455 Phillip Street, Unit 100A
Waterloo, Ontario N2L 3X2
Canada
www.ghd.com

GHD Reference No: 006883

October 09, 2023

Mr. Aiden Conway
Emergency Remedial Response Division
United States Environmental Protection Agency Region II
290 Broadway, 20th Floor
New York, New York 10007-1866

2nd Quarterly Monitoring Event Results – Trial/Partial Biosparge System Shutdown
Hooker Chemical/Ruco Polymer Corporation Site
Index No. II CERCLA-02-2001-2018

Dear Mr. Conway

This submittal provides the monitoring results for the second quarterly monitoring event pursuant to the Trial/Partial Biosparge System Shutdown Work Plan dated May 27, 2022 (Work Plan) for the Hooker/Ruco Site in Hicksville, New York, on behalf of Glenn Springs Holdings, Inc. (GSH). The United States Environmental Protection Agency (USEPA) approved the Work Plan on August 18, 2022

The trial shutdown commenced on January 25, 2023. Injection wells IW-3 and IW-4, associated with the north injection well fence, and injection wells IW-16 and IW-17, associated with the middle injection well fence, were shut down. The location of the injection well fences are shown on Figure 1.

Quarterly groundwater sampling for vinyl chloride monomer (VCM), trichloroethylene (TCE), and tetrachloroethylene (PCE) is occurring in each of the following monitoring wells during the trial/partial shutdown; MW-61(D2), MW-70(D1 and D2), MW-72(D1 and D2), MW-76 (D1, and D2), MW-81 (D1 and D2), MW-83(D2), MW-75(D1), and MW-87(D2). The locations of the monitored wells are presented on Figure 1.

The first quarterly event since shutdown commenced occurred as part of the first 2023 semi-annual monitoring event. Results were presented in the Semi-annual Report – 1st Half 2023 (January through July), dated July 14, 2023 (Semi-annual Report).

The second quarterly event occurred on August 8, 2023. Results are presented in Table 1, as well as results from the first quarterly event and the two most recent events pre-shutdown. A Quality Assurance/Quality Control (QA/QC) review of the August 2023 results is provided in Attachment A. The electronic deliverables were provided electronically to the USEPA on October 9, 2023. The results are discussed below.

North Injection Well Fence

A summary of VCM concentrations for monitoring wells proximate to the north injection well fence is illustrated in the table below.

Monitoring Well VCM Concentrations (µg/L) Proximate to North Injection Well Fence				
Well	Pre-Shutdown		Post Shutdown	
	April 2022	October 2022	April 2023	August 2023
MW-75D1	ND	5.5	ND	ND
MW-72D1	ND	ND	2.1	3.1
MW-72D2	ND	ND	ND	ND
MW-70D1	7.1J	ND	1.2	2.9
MW-70D2	ND	ND	ND	ND
MW-76D1	25	16	12	9.6
MW-76D2	ND	ND	ND	ND

As shown in the table:

– VCM was not detected in MW-75D1, MW-70D2, MW-76D2, and MW-76D2 in the two post-shutdown sampling events
– VCM concentrations in MW-76D1 continue to decrease (25 µg/L to 9.6 µg/L)
– VCM increased in MW-72D1 from non-detect pre-shutdown to 2.1 µg/L in April 2023 and 3.1 µg/L in August 2023
– VCM concentrations in MW-70D1 post-shutdown were 1.2 µg/L in April 2023 and 2.9 µg/L in August 2023

South Injection Well Fence

Monitoring wells associated with the trial shut down monitoring for the south injection well fence are MW-61(D2), MW-81(D1 and D2), MW-83(D2), and MW-87(D2). As shown in the summary table below, VCM was not detected (1 µg/L) in any of these wells in the first two quarterly monitoring events.

Monitoring Well VCM Concentrations (µg/L) Proximate to South Injection Well Fence				
Well	Pre-Shutdown		Post-Shutdown	
	April 2022	October 2022	April 2023	August 2023
MW-87D2	ND	ND	ND	ND
MW-83D2	ND	ND	ND	ND
MW-61D2	ND	ND	ND	ND
MW-81D1	ND	ND	ND	ND
MW-81D2	ND	ND	ND	ND

Dissolved Oxygen Monitoring

Collection of monthly dissolved oxygen (DO) readings was included in the Work Plan. A round of measurements were collected prior to the trial shutdown and monthly thereafter through June 2023 (except during April when the groundwater sampling event occurred). The instrument used was a RDO Pro-X Optical DO Probe from In-Situ. The results of this monitoring were presented in the Semi-annual Report as well as a

summary of difficulties that occurred in obtaining DO readings. Based on these difficulties and the relative consistency in DO results between monthly events over the first six months, it was recommended that the Work Plan scope be revised to cease monthly DO monitoring with the probe and replace it with DO measurement during the quarterly event using the same procedures as currently used for the semi-annual monitoring events, which includes measurement of DO from water retrieved from the screened interval of the well via a super sleeve using a multimeter.

Per a letter dated July 14, 2023, USEPA conditionally approved the above change provided that all efforts to deploy the probe had been made. The efforts made were discussed during a virtual meeting with USEPA on September 18, 2023, which resulted in USEPA's approval of this change.

DO concentrations for this quarter as well as results from the first quarterly event and the two most recent events pre-shutdown are presented in Table 1. As shown in Table 1, the DO concentrations are generally stable and for the first two post-shutdown events, all exceeded the target concentration of 2 milligrams/liter (mg/L)[1] with the exception of MW-70D1 (1.82 mg/L in August 2023).

Recommendations

As stated in the Work Plan, rebound for the purpose of the trial shutdown is defined as follows:

– The VCM concentration does not increase above 2 µg/L for two consecutive events at wells MW-61, MW-70, MW-72, MW-76D2, MW-81, and MW-83
– The VCM concentration does not increase in well MW-76D1

Based on the April and August 2023 data, some rebound may be occurring MW-72D1; however, concentrations are low and within the typical range of fluctuation observed at the monitoring wells over time. The detection of VCM marginally above 2 µg/L in MW-70D1 in August 2023 is not indicative of rebound as defined in the Work Plan. Further monitoring will assist in determining VCM concentration trends on these wells.

Based on the post-shutdown monitoring results collected to date, the following is recommended:

– continue monitoring and sampling per the Work Plan
– no change to the trial shutdown scope of work is required at this time

The results and recommendations presented herein were discussed with USEPA during the September 18, 2023 virtual meeting. USEPA concurred with the above recommendations. Further, USEPA also agreed to change the submittal of the Trial Shutdown Evaluation Report from 60 days after completion of the fourth quarterly sampling event to 60 days after completion of the sixth (and last per the Work Plan) quarterly sampling event.

The next (third) quarterly sampling event is scheduled for October 2023 in conjunction with the second semi-annual sampling event.

[1] Target DO concentration per the "100% Final Design Report, Off-Site Groundwater Biosparge Phase I Treatment System", May 2005, where DO concentration is sufficient for VCM to biodegrade.

Should you have any questions on the above, please do not hesitate to contact the undersigned at 519-340-4313 or email john.pentilchuk@GHD.com.

Regards

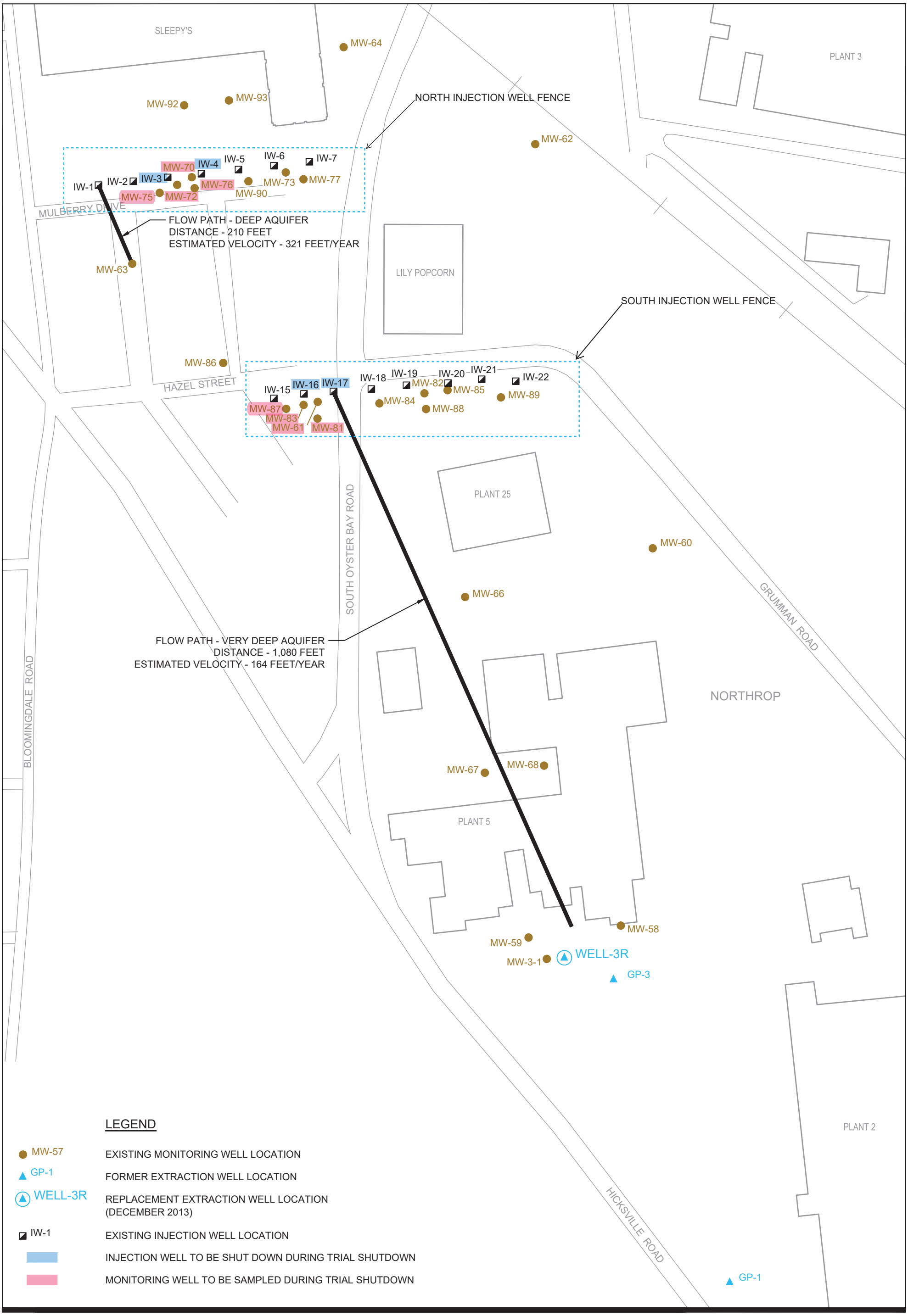
John Pentilchuk
Project Director

+1 519 340-4313
john.pentilchuk@ghd.com

JS/kf/12

Encl.

c: M. Wieder (USEPA)
S. Scharf (NYSDEC)
R. Ockerby (NYSDOH)
J. Watts-Gravette (US Navy)
E. Hannon (Northrop Grumman)
T. Troutman (Covestro)
T. Kelly (Nassau County)
P. Bluestein (GSH)



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Coordinate System:
NAD83 NEW YORK STATE PLANES,
LONG ISLAND, US FOOT

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HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

INJECTION AND MONITORING WELL LOCATIONS

Project No. **6883**
Date **May 2022**

FIGURE 1

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Table 1

Analytical Results
Trial/Partial Biosparge System Shutdown
Hooker Ruco Site
Hicksville, New York

Well	Date Sampled	PCE (µg/L)	TCE (µg/L)	VCM (µg/L)	DO [(1)] (mg/L)
MW-61D2	8/8/2023	93	63	1.0U	NM
	4/20/2023	92	60	1.0U	9.00
	10/27/2022	74	58	1.0U	7.17
	4/21/2021	66.1	42.3	1.0U	4.31
MW-70D1	8/8/2023	1.0U	1.0U	2.9	1.82
	4/20/2023	1.0U	1.0U	1.2	4.34
	10/25/2022	0.36U	0.46U	1.0U	2.73
	5/10/2022	1.0U	1.0U	7.1J	3.77
MW-70D2	8/8/2023	1.7	0.47J	1.0U	8.89
	4/20/2023	4.9	4.5	1.0U	3.68
	10/25/2022	1.9	3.4	1.0U	1.40
	5/10/2022	3.3	5.2	1.0UJ	4.85
MW-72D1	8/8/2023	0.36J	2.4	3.1	5.24
	4/20/2023	1.0U	1.4	2.1	13.07
	5/15/2020	1.0U	1.0U	1.0U	9.43
	10/14/2019	1.0U	1.0U	1.0U	0.64
MW-72D2	8/8/2023	12	2.8	1.0U	3.09
	4/20/2023	16	3.1	1.0U	6.97
	10/25/2022	13	3.2	1.0U	6.34
	5/11/2022	37	5.6	1.0U	10.49
MW-75D1	8/8/2023	1.0U	1.0U	1.0U	4.22
	4/20/2023	1.0U	1.0U	1.0U	5.37
	10/25/2022	0.36U	0.46U	5.5	0.98
	5/11/2022	1.0U	1.0U	1.0UJ	8.27
MW-76D1	8/8/2023	1.0U	1.4	9.6	7.26
	4/20/2023	1.0U	1.1	12	6.21
	10/25/2022	1.0U	1.3	16	4.99
	5/11/2022	1.0U	0.99J	25J	2.15
MW-76D2	8/8/2023	1.6	1.0U	1.0U	9.59
	4/20/2023	1.2	1.0U	1.0U	5.69
	10/25/2022	8.1	4.2	1.0U	4.02
	5/11/2022	1.7	0.97J	1.0U	2.48
MW-81D1	8/8/2023	26	21	1.0U	13.31
	4/25/2023	30	19	1.0U	20.03
	10/28/2022	27	20	1.0U	9.70
	5/13/2022	40	35	1.0U	15.97

Table 1

Analytical Results
Trial/Partial Biosparge System Shutdown
Hooker Ruco Site
Hicksville, New York

Well	Date Sampled	PCE (µg/L)	TCE (µg/L)	VCM (µg/L)	DO (1) (mg/L)
MW-81D2	8/8/2023	35	23	1.0U	2.35
	4/25/2023	10	8.5	1.0U	3.86
	10/28/2022	21	5.9	1.0U	9.7
	5/13/2022	13	11	1.0U	2.73
MW-83D2	8/8/2023	89	130	1.0U	3.47
	4/21/2023	84	130	1.0U	5.87
	10/28/2022	69	120	1.8U	7.44
	5/12/2022	140	130	4.0U	6.99
MW-87D2	8/8/2023	230	16	1.0U	6.82
	4/21/2023	190	13	1.0U	6.10
	10/27/2022	200	22	3.6U	3.46
	5/13/2022	180	20	5.0U	7.00

Notes:

(1) - Dissolved oxygen measure in the field via super sleeve sampler retrieved from well screen interval
U - Not detected at associated value
J - Estimated concentration
NM - Not measured due to super sleeve sampler tearing during retrieval
- Post-shutdown sampling event. Shutdown commenced January 25, 2023
- Pre-shutdown sampling event

Attachment A

August 2023 Analytical Data Validation

Data Validation Report

September 06, 2023

To	John Pentilchuk	**Contact No.**	716-205-1990
From	Michelle Kukta/eew/9	**Email**	Michelle.Kukta@ghd.com
Subject	Analytical Results and Full Validation OU-3 Trial Shutdown Groundwater Monitoring Glenn Springs Holdings, Inc.-Hooker Chemical/Ruco Polymer Superfund Site Hicksville, New York August 2023	**Project No.**	11224973

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

1. Introduction

This document details a full validation of analytical results for groundwater samples collected in support of the OU-3 Trial Shutdown Groundwater Monitoring at the Hicksville, New York site during August 2023. Samples were submitted to Eurofins Buffalo laboratory located in Amherst, New York. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. Evaluation of the data was based on information obtained from the finished data sheets, raw data, chain of custody forms, calibration data, blank data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spike (MS) samples, and field quality assurance/quality control (QA/QC) samples. The assessment of analytical and in-house data included checks for data consistency (by observing comparability of duplicate analyses), adherence to accuracy and precision criteria, and transmittal errors.

The QA/QC criteria by which these data have been assessed are outlined in the analytical method referenced in Table 3 and applicable guidance from the documents entitled:

i) “Hooker Chemicals/Ruco Polymers Superfund Site Quality Assurance Project Plan (QAPP)", Revision 5, July 2022

ii) “National Functional Guidelines for Organic Superfund Methods Data Review", United States Environmental Protection Agency (USEPA), 540-R-20-005, November 2020

2. Sample Holding Time and Preservation

The sample holding time criteria for the analysis is summarized in Table 3. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Gas Chromatography/Mass Spectrometer (GC/MS) – Tuning and Mass Calibration

3.1 Organic Analyses

Prior to volatile organic compound (VOC) analysis, GC/MS instrumentation is tuned to ensure optimization over the mass range of interest. To evaluate instrument tuning, the method requires the analysis of the specific tuning compound bromofluorobenzene (BFB). The resulting spectra must meet the criteria cited in the method before analysis is initiated. Analysis of the tuning compound must then be repeated every 12 hours throughout sample analysis to ensure the continued optimization of the instrument.

The tuning compound was analyzed at the required frequency throughout VOC analysis periods. All tuning criteria were met indicating that proper optimization of the instrumentation was achieved.

4. Initial Calibration - Organic Analyses

To quantify VOCs of interest in samples, calibration of the GC/MS over a specific concentration range must be performed. Initially, a five-point calibration curve containing all compounds of interest is analyzed to characterize instrument response for each analyte over a specific concentration range. Linearity of the calibration curve and instrument sensitivity are evaluated against the following criteria:

i) All relative response factors (RRFs) must be greater than or equal to the method acceptance criteria

ii) The percent relative standard deviation (%RSD) values must not exceed 20.0 percent or a minimum coefficient of determination (R^2) of 0.990 if linear and quadratic regression calibration curves are used

The initial calibration data for VOCs were reviewed. All compounds met the criteria for sensitivity and linearity.

5. Continuing Calibration - Organic Analyses

To ensure that instrument calibration for VOC analyses is acceptable throughout the sample analysis period, continuing calibration standards must be analyzed and compared to the initial calibration curve every 12 hours. Stability of the calibration curve and instrument sensitivity are evaluated against the following criteria:

i) All RRF values must meet the criteria outlined in the analytical method

ii) Percent difference (%D) values must not exceed 20 percent, or the criteria outlined in the analytical method

Calibration standards were analyzed at the required frequency, and most results met the method criteria for instrument sensitivity and stability. Two compounds in a calibration standard were outside of criteria and showed some variability from the initial calibration. Sample results associated with outlying percent difference values were qualified as estimated, see Table 4.

6. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

7. Surrogate Spike Recoveries

In accordance with the method employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for VOC determinations were spiked with the appropriate number of surrogate compounds prior to sample analysis.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries were within the laboratory control limits.

8. Internal Standards (IS) Analyses

IS data were evaluated for all VOC sample analyses.

To ensure that changes in the GC/MS sensitivity and response do not affect sample analysis results, IS compounds are added to each sample prior to analysis. All results are then calculated as a ratio of the IS responses.

The sample IS results were evaluated against the following criteria:

i) The retention time of the IS must not vary more than ±10 seconds from the associated calibration standard.

ii) IS area counts must not vary by more than a factor of two (50 percent to +100 percent) from the associated calibration standard.

All organic IS recoveries and retention times met the above criteria.

9. Laboratory Control Sample Analyses

LCS or LCS/laboratory control sample duplicate (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study, LCS or LCS/LCSD were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

The LCS and LCS/LCSD contained all compounds of interest. All LCS recoveries and RPDs were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision.

10. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision. If only the MS or MSD recovery was outside of control limits, no qualification of the data was performed based on the acceptable recovery of the companion spike and the acceptable RPD. High MS recoveries do not impact any associated non-detect sample results.

MS/MSD analyses were performed as specified in Table 1.

The MS/MSD samples were spiked with all compounds of interest. Most percent recoveries and all RPD values were within the laboratory control limits, demonstrating acceptable analytical accuracy and precision. Positive sample results associated with high recoveries were qualified as estimated, see Table 5.

11. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample and one field duplicate sample set.

11.1 Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank was submitted to the laboratory for VOC analysis. All results were non-detect for the compounds of interest.

11.2 Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, one field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with the duplicate sample must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criterion is the RL value for water samples.

All field duplicate results were within acceptable agreement and met the above criteria, demonstrating acceptable sampling and analytical precision.

12. Analyte Reporting

The laboratory reported detected results down to the sample-specific method detection limit (MDL) for each analyte. Positive analyte detections less than the RL but greater than the MDL were qualified as estimated (J) in Table 2. Non-detect results were presented as non-detect at the RL in Table 2.

13. Target Compound Identification

To minimize erroneous compound identification during organic analyses, qualitative criteria including compound retention time and mass spectra were evaluated according to the identification criteria established by the method. The samples identified in Table 1 were reviewed. The organic compounds reported adhered to the specified identification criteria.

14. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable with the specific qualifications noted herein.

Regards,

Michelle Kukta
Data Management Team Leader - Chemistry and Data Validation

Table 1

Sample Collection and Analysis Summary
OU-3 Trial Shutdown Groundwater Monitoring
Glenn Springs Holdings, Inc.-Hooker Chemical/Ruco Polymer Superfund Site
Hicksville, New York
August 2023

					Parameter	
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**VOC**	**Comments**
GW080823CZ 001	MW-72D1	Groundwater	08/08/2023	09:15	X	
GW080823CZ 002	MW-72D2	Groundwater	08/08/2023	09:30	X	MS/MSD
GW080823CZ 003	MW-70D1	Groundwater	08/08/2023	10:00	X	
GW080823CZ 004	MW-70D2	Groundwater	08/08/2023	10:30	X	
GW080823CZ 005	MW-87D2	Groundwater	08/08/2023	10:50	X	
GW080823CZ 006	MW-83D2	Groundwater	08/08/2023	11:20	X	
GW080823CZ 007	MW-76D1	Groundwater	08/08/2023	12:15	X	
GW080823CZ 008	MW-76D2	Groundwater	08/08/2023	12:35	X	
GW080823CZ 009	MW-75D1	Groundwater	08/08/2023	13:00	X	
GW080823CZ 00X	MW-72D1	Groundwater	08/08/2023	00:00	X	FD(GW080823CZ 001)
GW080823CZ 010	MW-61D2	Groundwater	08/08/2023	13:50	X	
GW080823CZ 011	MW-81D1	Groundwater	08/08/2023	14:30	X	
GW080823CZ 012	MW-81D2	Groundwater	08/08/2023	14:50	X	
TRIP BLANK	Trip Blank	Water	08/08/2023	-	X	Trip Blank

Notes:

FD - Field Duplicate Sample of sample in parenthesis
MS/MSD - Matrix Spike/Matrix Spike Duplicate
VOC - Volatile Organic Compounds
"-" - Not applicable

Table 2

Analytical Results Summary
OU-3 Trial Shutdown Groundwater Monitoring
Glenn Springs Holdings, Inc.-Hooker Chemical/Ruco Polymer Superfund Site
Hicksville, New York
August 2023

Location ID:		MW-61D2	MW-70D1	MW-70D2	MW-72D1	MW-72D1	MW-72D2
Sample Name:		GW080823CZ 010	GW080823CZ 003	GW080823CZ 004	GW080823CZ 001	GW080823CZ 00X	GW080823CZ 002
Sample Date:		08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
						Duplicate	
Parameters	**Unit**						
Volatile Organic Compounds							
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	0.99 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	0.85 J	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethene (total)	µg/L	5.4	2.0 U	2.0 U	1.2 J	1.1 J	3.4
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	µg/L	30	39	32	23	27	22
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	µg/L	1.0 U	1.0 U	0.49 J	1.0 U	1.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane (Methyl chloride)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	5.4	1.0 U	1.0 U	1.2	1.1	3.4
cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table 2

Analytical Results Summary
OU-3 Trial Shutdown Groundwater Monitoring
Glenn Springs Holdings, Inc.-Hooker Chemical/Ruco Polymer Superfund Site
Hicksville, New York
August 2023

Location ID:		MW-61D2	MW-70D1	MW-70D2	MW-72D1	MW-72D1	MW-72D2
Sample Name:		GW080823CZ 010	GW080823CZ 003	GW080823CZ 004	GW080823CZ 001	GW080823CZ 00X	GW080823CZ 002
Sample Date:		08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
						Duplicate	
Parameters	**Unit**						
Volatile Organic Compounds (Continued)							
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m&p-Xylenes	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Methylene chloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	93	1.0 U	1.7	0.36 J	0.49 J	12 J
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Trichloroethene	µg/L	63	1.0 U	0.47 J	2.4	2.1	2.8 J
Vinyl chloride	µg/L	1.0 U	2.9	1.0 U	3.1	3.0	1.0 U
Xylenes (total)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

Table 2

Analytical Results Summary
OU-3 Trial Shutdown Groundwater Monitoring
Glenn Springs Holdings, Inc.-Hooker Chemical/Ruco Polymer Superfund Site
Hicksville, New York
August 2023

Location ID:		MW-75D1	MW-76D1	MW-76D2	MW-81D1	MW-81D2	MW-83D2	MW-87D2
Sample Name:		GW080823CZ 009	GW080823CZ 007	GW080823CZ 008	GW080823CZ 011	GW080823CZ 012	GW080823CZ 006	GW080823CZ 005
Sample Date:		08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023	08/08/2023
Parameters	**Unit**							
Volatile Organic Compounds								
1,1,1-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 UJ	1.0 UJ	2.0 U	1.0 UJ
1,1,2-Trichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
1,1-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	0.58 J	2.0 U	1.0 U
1,1-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	0.61 J	0.88 J	0.86 J
1,2-Dichloroethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
1,2-Dichloroethene (total)	µg/L	2.0 U	2.6	2.0 U	1.8 J	9.2	13	18
1,2-Dichloropropane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	10 U	10 U	10 U	10 U	10 U	20 U	10 U
2-Hexanone	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U
Acetone	µg/L	39	28	24	26	33	28	38
Benzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Bromodichloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Bromoform	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Carbon disulfide	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Carbon tetrachloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Chlorobenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Chloroethane	µg/L	1.0 U	1.0 U	0.64 J	0.49 J	1.0 U	2.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Chloromethane (Methyl chloride)	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	1.0 U	2.6	1.0 U	1.8	9.2	13	18
cis-1,3-Dichloropropene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Dibromochloromethane	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U

Table 2

Analytical Results Summary
OU-3 Trial Shutdown Groundwater Monitoring
Glenn Springs Holdings, Inc.-Hooker Chemical/Ruco Polymer Superfund Site
Hicksville, New York
August 2023

Location ID:		**MW-75D1**	**MW-76D1**	**MW-76D2**	**MW-81D1**	**MW-81D2**	**MW-83D2**	**MW-87D2**
Sample Name:		**GW080823CZ 009**	**GW080823CZ 007**	**GW080823CZ 008**	**GW080823CZ 011**	**GW080823CZ 012**	**GW080823CZ 006**	**GW080823CZ 005**
Sample Date:		**08/08/2023**	**08/08/2023**	**08/08/2023**	**08/08/2023**	**08/08/2023**	**08/08/2023**	**08/08/2023**
Parameters	**Unit**							
Volatile Organic Compounds (Continued)								
Ethylbenzene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
m&p-Xylenes	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4.0 U	2.0 U
Methylene chloride	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
o-Xylene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Styrene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Tetrachloroethene	µg/L	1.0 U	1.0 U	1.6	26	35	89	230
Toluene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 UJ	1.0 UJ	2.0 U	1.0 UJ
Trichloroethene	µg/L	1.0 U	1.4	1.0 U	21	23	130	16
Vinyl chloride	µg/L	1.0 U	9.6	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U
Xylenes (total)	µg/L	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	4.0 U	2.0 U

Notes:

U - Not detected at the associated reporting limit
UJ - Not detected; associated reporting limit is estimated
J - Estimated concentration

Table 3

Analytical Method
OU-3 Trial Shutdown Groundwater Monitoring
Glenn Springs Holdings, Inc.-Hooker Chemical/Ruco Polymer Superfund Site
Hicksville, New York
August 2023

Parameter	Method	Matrix	Holding Time Collection to Analysis (Days)
Volatile Organic Compounds (VOCs)	SW-846 8260C	Groundwater	14

Notes:

Method References:

SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions

Table 4

Qualified Sample Results Due to Outlying Continuing Calibration Results
OU-3 Trial Shutdown Groundwater Monitoring
Glenn Springs Holdings, Inc.-Hooker Chemical/Ruco Polymer Superfund Site
Hicksville, New York
August 2023

Parameter	Analyte	Calibration Date (mm/dd/yyyy)	%D	Associated Sample ID	Qualified Result	Units
VOC	1,1,2,2-Tetrachloroethane	08/10/2023	21	GW080823CZ 001	1.0 UJ	µg/L
				GW080823CZ 002	1.0 UJ	µg/L
				GW080823CZ 003	1.0 UJ	µg/L
				GW080823CZ 004	1.0 UJ	µg/L
				GW080823CZ 005	1.0 UJ	µg/L
				GW080823CZ 008	1.0 UJ	µg/L
				GW080823CZ 009	1.0 UJ	µg/L
				GW080823CZ 010	1.0 UJ	µg/L
				GW080823CZ 011	1.0 UJ	µg/L
				GW080823CZ 012	1.0 UJ	µg/L
				GW080823CZ 00X	1.0 UJ	µg/L
	trans-1,3-Dichloropropene	08/10/2023	21	GW080823CZ 001	1.0 UJ	µg/L
				GW080823CZ 002	1.0 UJ	µg/L
				GW080823CZ 003	1.0 UJ	µg/L
				GW080823CZ 004	1.0 UJ	µg/L
				GW080823CZ 005	1.0 UJ	µg/L
VOC	trans-1,3-Dichloropropene	08/10/2023	21	GW080823CZ 008	1.0 UJ	µg/L
				GW080823CZ 009	1.0 UJ	µg/L
				GW080823CZ 010	1.0 UJ	µg/L
				GW080823CZ 011	1.0 UJ	µg/L
				GW080823CZ 012	1.0 UJ	µg/L
				GW080823CZ 00X	1.0 UJ	µg/L

Notes:

%D - Percent difference
UJ - Not detected; associated reporting limit is estimated
VOC - Volatile Organic Compounds

Table 5

Qualified Sample Results Due to Outlying MS/MSD Results
OU-3 Trial Shutdown Groundwater Monitoring
Glenn Springs Holdings, Inc.-Hooker Chemical/Ruco Polymer Superfund Site
Hicksville, New York
August 2023

	Sample ID	Analyte	MS % Recovery	MSD % Recovery	RPD (percent)	Control Limits % Recovery	Control Limits RPD	Qualified Result	Units
VOC	GW080823CZ 002	Tetrachloroethene	169	159	6	74 - 122	20	12 J	µg/L
	GW080823CZ 002	Trichloroethene	129	127	2	74 - 123	16	2.8 J	µg/L

Notes:

MS - Matrix Spike
MSD - Matrix Spike Duplicate
RPD - Relative Percent Difference
J - Estimated concentration
VOC - Volatile Organic Compounds