

Quality Control Plan

Former Plum Brook Ordnance Works, Sandusky, Ohio Delineation of Soil Contamination Along the Sewer Lines Between TNT Area A and Waste Water Treatment Plant 1

Prepared By:

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PROJECT OBJECTIVE AND TASKS

This Quality Control Plan (QCP) was prepared by Shaw Environmental and Infrastructure, Inc. (Shaw) in support of the Delineation of Soil Contamination Along the Sewer Lines Between TNT Area A (TNTA) and Waste Water Treatment Plant 1 (WWTP1) at the former Plum Brook Ordnance Works (PBOW) in Sandusky, Ohio, under Delivery Order (DO) DX18, IDIQ Contract W912QR-08-D-0013, for the Louisville A/E Environmental Services.

In December 2008, a remedial investigation (RI) was conducted at the TNTA/WWTP1 Sewer lines using test pits to collect soil samples and piezometers and monitoring wells to collect groundwater samples for nitroaromatics analysis. This work was completed by Shaw Environmental and Infrastructure, Inc. (Shaw) under Delivery Order DX03. Data from the initial RI work is being used in a Baseline Human Health Risk Assessment (BHHRA) and Screening Level Ecological Risk Assessment (SLERA) to determine soil and groundwater exposure risks. Based on the findings of the investigation, the next phase of the RI work includes soil delineation. The objective of this task order is to better define the nature and extent of contaminated soils along the former trace of two sewer lines that carried waste water between TNTA and WWTP1 during PBOW operations.

This QCP presents the following tasks that will need to be completed in order to support the objective of this task order. :

- Task 1.0: Preparation and Submittal of Quality Control (QC) Plan
- Task 2.0: Preparation and Submittal of a Site-Specific Safety and Health Plan (SSHP) and Site-Specific Sample and Analysis Plan (SSAP) Addenda;
- Task 3.0: Sewer Line Soil Delineation and Investigation Requirements;
- Task 4.0: Analytical Requirements
- Task 5.0: Disposal of Investigation Derived Waste

- Task 6.0: Preparation and Submittal of the Site Delineation Report of the Sewer Lines;
- Task 7.0: Geographic Information System Deliverable
- Task 8.0: Project Management
- Task 9.0: Miscellaneous PBOW Team Support
- Task 10.0: Meetings.

The following presents detailed information for each of the above mentioned tasks.

Task 1.0 – Preparation and Submittal of Quality Control Plan.

Shaw prepared this QCP based on requirements described in ER 1110-1-12, Quality Management and CEORD 1110-1-9, Quality Control. As part of the QCP development, Shaw incorporated a criteria management process to ensure standard details appropriate for the USACE requirements are developed, updated, and made available to all project stake holders and reviewers. This QCP is an addendum to the Site-Wide Sample and Analysis Plan (SWSAP, prepared under contract No. W912DR-05-0026, DX10) which defines the quality verification activities for specific professional disciplines. This verification process will be implemented to ensure that the work output is acceptable and meets all requirements detailed in the SOW.

An independent review of documents and submittals, as well as other tasks presented in this QCP, shall be performed to verify that work is conducted in an acceptable manner and meets all the requirements detailed in the SOW presented in Shaw's proposal.

Task 2.0 – Preparation and Submittal of Site-Specific Safety and Health Plan and Site-Specific Sampling and Analysis Plan Addenda.

Shaw will develop and submit a Site-Specific Safety and Health Plan (SSHP) addendum specific to the soil delineation activities being performed during delineation activities. The SSHP addendum required by 29 CFR 1910.120(b)(4) shall be prepared and submitted to CELRN-EC-E. This addendum will describe the health and safety procedures, practices to be implemented and equipment utilized to protect affected personnel from the potential hazards associated with the site-specific tasks. The level of detail provided in the addendum will be tailored to the type of work, complexity of operations being accomplished, hazards anticipated and the extent new conditions or procedures affecting the need to supplement the updated *Site-Wide Safety and Health Plan*.

Shaw will also develop a Site-Specific Sampling and Analysis Plan (SSAP) addendum specific to the delineation investigation to be performed. The Site-Wide Sampling and Analysis Plan (SWSAP, prepared under Contract No W912DR-05-D-0026, DX10) will be used as the base document. The SSAP will be prepared as an addendum to the SWSAP and will present details regarding the investigative work as described in the SOW. The SSAP addendum will identify sampling standard operating procedures, analytical methods and data quality objectives specific for the investigation of the WW Sewer Line. In addition, it will identify sampling locations for this area, rationale underlying the choice of locations and any expected variations from the SWSAP.

Task 3.0 – Sewer Line Soil Delineation and Investigation Requirement

Prior to the delineation activity, Shaw will survey in locations along the TNTA/WWTP1 sewer line every 100 feet. Representative samples will be collected from immediately below the sewer line using direct push sampling techniques. Additionally, Shaw will excavate test pits at each survey location and at the midpoint.

Initial sampling will be along the sewer line trace. Composite samples will be collected along 50 foot segments of the sewer line. Each composite will consist of 5 individual aliquots collected immediately below the sewer line (i.e., one sample per 10 feet of sewer line). All soil samples will be screened using a colorimetric test kit for nitroaromatics. All screening results that exceed 10 mg/kg nitroaromatics will be sent for off-site analysis. Lateral and vertical delineation will be completed pending results of the soil sampling. The lateral delineation will consist of composite sampling (5 point composites) at approximately 10 feet from the sewer line trace. The spacing may be modified based on field screening results. The vertical delineation will be conducted at three locations along the 50 ft segment of sewer line through collection of discrete samples from 8 to 10 ft bgs and in areas of contamination exceeding 10 mg/kg. The USACE will be consulted before any potential modifications are implemented

To verify the accuracy of the field screening method, approximately 10 percent of the collected field screening samples will be submitted for off-site laboratory analysis. A quick turn-around-time will be requested on the analysis. The samples will be selected to represent the full range of detected concentrations (nondetect, low, medium and high concentrations). The data will be reviewed in real time to determine if changes to the field screening approach are warranted. The evaluation of the field screening will be completed in conjunction with the USACE.

Raw explosive material is not expected to be encountered during soil sampling activities. Should sampling personnel encounter raw explosives, Shaw will stop sampling and will contact CELRN to discuss procedures for disposal of the raw explosive material. Shaw will obtain all necessary utility clearances and permits from NASA.

All boring locations will be sketched and surveyed to the nearest 1 foot; land elevations will be surveyed to within ± 0.01 foot referenced to the National Geodetic Vertical Datum of 1929. Any site clearing that may be necessary for equipment access will be coordinated with NASA.

Task 4.0 – Analytical Requirements

Shaw will collect a total of 350 field screening soil samples and 387 confirmation samples for laboratory analysis as described in Task 3.0. Additionally, the following quality assurance/quality control (QA/QC) samples will be collected and analyzed (relative quantities in parentheses):

- Equipment rinsates ($\leq 5\%$)
- Source water (1)
- Blind duplicates ($\leq 10\%$)
- Split samples ($\leq 10\%$)
- Matrix spike/matriz spike duplicate samples ($\leq 10\%$).

All details of sampling shall conform to the CELRN-EC-E approved SWSAP, and to applicable USEPA (SW-846) and USACE requirements (ER 1110-1-263, 1 April 1996). Details include sample volumes, composition and size of containers, methods of preservation, identification and labeling, packing, transportation and shipment.

Shaw will verify and document that the laboratory performing work on this project is compliant with Department of Defense Quality Systems Manual (DOD QSM) Revision 4.1. The most recently promulgated methods from EPA's SW-846 *Test Methods for Evaluating Solid Wastes (SW-846)* will be used with the exception of SW-846 method 8330 for nitroaromatics. For comparability purposes, multi incremental sampling will not be required.

Shaw will be responsible for collecting, packaging, coordinating and shipping QA samples to the quality assurance laboratory. All shipments will include a temperature blank. The primary samples will have project-specific QC that will be used only for this project. When sample shipments arrive at the laboratory a cooler receipt form will be completed and signed by the sample custodian. Copies of the completed chain of custody

and cooler receipt forms will be included in the Site Delineation Report.

Analytical data generated by the laboratory will be extensively reviewed prior to report generation to assure the validity of the reported data. The data from all site samples, with the exception of water quality parameters, total organic carbon, and IDW samples, will be validated by qualified Shaw personnel who have no responsibility for sample collection or analysis. Validation will follow the logic and review sections included in the US Environmental Protection Agency Contract Laboratory Program - National Functional Guidelines for Superfund Organic Data Review, June 2008 (EPA 540/R-08/01) and the US Environmental Protection Agency Contract Laboratory Program National Functional Guidelines for Superfund Inorganic Data Review, January 2010 (EPA 540/R-10/011).

Shaw will report all data reduction procedures including the methods or equations of concentration calculations, reporting units of concentration; moisture related data and the procedures used for calculating PARCC parameters. The data will be reported in a "CLP like" format and will be of sufficient quality for a Chemical Quality Assurance Report to be submitted. Shaw will provide CLP-like data packages consisting of all elements required in CLP definitive level data deliverables. Shaw will also provide an additional electronic data deliverable for the chemical data, consisting of a SEDD as defined in the USEPA Contract Laboratory Program requirements. Shaw will prepare a table which relates all QA samples to their corresponding field and QC samples sent to the primary laboratory.

An evaluation of the field screening method during implementation of the field investigation will be provided to the USACE. This evaluation will be done to modify the field screening approach if needed.

Task 5.0 – Disposal of Investigation Derive Waste

After receiving characterization data for the IDW, Shaw will review and prepare a letter proposing an appropriate disposal option. Shaw will arrange for disposal of the IDW through a subcontractor in accordance with all local, state and federal laws regulatory standards.

Task 6.0 – Preparation and Submittal of Delineation Report

Shaw will prepare a Site Delineation Report following the validation of the soil analytical results. Data summaries will include all sample identification numbers, sample locations,

sample dates, detected chemical concentrations, method detection limits, validation qualifiers, maximum detected concentration column, background screening value (if applicable) and risk-based screening values. At this phase, screening values are not considered judicial or regulatory limits, but are included to provide perspective to the data. The screening levels will be the same levels used in the data screening portion of a human health risk assessment (unless subsequently updated prior to the risk assessment). Shaw will present the investigation results in report format, which includes a narrative that details the nature of work performed during the investigation, problems encountered, and conclusions and recommendations. The report will identify when method detection limits for individual analytes exceeding the appropriate screening value and the location where the data was collected.

Figures will also be prepared that indicate sampling locations (including depths) for each sample collected and will present analytical results where values that exceed screening criteria, (for reference purposes only).

The Site Delineation Report will be submitted as draft and final versions only. The draft version will be submitted to all reviewing parties, including OEPA, CEHNC-CX, and CHPPM. Shaw will revise the report as per agency comments. Shaw will respond to all comments by the USACE and OEPA and will submit official response to comments to CELRN-EC-E.

Task 7.0 – Geographic Information System Deliverable

Information collected during this investigation will be added to the database developed during previous investigations. This database includes information related to the installation of groundwater monitoring wells (both overburden and bedrock wells) by Morrison Knudsen Corporation, Dames & Moore, and IT Corporation. This database also includes analytical (chemical) results obtained from the previous investigation of soil and groundwater collected by Dames & Moore and IT Corporation. The deliverable package, including Metadata, will be formatted as specified in the previously provided Data Standard for Corps of Engineers Environmental Restoration Sites and the Tri Services Spatial Data Standards (TSSDS). The TSSDS are available at the following link: <http://fwgcom.wes.army.mil/projects/standards/tssds/>. Shaw will be responsible for correcting any added files with transcription errors.

The information collected during this investigation will be entered into a Geographic Information System (GIS) Data Base. The GIS data will be transferred to the

Huntington District Corps of Engineers (CELRH), coordinating with CELRH (Rick Meadows) as to the appropriate data and supporting documentation formats.

Task 8.0 – Project Management

Project management includes labor necessary to manage the project and includes home office support services such as procurement, contracting, invoicing, and coordination.

Task 9.0 – Miscellaneous Task Team Support

Shaw will participate in and provide support for task groups formed by the PBOW project team. Services involved in task group support may include participation in meetings and teleconferences, joint scoping, scheduling future site activities, task group memoranda, miscellaneous CADD support, and document reviews.

Task 10.0 – Meetings

Shaw will attend two meetings tentatively scheduled to be held in Sandusky, Ohio.

PROJECT SCHEDULE AND MILESTONES

The project schedule and milestones are presented in Figure 1.

KEY SHAW PROJECT PERSONNEL

- **Project Manager** - Mr. Steven T. Downey will serve as Shaw's Project Manager.
- **Technical Lead** - Mr. Michael Gunderson will serve as the Technical Lead.
- **QA Manager** - Mr. Kenneth Martinez will serve as the Project QA Manager.
- **H&S Officer** – Mr. Doug Russell will serve as Shaw's H&S Officer
- **Project Chemist** -Mr. Eddie Weaver will serve as the Project Chemist.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

This section of the QCP summarizes the Shaw internal technical and external peer review. The Shaw QA program provides controls for the formal verification (checking) of documents such as calculations and the presentation of information in the form of drawings, logs, and tables.

Review and necessary approvals are also cited for quality-related documents; however, during the course of a project or proposal, verification of technical decisions and concepts (such as interpretation of data and evaluation of results) is required in order that the project or proposal

can proceed on a sound conceptual basis. The review approach, may be needed to address the following questions:

- During the project planning stage, have appropriate steps been implemented to satisfy the goals and objectives of the project?
- Are data of sufficient quality and properly interpreted so that conclusions can be justified and demonstrated?
- Are design parameters reasonable for the computations performed? What is the effect of variations of the assumptions upon the results?
- Do the results presented by Shaw in the form of a report, or other document, adequately represent the work performed and the conclusions reached? Do the results fulfill the objectives of the project?

The internal technical review (ITR) process is used to verify these steps. Documents to be written during a project and indicated in the proposal will be subjected to peer review. The Shaw PM will complete a matrix of these documents on a delivery order basis and use it to obtain the required reviews.

A technical reviewer is selected based upon the following criteria:

- The reviewer must be independent of the project. The reviewer must be sufficiently informed regarding the project, but should not be making decisions that determine or affect the course of the project. The peer review process is an “outside” review of the project.
- The reviewer must be a person knowledgeable in the specific area of work, preferably a senior technical associate. Technical reviewers will be part of the Shaw organization.

At the conclusion of a technical peer review, the reviewer(s) will prepare written review comments, sign off on the Discipline Sign-Off Review form (Figure 2) and forward to the PM; a copy of these review documents will also be placed in the project files. Technical review comments will be resolved and incorporated into the document as appropriate. ITR comments are available for USACE inspection upon request.

External peer review will be performed on all draft project deliverables prior to issuance as final documents. It is anticipated that the external peer review will be performed, as a minimum, by the USACE and the OEPA. A formal response to peer review comments will be issued to all reviewing parties, documenting revisions made where appropriate to the draft deliverables; this

does NOT apply to the Report of Finding prepared under this delivery order. All responses to the peer review comments will be coordinated with the USACE for their concurrence prior to incorporation. Final deliverables will be submitted after incorporating any pertinent comments that arise from peer review of the draft documents. Table 1 summarizes the preparation and review process for the required project deliverables.

FIELD ACTIVITY QA REQUIREMENTS

Field investigation activities will follow the procedures specified in the SSAP to ensure that project quality requirements are satisfied. Field activity QA will be implemented by performing project-specific training; properly preparing for field work before mobilization; issuing variances, nonconformance reports, and corrective action reports; and documenting field quality control in the investigation reports.

Field team members, including Shaw personnel and subcontractor personnel, will receive project-specific training before mobilization to the job site by reading the applicable work plans and procedures. Upon mobilization to the site, but prior to commencing field activities, all site personnel will attend the project kickoff meeting, which will consist of a review of all project requirements and objectives to ensure that the project team is fully aware of the goals of the PBOW investigations. Before initiating each days field work, all team members will participate in a tailgate safety meeting (TSM) conducted by the Shaw Field Coordinator to address safety and quality issues pertinent to the activities to be performed. The TSM will be documented and all personnel will sign the attendance record. Worker training will follow the requirements specified in Shaw SOPs.

Prior to mobilization to the site, the Shaw PM, assisted by the Shaw Field Coordinator and the Shaw Analytical Coordinator, will examine project field work preparation requirements to ensure that all necessary arrangements, including personnel assignments, work plans, site entry/drilling permits, training, schedule, equipment rentals, supplies, subcontractors, have been accomplished for execution of the field effort in an efficient and effective manner. The Shaw PM and QAM must approve the project preparation prior to mobilization.

Changes or variances to the SAP, SSHP, QAPP, and/or site-specific work plans may be initiated either in the office or in the field as may be necessary. All variances will be noted on the Field Activity Daily Log (FADL) and will be formally recorded on the Variance Log. Variances will be approved by the Shaw QAM and the Shaw PM prior to implementation of the change.

Variations that will affect the project scope, cost, or schedule will be submitted to the USACE for approval prior to implementation.

Nonconforming equipment, items, activities, conditions, and unusual incidents that could affect compliance with project requirements will be identified, controlled, and reported in a timely manner. A nonconformance is defined as a malfunction, failure, deficiency, or deviation that renders the quality of any item unacceptable or indeterminate. The originator (any Shaw employee) of a nonconformance report will describe the finding on the Nonconformance Report provided for this purpose and will notify the Shaw PM and QAM. Each nonconformance will be reviewed and a disposition will be issued for the item, activity, or condition. The disposition of a nonconformance will be documented and approved by the Shaw organization responsible for issuing the nonconformance. The QAM will concur with the disposition of the nonconformance prior to closure of the Nonconformance Report.

In addition, the Shaw PM will notify the USACE Technical Coordinator within 48 hours of significant nonconformances that could impact the project cost, schedule, or scope of work and will indicate the corrective action taken or planned.

SUBCONTRACTOR QA/QC REVIEW

Shaw has assigned personnel to monitor and review work performed by subcontractors in conjunction with this investigation. Mr. Steven T. Downey will serve as the principal point-of-contact (POC).

The selection of qualified subcontractors, as required, will be accomplished in accordance with Shaw procurement and quality assurance (QA) procedures. Subcontractors such as drillers, geophysical specialists, surveyors, and environmental monitoring specialists, must satisfy predefined qualifications developed by the PM and Shaw that are defined in the procurement bid packages. Each subcontractor bid submittal is reviewed by technical personnel, purchasing, and QA personnel to verify that the bidders are technically qualified and can satisfy the project objectives. Before starting work, Shaw will perform a quality check to ensure that the subcontractor(s) has fulfilled the procurement requirements necessary to begin activities. Subcontractors involved in environmental measurements will be monitored by the Shaw Field Coordinator to verify the use of calibrated equipment and qualified operators.

CUSTOMER INVOLVEMENT

Customer involvement will be ongoing throughout the duration of this investigation, and Shaw personnel will be available as needed for question, consultation, etc. Project personnel may be reached at the following telephone numbers:

Mr. Steven T. Downey Project Manager	(865) 694-7496	Fax (225) 987-3034
Mr. Michael Gunderson Technical Lead	(865) 694-7446	Fax (865) 690-3626
Mr. Kenneth Martinez Quality Assurance Manager	(865) 670-2656	Fax (865) 690-3626
Doug Russell H&S Officer	(865)-692-3584	Fax (865) 690-3626
Mr. Eddie Weaver Project Chemist	(865) 560-5274	Fax (865) 693-4944

Each work plan or other deliverable to be prepared in more than draft form will be submitted to the USACE Nashville District as specified in the SOW for review and comment. All review comments will be addressed and incorporated into the final submittals, if appropriate.

DOCUMENTATION OF PROJECT DECISIONS AND RECORDS MANAGEMENT

The Shaw Project Records Clerk is responsible for maintaining control and retention for project-related records. Record control includes receipt from external and internal sources, transmittal, transfer to storage, and indication of record status. Retention includes receipt at storage areas, indexing and filing, storage and maintenance, and retrieval. Shaw will maintain the project repositories at 312 Directors Drive in Knoxville, Tennessee, for all project records, including correspondence. Records will be controlled and retained, as appropriate, in the office central files or laboratory files. The Project Records Clerk will assign control numbers to all outgoing documents and is responsible for properly filing the controlled records (except for those related to accounting, purchasing, and drafting, which are retained in the respective department files). Shaw will also provide the USACE Nashville District with a copy of all telephone memos, written correspondence, and meeting minutes regarding information related to the project within ten (10) days of the event. Copies of all records will be retained by Shaw for a minimum of seven (7) years after the end of the contract period. In addition, project records deemed to be of importance by the USACE will be turned over to the USACE at the time of project close-out.

PROJECT CLOSE-OUT

At the completion of this investigation, a project close-out meeting will be conducted. This will be at a time and place to be determined by Nashville District personnel, and may take the form of a teleconference. The purpose of this meeting will be to exchange feedback, discuss lessons learned, and conduct a final product verification.

Table 1

**Delineation of Soil Contamination
Along the Sewer Lines Between TNT Area A and
Waste Water Treatment Plant 1
Former Plum Brook Ordnance Works, Sandusky, Ohio**

Submittal Description/ Title	Document Preparation and Review Process					
	Principal Author(s)	Discipline	Peer Review	Discipline	Project Review	Discipline
SSAP	Karl Van Keuren Eddie Weaver	Geologist Chemist	Eric Weaver Tom Siard	Geologist Risk Assessor	Michael Gunderson Steve Downey Ken Martinez	Geologist Engineer QA Specialist
SSHP	Doug Russell	H&S Coordinator	Eric Weaver Ken Martinez	Geologist QA Specialist	Steven Downey Michael Gunderson	Engineer Geologist
Site Delineation Report	Dave Kessler	Geologist	Eric Weaver Eddie Weaver	Geologist Chemist	Steven Downey Michael Gunderson Ken Martinez	Engineer Geologist QA Specialist

NOTE: Where multiple authors are identified, one or more of those identified may be involved in the document preparation depending on availability. Should replacements be necessary, personnel of comparable experience and qualifications will be utilized.