extraction or analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits or RPD outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date: 23 January 2026

To: Aron Krasnopoler

Dave Towsey

From: Matthew Richardson

CC: Kristoffer Henderson

Subject: Eurofins Pittsburgh Laboratory Job ID 180-193078-1, Stage 2A Data Validation

---

Two water samples and one trip blank were submitted to Eurofins Pittsburgh for analysis. The samples were collected on 11 July 2025 at the Former Sperry Remington site located in Elmira, New York. Eurofins Lancaster analyzed the samples for the following analysis:

- Volatile Organic Compounds (VOCs) by United States (US) Environmental Protection Agency (EPA) Methods 5030C/8260D

The data were validated at a US EPA Stage 2A data validation level, based on the pertinent methods referenced by the data package, as well as professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 771 South Main Street, City of Elmira, Chemung County, New York, September 2018; updated May 2024 (Agency Review Draft).

The following samples were validated at a Stage 2A level:

Laboratory ID	Client ID
180-193078-1	SSHS-MW-107I-07102025
180-193078-2	SSHS-MW-107S-07102025

Laboratory ID	Client ID
180-193078-3	SSHS-TripBlank-07102025

The samples were received at the laboratory within the criteria of 0-6.0ºC. No sample preservation issues were noted by the laboratory.

DRAFT

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and based on the information provided, the data are usable for supporting project objectives.

The samples were prepared and analyzed within the method specified holding times.

The samples were reported to the method detection limits (MDLs). Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP/FSP.

Results and sample IDs in the electronic data deliverable (EDD) were reviewed against the information provided by the associated level II report at a minimum of 20%. It was noted that the sample IDs in the EDD included the date of collection in the suffix; this suffix was not listed on the COC. No other discrepancies were identified between the level II report and the EDD.

The results for the laboratory and field QC samples; which include method blanks, the trip blank, laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) pairs, matrix spike/matrix spike duplicate (MS/MSD) pairs, field duplicates, laboratory duplicates, and surrogates; were validated using automation. The data quality exceedances were qualified using automation and in accordance with Table 1 in the project QAPP/FSP. See automated verification log for details on the data quality exceedances. The automation was verified by the data validator in development and inspected periodically for functionality during the data validation. The automated validation qualifiers were reviewed by the data validator. The QC issues listed below were not validated using automation.

1.0 VOLATILE ORGANIC COMPOUNDS

No qualifications were applied to the VOCs data.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Extraction or analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits or RPD outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date: 23 January 2026

To: Aron Krasnopoler

Dave Towsey

From: Matthew Richardson

CC: Kristoffer Henderson

Subject: Eurofins Pittsburgh Laboratory Job ID 180-193128-1, Stage 2A Data Validation

---

DRAFT

Two water samples, one field duplicate and one trip blank were submitted to Eurofins Pittsburgh for analysis. The samples were collected on 11 and 14 July 2025 at the Former Sperry Remington site located in Elmira, New York. Eurofins Pittsburgh analyzed the samples for the following analysis:

- Polychlorinated Biphenyls (PCBs) by United States (US) Environmental Protection Agency (EPA) Methods 3510C/8082A

Eurofins Lancaster analyzed the samples for the following analysis:

- Volatile Organic Compounds (VOCs) by US EPA Methods 5030C/8260D

The data were validated at a US EPA Stage 2A data validation level, based on the pertinent methods referenced by the data package, as well as professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 771 South Main Street, City of Elmira, Chemung County, New York, September 2018; updated May 2024 (Agency Review Draft).

The following samples were validated at a Stage 2A level:

Laboratory ID	Client ID
180-193128-1	SSHS-MW-108-07112025
180-193128-2	SSHS-MW-11I-07142025

Laboratory ID	Client ID
180-193128-3	SSHS-DUP-01-07112025
180-193128-4	SSHS-TRIPBLANK-07142025

The samples were received at the laboratory within the criteria of 0-6.0ºC. No sample preservation issues were noted by the laboratory.

The laboratory narrative indicated the sample container for sample SSHS-MW-108I-07112025 did not match the chain of custody (COC). The sample was logged by the laboratory as it appears on the COC, SSHS-MW-108-07112025.

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and based on the information provided, the data are usable for supporting project objectives.

The samples were prepared and analyzed within the method specified holding times.

The samples were reported to the method detection limits (MDLs). Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP/FSP.

Results and sample IDs in the electronic data deliverable (EDD) were reviewed against the information provided by the associated level II report at a minimum of 20%. It was noted that the sample IDs in the EDD included the date of collection in the suffix; this suffix was not listed on the COC. No other discrepancies were identified between the level II report and the EDD.

The results for the laboratory and field QC samples; which include method blanks, the trip blank, laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) pairs, matrix spike/matrix spike duplicate (MS/MSD) pairs, field duplicates, laboratory duplicates, and surrogates; were validated using automation. The data quality exceedances were qualified using automation and in accordance with Table 1 in the project QAPP/FSP. See automated verification log for details on the data quality exceedances. The automation was verified by the data validator in development and inspected periodically for functionality during the data validation. The automated validation qualifiers were reviewed by the data validator. The QC issues listed below were not validated using automation.

DRAFT

1.0 VOLATILE ORGANIC COMPOUNDS

No qualifications were applied to the VOCs data.

2.0 POLYCHLORINATED BIPHENYLS

No qualifications were applied to the PCBs data.

---

* * * * *

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Extraction or analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits or RPD outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT

Geosyntec consultants

180A Market Place Boulevard
Knoxville, TN 37922
PH 865.330.0037
www.geosyntec.com

Memorandum

Date:	23 January 2026
To:	Aron Krasnopoler
	Dave Towsey
From:	Matthew Richardson
CC:	Kristoffer Henderson
Subject:	Eurofins Pittsburgh Laboratory Job ID 180-198541-1, Stage 2A Data Validation

---

Four water samples, one field duplicate and one trip blank were submitted to Eurofins Pittsburgh for analysis. The samples were collected on 13 November 2025 at the Former Sperry Remington site located in Elmira, New York. Eurofins Pittsburgh analyzed the samples for the following analysis:

- Polychlorinated Biphenyls (PCBs) by United States (US) Environmental Protection Agency (EPA) Methods 3510C/8082A

Eurofins Lancaster analyzed the samples for the following analysis:

- Volatile Organic Compounds (VOCs) by US EPA Methods 5030C/8260D

The data were validated at a US EPA Stage 2A data validation level, based on the pertinent methods referenced by the data package, as well as professional and technical judgment and the following documents:

- US EPA National Functional Guidelines for Organic Superfund Methods Data Review, November 2020 (EPA 540-R-20-005)
- US EPA National Functional Guidelines for Inorganic Superfund Methods Data Review, November 2020 (EPA 540-R-20-006)
- New York State Department of Environmental Conservation DEC Program Policy, DER-10/ Technical Guidance for Site Investigation and Remediation, May 3, 2010
- Quality Assurance Project Plan/Field Sampling Plan (QAPP/FSP), Former Sperry Remington Site – North Portion, 771 South Main Street, City of Elmira, Chemung County, New York, September 2018; updated May 2024 (Agency Review Draft).

The following samples were validated at a Stage 2A level:

DRAFT

Laboratory ID	Client ID
180-198541-1	SSHS-MW-107I-11132025
180-198541-2	SSHS-MW-107S-11132025
180-198541-3	SSHS-MW-108-11132025

Laboratory ID	Client ID
180-198541-4	SSHS-MW-11I-11132025
180-198541-5	SSHS-DUP-01-11132025
180-198541-6	SSHS-TRIPBLANK-11132025

The samples were received at the laboratory within the criteria of 0-6.0ºC. No sample preservation issues were noted by the laboratory.

Overall, based on this Stage 2A data validation covering the quality control (QC) parameters listed below and based on the information provided, the data are usable for supporting project objectives.

The samples were prepared and analyzed within the method specified holding times.

The samples were reported to the method detection limits (MDLs). Elevated non-detect results were not reported. The MDLs met the screening criteria listed in Table 1 of the QAPP/FSP.

Results and sample IDs in the electronic data deliverable (EDD) were reviewed against the information provided by the associated level II report at a minimum of 20%. It was noted that the sample IDs in the EDD included the date of collection in the suffix; this suffix was not listed on the COC. No other discrepancies were identified between the level II report and the EDD.

The results for the laboratory and field QC samples; which include method blanks, the trip blank, laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) pairs, matrix spike/matrix spike duplicate (MS/MSD) pairs, field duplicates, laboratory duplicates, and surrogates; were validated using automation. The data quality exceedances were qualified using automation and in accordance with Table 1 in the project QAPP/FSP. See automated verification log for details on the data quality exceedances. The automation was verified by the data validator in development and inspected periodically for functionality during the data validation. The automated validation qualifiers were reviewed by the data validator. The QC issues listed below were not validated using automation.

1.0 VOLATILE ORGANIC COMPOUNDS

The following continuing calibration verification (CCV) issues were noted in the laboratory narrative:

- The percent differences (%Ds) of 1,1,2,2-tetrachloroethane, 1,2-dibromo-3-chloropropane, 2-butanone, 2-hexanone, methyl acetate and trans-1,3-dichloropropene in the CCV standard in batch 734966 were outside of the laboratory specified acceptance criteria with low bias. Therefore, the non-detect results of 1,1,2,2-tetrachloroethane, 1,2-dibromo-3-

DRAFT

chloropropane, 2-butanone, 2-hexanone, methyl acetate and trans-1,3-dichloropropene in the associated samples were UJ qualified as estimated less than the MDLs.

- The %Ds of 1,4-dioxane and dichlorodifluoromethane in the CCV standard in batch 734966 were outside of the laboratory specified acceptance criteria with high bias. Therefore, the non-detect results of 1,4-dioxane and dichlorodifluoromethane in the associated samples were UJ qualified as estimated less than the MDLs.

The VOC data were qualified using automated validation and manually reviewed by the data validator. See verification log for more details.

2.0 POLYCHLORINATED BIPHENYLS

The PCBs data were qualified using automated validation and manually reviewed by the data validator. See verification log for more details.

---

* * * * *

DRAFT

ATTACHMENT 1
DATA VALIDATION QUALIFIER DEFINITIONS AND INTERPRETATION KEY
Assigned by Geosyntec's Data Validation Team

DATA QUALIFIER DEFINITIONS

U The analyte was analyzed for but was not detected above the reported sample quantitation limit. Upon application of the U qualifier to a reported result, the definition changes to "not detected at or above the reported result."

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The analyte was positively identified; however, the associated numerical value is likely to be higher than the concentration of the analyte in the sample due to positive bias of associated QC or calibration data or attributable to matrix interference.

J- The analyte was positively identified; however, the associated numerical value is likely to be lower than the concentration of the analyte in the sample due to negative bias of associated QC or calibration data or attributable to matrix interference.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

DRAFT

ATTACHMENT 2
DATA VALIDATION REASON CODES
Assigned by Geosyntec's Data Validation Team

Valid Value	Description
1	Preservation requirement not met
2	Extraction or analysis holding time exceeded
3	Blank contamination (i.e., method, trip, equipment, etc.)
4	Matrix spike/matrix spike duplicate recovery or RPD outside limits
5	LCS recovery outside limits or RPD outside limits (LCS/LCSD)
6	Surrogate recovery outside limits
7	Field Duplicate RPD exceeded
8	Serial dilution percent difference exceeded
9	Calibration criteria not met
10	Linear range exceeded
11	Internal standard criteria not met
12	Lab duplicates RPD exceeded
13	Other
14	Lab flag removed: no validation qualification required

LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample duplicate
RPD - Relative percent difference

DRAFT