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Quality Assurance Project Plan

Former Mohawk Finishing Products Site
Amsterdam, New York.

April 10, 2009

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Quality Assurance Project Plan

Former Mohawk Finishing Products Site,
Amsterdam, New York

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Figures

Plan Acknowledgement

The employee's signature below indicates his/her understanding, acceptance, and compliance with the requirements of this Quality Assurance Project Plan (QAPP).

Site Name: **Former Mohawk Finishing Products, Amsterdam, New York**

Marc Sanford		4/10/2009
ARCADIS Project Manager	Signature	Date
Todd Carignan		4/10/2009
ARCADIS Project Engineer	Signature	Date
ARCADIS Staff Scientist		
ARCADIS Quality Assurance Manager	Signature	Date
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1. Introduction

This Quality Assurance Project Plan (QAPP) presents the organizational structure, data quality objectives (DQOs) and data management scheme for conducting the Remedial System Operation and Monitoring (O&M) tasks and defines the specific quality control (QC) checks and quality assurance (QA) auditing processes. The QAPP is designed to assure that the precision, accuracy, representativeness, comparability, and completeness (the PARCC parameters) of the collected data are known, documented, and adequate to satisfy the DQOs of the study. The format and contents of the QAPP have been prepared in accordance with the following United States Environmental Protection Agency (USEPA) guidance documents: "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans" (USEPA 1983); "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (USEPA 1988); "Data Quality Objectives: Development Guidance for Uncontrolled Hazardous Waste Site Remedial Response Activities" (USEPA 1987); "NEIC Policies and Procedures" (USEPA 1986); and "Region II CERCLA Quality Assurance Manual" (USEPA 1989a).

The QAPP serves as an overall summary of the QA/QC structure of the O&M tasks. Some parts of the structure are described in this document (e.g., data management); and other parts are described in the Field Sampling Plan (FSP) and are incorporated into the QAPP by reference (e.g., Standard Operating Protocols and Procedures [SOPs], which provide detailed descriptions of the methodologies that will be followed for the O&M tasks).

The internal laboratory SOPs and quality assurance/quality control (QA/QC) procedures will be described in the laboratory QAPP, an independent plan provided by the analytical laboratory. The SOPs provided by laboratory will be consistent with the USEPA methodologies planned for this project. At the time of the preparation of this QAPP, the analytical laboratory has not been chosen. When the analytical laboratory is chosen, their QAPP and SOPs will be kept on file with this QAPP.

2. Project Organization and Responsibilities

The responsibilities of key personnel for the project are detailed below.

- The Project Director, Marc Sanford, is responsible for the overall QA including technical adequacy of the O&M activities and reports, and conformance to the scope of work

- The Project Manager, Marc Sanford, is responsible for the following: sampling QC; overall project coordination; adherence to the project schedules; directing, reviewing, and assessing the adequacy of the performance of the technical staff and subcontractors assigned to the project; implementing corrective action, if warranted; interacting with the NYSDEC; preparing the progress and O&M reports; and maintaining full and orderly project documentation.

- The Project Engineer, Todd Carignan, will be responsible for supervising remedial system, O&M activities, reviewing and analyzing system treatment system data, interacting with the project manager, and preparing O&M reports.

- The O&M Team members include the sampling team, engineering advisors, support staff (e.g., data processors, secretaries, and in-house experts in hydrogeology and chemistry, etc.) who are responsible for the technical direction and adequacy of the work in their respective areas of specialty which are or may be required to meet the project objectives.

- The Project QA/QC Manager ARCADIS Staff Scientist, is responsible for performing systems auditing, and for providing independent data quality review of project documents and reports.

- The Project Health and Safety Coordinator, Todd Carignan, is responsible for implementing the site-specific health and safety directives in the HASP and for contingency response.

A project organization chart that includes key project personnel is provided as Figure 1.

Tasks that will be performed by subcontractors include drilling, excavating, surveying, and analytical (laboratory) testing. The internal project organizational structure within the laboratory will be described in the laboratory QAPP. All communication between ARCADIS and the NYSDEC will be directed through the Project Manager. During excavation, remedial system installation, and construction activities, ARCADIS's designated on-site representative will interface between the NYSDEC's on-site representative and the Project Manager to discuss any necessary field changes.

3. Quality Assurance/ Quality Control

The overall QA objective is to develop and implement procedures for field measurements, sampling, and analytical testing that will provide data of known quality that is consistent with the intended use of the information. This section defines the objectives by (1) describing the use of the data (2) specifying the applicable QC effort (field checks and analytical support levels), and (3) defining the QC objectives (data quality acceptance criteria).

3.1 Data Usage and Requirements

The field measurements and laboratory analyses will be used to support one or more steps in the O&M process. These field steps include influent and effluent sampling of groundwater, sampling of vapor phase, groundwater sampling of site wells, and surface water sampling. The data to be collected range from qualitative information (based on field observations) to quantitative laboratory analyses.

The sampling ports located in the system will be sampled periodically using a hand-held instrument containing a photoionization detector (PID) or flame ionization detector (FID) to monitor for the presence of VOCs. The operating procedures for these instruments, including calibration and QC, are discussed in the FSP (Appendix E). For the water and air samples to be collected at the site, the specific volatile organic compounds (VOCs) to be analyzed and the methods and quantitation limits to be used, will be determined when the related permit requirements are finalized.

3.2 Level of Quality Control Effort

The laboratory will follow standard QC measures to provide data of known and defensible quality. The data quality elements that will be checked and documented include the PARCC parameters which are discussed separately below:

3.2.1 Precision

Measurements of data precision are necessary to demonstrate the reproducibility of the analytical data. Precision of the water sample data will be determined from the analyses of matrix spike and matrix spike duplicates (MS/MSDs). MS/MSD samples will be collected at a frequency of 5 percent (one MS/MSD pair per 20 samples), or one per 1-week sampling period. An extra sample volume will be collected for each replicate and MS/MSD sample taken. MS/MSD samples will be labeled on the sample container and appropriate sample log and chain-of-custody forms. Laboratory precision requirements will be provided in the laboratory QAPP.

3.2.2 Accuracy

Accuracy is the relationship of the reported data to the "true" value. The accuracy of the methods used for the analyses of water samples will be evaluated through the use of calibration standards, MS/MSD analyses, and surrogate spikes. MS/MSD samples will be collected and analyzed at a frequency of 5 percent (one MS and one MSD per 20 samples per matrix), or one MS/MSD pair per 1-week period. An extra sample

volume will be collected for each MS/MSD sample taken. Laboratory accuracy requirements will be provided in the laboratory QAPP.

3.2.3 Representativeness

All data obtained during the O&M tasks, including data from replicate samples, should be representative of actual conditions at the site. Considerations for evaluating the representativeness of the data include, but are not limited to, the following: the sampling location; the methods used to obtain samples at the site; and the appropriateness of the analytical method to the type of sample obtained. All field sampling activities will be performed according to the protocols and SOPs described in the FSP. Laboratory representativeness requirements will be provided in the laboratory QAPP.

3.2.4 Comparability

Comparability will be achieved by utilizing standardized sampling and analysis methods and data reporting format. The data will be generated such that it is comparable to the existing database.

3.2.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement program compared to the total amount collected. The validity of the collected data will be evaluated utilizing the appropriate QA/QC guidelines. Laboratory completeness requirements will be provided in the laboratory QAPP.

The sampling team will use many different types of QA/QC samples to ensure and document the integrity of the sampling procedures, laboratory sample handling procedures, and the validity of the measurement data.

Field replicate water samples will be collected to also demonstrate the reproducibility of the sampling technique. These analyses will be in addition to the replicates that the laboratory must run and will not be replaced by a laboratory-generated replicate. The replicate sampling locations will be selected for each sampling event. Since the replicate will be "blind" to the laboratory, it will have a coded identity on its label and on the chain-of-custody record form. The actual sampling location will be recorded on a daily log form and on the water sampling log form.

Analyte-free deionized water will be obtained from the laboratory to be used for trip blanks, collecting field blanks, and the final decontamination rinse where required. This

water will be prepared and analyzed by the laboratory on a routine basis and a record of this data will be kept on file. Protocols for the handling of trip blanks, collection of field blanks, and decontamination of equipment are provided in the FSP. To determine if cross-contamination has occurred during sampling, field blanks will be prepared and analyzed for the same parameters as the samples.

One trip blank, consisting of three 40-mL vials filled by the laboratory with analyte-free deionized water, will be provided by the laboratory daily for each container used to ship and store water samples to be analyzed for VOCs during each sampling event. Trip blanks will not be more than 24 hours older than the associated water samples and will be analyzed for VOCs only.

The USEPA standard series of analytical support levels to denote types of analysis and the associated level of QC effort are listed below.

- Level 1. Field screening or analysis using portable instruments.
- Level 2. Field analyses using more sophisticated instruments.
- Level 3. Standard USEPA-approved laboratory methods.
- Level 4. USEPA CLP routine analytical services laboratory methods.
- Level 5. USEPA CLP non-standard services laboratory methods.

The analyses that will be performed during the monitoring of the remedial system will fall within Levels 1, and 3. The measurements for total VOCs in air will be performed at Level 1. The groundwater, surface water, and air samples that will be sent to the laboratory for analysis will be performed using standard New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) (NYSDEC 1991) and/or USEPA laboratory methods (Level 3).

3.3 Quality Control Objective

The QC objective for the monitoring of the remedial system is to provide data of known and acceptable quality. Several different types of QC check samples will be analyzed and the results will be compared to data quality acceptance criteria and/or QC control limits that are specified for each method. The laboratory will routinely run these QC samples in accordance with the protocols and frequencies specified in the analytical methods. The QC check samples include the following:

- Blank samples
- Initial and continuing calibrations
- Surrogate spikes
- Matrix spikes/analytical spikes
- Duplicate samples
- Control samples

The QC control limits, or data quality acceptance criteria, for each of the types of QC check samples will also be specified in the laboratory QAPP. The specific types and frequencies of QC checks which will be performed in support of each test method, the calibration procedures for each instrument, and the QC control limits and/or data quality acceptance criteria for each of the types of QC check samples, will be specified in detail in the laboratory QAPP.

4. Sampling Procedures

Samples will be collected in accordance with the approved project SOPs. These are provided in the FSP. The SOPs specify detailed step-by-step protocols for sample collection and address the following as appropriate:

- Use of sampling equipment.
- Decontamination of sampling equipment.
- Pre-sampling requirements (well evacuation volumes).
- Field screening procedures.
- Field analysis procedures.
- Field QC check sample collection procedures.
- Sample packaging and shipment.
- Sampling documentation and chain-of-custody.

All samples will be delivered to the laboratory 24 hours from time of collection.

5. Sample Custody

A chain-of-custody record will be maintained for each sample collected and will provide an accurate written record that can be used to trace the possession and holding of samples from collection through analysis and reporting. Sample bottles to be used for this project will be selected, prepared, and quality controlled according to OSWER Directive #9240-0-005 "Specifications and Guidance for Obtaining Contaminant-Free Sample Containers" (USEPA 1989b).

The procedures that will be followed to provide the chain-of-custody in the field from sample collection through shipment to the laboratory (including sample preservation) are specified in the FSP (Appendix E). The procedures that will be used to continue the chain-of-custody for each sample from its arrival in the laboratory through analysis and reporting will be specified in the laboratory QAPP. The laboratory sample custody procedures will conform to USEPA guidelines. The project samples will be retained by the laboratory until the holding times are exceeded, or until permission to discard is received.

6. Calibration Procedures

The calibration procedures for field instrumentation are discussed in the FSP (Appendix E). These procedures are described for the following instruments:

- Water-level recorder (M-scope).
- PID (TIP or HNU).

The calibration procedures for laboratory instrumentation will be discussed in the laboratory QAPP.

7. Analytical Procedures

All water analyses will be performed in accordance with NYSDEC ASP (NYSDEC 1991) methods. All air analyses will be performed in accordance with USEPA methods. The specific parameters, quantitation limits, analytical methods and data deliverables to be used will be determined when the permit requirements are finalized. The types and frequencies of QC checks will be those specified in the analytical methods and are discussed in Section 3.3 (Quality Control Objectives) of this QAPP.

8. Data Validation, Recording, and Reporting

Data collected during the monitoring of the remedial system, including field and laboratory results, will be reduced, reviewed, summarized, and reported. The reduction of the field data will consist of summarizing the raw field data, which may be presented in the form of tables, logs, illustrations, and graphs, as deemed appropriate by the project manager. The laboratory data will also be reduced and tabulated electronically. The data will then be suitable for inclusion in reports and will be designed to facilitate comparison and evaluation of the results.

The tables and logs will be compiled whenever feasible by the field personnel, who will inform the project manager of any problems encountered during data collection, identify apparent inconsistencies, and provide opinions on the data quality and limitations. A review of the analytical data packages with respect to sample receipt and handling, analytical methods, data reporting and deliverables, and document control will also be conducted. The tables and logs will be used as the basis for data interpretation and will be checked against the original field documentation by an independent reviewer prior to use.

The laboratory procedures for reducing, validating, and reporting the analytical data will be described in the laboratory QAPP.

9. Internal Quality Control

The field personnel will make use of the following types of QA/QC samples to ensure and document the integrity of the sampling and sample handling procedures and the validity of the measurement data: field replicates, field blanks, and laboratory-prepared trip blanks. The frequencies for collecting the QA/QC samples are specified in Section 3.2 (Level of Quality Control Effort) of this QAPP. The procedures for collecting the QA/QC samples are specified in the FSP. The QA/QC sample results will be compared to acceptance criteria, and documentation will be performed showing that those criteria have been met. Any samples in nonconformance with the QC criteria will be identified and reanalyzed by the laboratory, if possible.

Two types of quality assurance mechanisms are used to ensure the production of analytical data of known and documented quality: analytical method QC, and program QA. The internal quality control procedures for the analytical services on samples to be provided will be specified in the laboratory QAPP. These specifications include the types of control samples required (sample spikes, surrogate spikes, reference samples, controls, blanks), the frequency of each control, the compounds to be used for sample spikes and surrogate spikes, and the quality control acceptance criteria. The laboratory will be responsible for documenting that both initial and ongoing instrument and analytical QC criteria are met in each package. This information will be kept on file at the laboratory and will be made available upon request.

10. Performance and System Audits

Performance and system audits will be performed on a periodic basis, as appropriate, to ensure that the monitoring of the remedial system is implemented in accordance with

the approved project SOPs and in an overall satisfactory manner. Examples of audits that will be performed during the O&M activities are as follows:

- The field personnel will supervise and check on a daily basis the following tasks: that the O&M tasks are conducted correctly; that monitoring wells are installed and developed correctly; that field measurements are made accurately; that equipment is thoroughly decontaminated; that samples are collected and handled properly; and that all field work is accurately and neatly documented. QA checklists will be filled out daily during O&M activities.

- On a timely basis, the data packages submitted by the laboratory will be checked for the following information: that all requested analyses were performed; that sample holding times were met; that the data were generated through the approved methodology with the appropriate level of QC effort and reporting; and that the analytical results are in conformance with the prescribed acceptance criteria. The quality and limitations of the data will be evaluated based on these factors.

- The project manager will oversee the field personnel and check that the management of the acquired data proceeds in an organized and expeditious manner.

- Audits of the laboratory are performed on a regular basis by regulatory agencies. Audits will be discussed in the laboratory QAPP.

11. Preventive Maintenance

ARCADIS has established a program for the maintenance of field equipment to ensure the availability of equipment in good working order when and where it is needed, as indicated in the following examples:

- An inventory of equipment, including model and serial number, quantity, and condition will be maintained. Each item will be tagged and signed out when in use, and its operating condition and cleanliness will be checked upon return. Routine checks will be made on the status of equipment, and spare parts will be stocked. An equipment manual library will also be maintained.

- The field personnel is responsible for making sure that the equipment is tested, cleaned, charged, and calibrated in accordance with the manufacturer's instructions before being taken to the field.

The laboratory also follows a well-defined program to prevent the failure of laboratory equipment and instrumentation. This preventive maintenance program will be described in the laboratory QAPP.

12. Data Assessment Procedures

The field and laboratory-generated data will be assessed for the PARCC parameters. Both quantitative and qualitative procedures will be used for these assessments. The criterion for assessment of field measurements will be that the measurements were taken properly using calibrated instruments. Assessment of the sampling data with respect to field performance will be based on the criteria that the samples were properly collected and handled. Field QC check sample results will also be considered in assessing the representativeness and comparability of the samples collected. The project manager will have overall responsibility for data assessment and integration of that assessment into data use and interpretation.

The laboratory will calculate and report the precision, accuracy, and completeness of the analytical data. Precision will be expressed as the relative percent difference (RPD) between values for duplicate samples. Accuracy will be expressed as percent recoveries (%Rs) for surrogate standards and matrix spike compounds. The precision and accuracy results will be compared to the prescribed QC acceptance criteria. The QC acceptance criteria prescribed for each test method will be presented in the laboratory QAPP. Completeness is expressed as the percentage of valid data, based on the total amount of data intended to be collected. The laboratory will make every attempt to generate completely valid data.

Rigorous QA/QC procedures will be followed for the collection of samples. The FSP sampling protocols will be strictly adhered to in order to maintain consistency in sampling and representativeness and comparability of the samples.

The assessment of data representativeness with respect to laboratory performance will be based on sample handling and analyses with respect to holding times and also on the method blank results. Data comparability will be assessed based on laboratory performance with respect to USEPA analytical protocols.

13. Corrective Action

The QA/QC program contained in this QAPP will enable problems to be identified, controlled, and corrected. Potential problems may involve non-conformance with the SOPs and/or analytical procedures established for the project, or other unforeseen difficulties. Any persons identifying an unacceptable condition will notify the field personnel, where applicable, and/or the project manager. The project manager will be responsible for developing and initiating appropriate corrective action and verifying that

the corrective action has been effective. For laboratory analysis, both the identified deviations and corrective actions will be documented.

Corrective actions may include repeating measurements, resampling and/or reanalysis of samples, and amending or adjusting project procedures. If warranted by the severity of the problem (e.g., if monitoring wells require resampling or if the project schedule may be affected), the NYSDEC project manager will be notified. Additional work, which is dependent upon an unacceptable activity, will not be performed until the problem has been eliminated.

14. Quality Assurance Reports

Data collection activities will be documented through the use of field log forms and log books. The data packages prepared by the analytical laboratory will include the appropriate analytical data, the results of the QC check samples, and a description of problems encountered and corrective actions taken. These field records and data packages will be reviewed and included in the project file. The laboratory's internal QA reporting will be described in the laboratory QAPP.

15. References

New York State Department of Environmental Conservation (NYSDEC). 1989, Partially Revised 1991. Analytical Services Protocol (ASP). 8 vols., September 1989, Partially Revised December 1991.

U.S. Environmental Protection Agency (USEPA). 1983. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans. QAMS-005/80.

U.S. Environmental Protection Agency (USEPA). 1986. NEIC Policies and Procedures. EPA-330/9-78-001-R.

U.S. Environmental Protection Agency (USEPA). 1987. Data Quality Objectives: Development Guidance for Uncontrolled Hazardous Waste Site Remedial Response Activities. OSWER Directive 9355.0-7B. Washington D.C.: Hazardous Site Control Division.

U.S. Environmental Protection Agency (USEPA). 1989a. Region II CERCLA Quality Assurance Manual, Revision I.

U.S. Environmental Protection Agency (USEPA). 1989b. Specifications and Guidance for Obtaining Contaminant-Free Sample Containers. OSWER Directive 9240.0-005.

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