Final Quality Control Plan

Remedial Investigation Part 1 for the Waste Water Treatment Plants 1 and 3 and Ash Pits 1 and 3 and the Nitroaromatics Treatability Study Former Plum Brook Ordnance Works, Sandusky, Ohio

Prepared By:

Shaw Environmental, Inc.
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Submitted to:

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Post Office Box 1070
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Revision 0

Delivery Order DX10
IDT Contract W912DR-05-D-0026
Shaw Project Number 132288

July 25, 2008

SIGNATURE PAGE

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Remedial Investigation Part 1 of
Waste Water Treatment Plants 1 and 3
Ash Pits 1 and 3
and
Nitroaromatics Treatability Study
Former Plum Brook Ordnance Works (PBOW), Sandusky, Ohio

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Submitted By:

Steven T. Downey, P. E., PMP
Project Manager
Shaw Environmental, Inc.

7/25/08
Date

Accepted By:

Kathy McClanahan
Technical Coordinator, Technical Management Section
U.S. Army Engineer District, Nashville

Date

Doug Mullendore
Chief, Environmental Restoration Branch
U.S. Army Engineer District, Nashville

Date

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Draft Quality Control Plan

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July 25, 2008

PROJECT OBJECTIVE AND TASKS

This Quality Control Plan (QCP) has been prepared in support of Phase 1 Remedial Investigation (RI) efforts at Waste Water Treatment Plants (WWTP) 1 and 3 and Ash Pits 1 and 3, for preparation of a bench-scale treatability study for the alkaline hydrolysis of nitroaromatics, preparation of a Site-Wide Health and Safety Plan (SWHSP), and preparation of a Site-wide Sampling and Analysis Plan (SWSAP) at the former Plum Brook Ordnance Works (PBOW) in Sandusky, Ohio, under Delivery Order (DO) DX10 of IDT Contract W912DR-05-D-0026.

Recent environmental investigations were conducted by the USACE, Louisville District at WWTP 1 & 3 and Ash Pits 1 & 3 and were presented in documents titled *Limited Site Investigation for the former Plum Brook Ordnance Works Waste Water Treatment Plants No. 1 and 3*,July 2000a and *Limited Site Investigation for the former Plum Brook Ordnance Works Ash Pits No. 1 and 3*,July 2000b. Based on the findings of both Limited Site Investigation's, the performance of an RI is recommended for each of the WWTP and Ash Pit areas. To support the evaluation of remedial alternatives for soil at the TNT manufacturing areas, a bench-scale treatability study using alkaline hydrolysis for nitroaromatic contaminants will also be conducted. Alkaline hydrolysis was recently identified as a potential technology for soil remediation at PBOW TNT Area C and TNT Area A. In addition, tasks to be completed for this project include preparation of a Site-Wide Health and Safety Plan (SWSHP) and a Site-Wide Sampling and Analysis Plan (SWSAP) which will be used in the future during preparation of site-specific plans for other PBOW areas.

Specific tasks to accomplish under this project include:

Task 1 – Preparation and Submittal of an Updated Quality Control Plan (QCP).

Shaw Environmental, Inc. (Shaw) will prepare and submit an updated QCP for the work to be conducted at PBOW. The QCP will be prepared and updated in accordance with requirements of ER 1110-1-12, Quality Management, and CEORD 1110-1-9, Quality Control. As part of the QCP development, Shaw will develop a criteria management process to ensure design criteria and standard design details appropriate for the U.S. Army Corps of Engineers (USACE) requirements are developed, updated, and made available to the designers and reviewers involved in this project. The QCP will clearly define the quality verification activities for specific professional disciplines. This design verification process will be implemented to ensure that an acceptable design is produced by the designer.

A verification statement will be included with all products submitted to the Government under this SOW. The statement will be signed by the independent reviewers identified in the QCP, stating that they have reviewed the applicable document or product and that all internal comments have been resolved, thus completing the product for release to the Government. All comments generated by reviewers of a product or document, along with their resolution, will be submitted with the verification statement. Should the design or independent review be conducted by individuals not identified for that activity by the QCP, an explanation of the variance and how quality was maintained despite the variation from the approved QCP will be provided with the verification statement.

Task 2 – Preparation and Submittal of Site-Wide Safety and Health Plan and Site-Wide Sampling and Analysis Plan.

Shaw will update and submit a Site-Wide Safety and Health Plan (SWSHP) for work to be conducted at PBOW. The current Site-Wide Safety and Health Plan (IT, July 1996) will be used as the base document which will be updated to current standards that follow OSHA 29 CFR 1910, 20 CFR 1926, USACE EM-385-1-1 (November 2003) and other health and safety regulations, policies and procedures that applicable to ensure worker safety. Shaw will also develop a Site-Specific Safety and Health Plan (SSHP) addendum specific to the investigation of WWTP 1 & 3 and Ash Pits 1 & 3. The SSHP addenda required by 29 CFR 1910.120(b)(4) shall be prepared and submitted to CELRN-EC-R. These addenda will describe the health and safety procedures, practices, and equipment to be implemented and utilized to protect affected personnel from the potential hazards associated with the *site-specific* tasks to be performed. The level of detail provided in the addendum will be tailored to the type of work, complexity of operations to be accomplished, hazards anticipated and to the extent that new conditions or procedures affect the need to supplement the updated *Site-Wide Safety and Health Plan.*

Shaw will update and submit a Site-Wide Sampling and Analysis Plan (SWSAP) for work to be conducted at PBOW. The current Site-Wide Sampling and Analysis Plan (IT, July 1996) will be used as the base document which will be updated to current methods

and standards. Shaw will also develop a Site-Specific Sampling and Analysis Plan (SSAP) addendum specific to the investigation of WWTP 1 & 3 and Ash Pits 1 & 3. The SSAP will be prepared as an addendum to the SWSAP and it will present details concerning 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 WWTP 1 & 3 and Ash Pits 1 & 3. In addition, it will identify sampling locations for WWTP 1 & 3, Ash Pits 1 & 3, rationale underlying the choice of locations and any expected variations from the SWSAP.

Task 3.0 – Soil Remedial Investigations.

Across each of the four AOCs, Shaw will collect representative soil samples from 0 to 1 ft bgs, 3 to 5 ft bgs, and 8 to 10 ft bgs intervals through direct push sampling techniques. Because fill has been brought into some of these sites, especially the WWTP sites, Shaw will approximate the original soil surface and collect surface soil samples to 1 foot below this depth. The intermediate sample currently planned at a depth of 3 to 5 feet, may be moved based on site-specific conditions. The 8 to 10-foot interval will be collected at the respective depth below current ground surface. If bedrock is encountered at a depth of less than 10 feet bgs, then the deepest sample within a boring will be collected from bedrock to 2 feet above bedrock. Similarly, if groundwater is encountered prior to reaching 10 ft bgs, then the deepest soil interval will be sampled from the top of the groundwater to 2 feet above the groundwater.

No raw explosive material is 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.

At WWTP 1 and WWTP 3, Shaw will focus the soil investigation on the treatment tanks. At each WWTP area, a total of eight (8) borings will be advanced around the four tank locations. This totals 16 soil borings across the two WWTP areas. Because three samples are planned per boring, the total number of soil samples to be collected across the two WWTP areas is 48.

Shaw will install eight (8) borings in Ash Pit 1 and eight borings in Ash Pit 3, totaling 16 borings across the two areas. Because three samples are planned per boring, the total number of soil samples to be collected across the two ash pit areas is 48.

All boring locations will be sketched and surveyed to the nearest 1 foot; land elevations will be surveyed to within $\pm$ 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 – Groundwater Piezometer Remedial Investigations.

From the boreholes drilled during the soil investigation, Shaw plans to transform one borehole at each of the four tank areas at each WWTP into a piezometer and additionally install two piezometers at downgradient locations at each WWTP. Thus, Shaw will install a total of up to six piezometers at each WWTP site. Each location selected for piezometer installation will be continuously logged to bedrock for geotechnical classification. In all, 12 piezometers are planned for installation across WWTP 1 and 3.

At Ash Pit 1 and 3; six borings drilled at each Ash Pit during the soil investigation will be advanced to bedrock, continuously logged, and transformed into piezometers, for a total of 12 piezometers. Because during the Limited SI (July 2000b), large cobble-sized cinders were encountered such that the auger could not be advanced, Shaw will mobilize an appropriately large direct-push rig or other equipment to advance through this material.

If bedrock is encountered at the WWTP or Ash Pit Areas at a depth of less than 5 feet below ground surface and the borehole is dry, then no piezometer will be installed at this location as it is unlikely to produce measurable water. In this case, a suitable alternate location for piezometer installation will be sought. For the WWTP sites, if the soil boring locations around a tank have shallow bedrock (e.g., <5 feet) and/or appears to be dry, then an additional borehole outside of the tank locations will be made for piezometer installation.

Groundwater samples will be collected using low-flow technology unless this technology is not appropriate for a given piezometer, and a variation is approved by OEPA and USACE. It is anticipated that both filtered (for metals) and unfiltered samples will be collected from the 24 piezometers, if there is sufficient overburden groundwater. SVOCs, nitroaromatics, and metals will be analyzed in every sample. VOCs will not be analyzed, as no sources of VOCs would be expected based on former site operations. Shaw will coordinate with the primary and QA laboratories as to the volumes of sample necessary to satisfy all internal laboratory QC requirements. All samples will be collected and analyzed in conformance with applicable EPA and USACE requirements, using techniques and equipment described in the approved SSAP or SWSAP.

Before any of the piezometers within a given source area (i.e., WWTP 1, WWTP 3, Ash Pit 1, or Ash Pit 3) are sampled, the water level will be measured and recorded for all of the piezometers involved in this investigation at the given source area. The piezometer will be purged with clean, non-contaminating equipment. Periodically, during the purge process a portion of the purge water shall be tested and recorded for pH, turbidity, specific conductance, dissolved oxygen, and temperature using flow-through measurement cells. Once the relevant parameters have stabilized (as defined by EM 200-1-3, page C-17) and three consecutive turbidity readings have been less than 100 NTUs, Shaw will measure and record the reduction-oxidation potential of the groundwater and

the sample may be collected. If the relevant parameters do not stabilize and the water level cannot be maintained, Shaw will propose to CELRN how they intend to proceed to ensure that sampling is of quality to fulfill one or more of the project objectives.

Water samples from nearly dry piezometers (e.g., <12 inches of water) are not always representative of formation water and may inappropriately influence contaminant evaluations. If such conditions are encountered, Shaw will propose to CELRN how they intend to proceed.

The groundwater sampling equipment will either be dedicated or cleaned between each piezometer use to prevent cross-contamination. If the sampling equipment requires flexible delivery tubing, it will be constructed of a PTFE material such as Teflon.

Task 5.0 – Analytical Requirements.

A total of 96 soil samples and 24 groundwater samples will be collected for laboratory analysis as described in Sections 3 and 4, respectively. In addition, the following quality assurance/quality control (QA/QC) samples will be collected and analyzed (relative quantities in parentheses):

- Equipment rinsates (5%<)
- Source water (1)
- Blind duplicates (10%<)
- Split samples (10%<)
- Matrix spike/matrix spike duplicate samples (10%<).

All details of sampling shall conform to the CELRN approved Site-Wide SAP, 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 document to verify that the laboratory performing work on this project is compliant with Department of Defense Quality Systems Manual (DOD QSM) Revision 3. 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 filled out and signed by the sample custodian. Copies of the completed chain of custody and cooler receipt forms will be included in the RI 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 Organic Data Review, October 1999 (EPA 540/R-94/012) and the US Environmental Protection Agency Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994 (EPA 540/R-94/-13).

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.

Task 6.0 – Disposal of Investigation Derived Wastes

Shaw will collect investigation derived wastes (IDW), including soil cuttings, decontamination fluids, and personal protective equipment (PPE) which can not be decontaminated and place them in properly labeled, sealed drums. IDW will be segregated by type and origin; there will be no intermixing of media. All IDW drums will be stored on bermed pallets to prevent release of the material to the soil in the event of drum failure. The SSAP will include procedures for IDW management (e.g., drumming, labeling, storage, inspection, and disposal).

After receiving characterization data for the IDW, Shaw will review and data and prepare a letter proposing an appropriate disposal option. Shaw will arrange for disposal of the IDW through a subcontractor. All IDW generated during groundwater sampling efforts will be disposed of off-site within the mandated 90-day time frame.

Task 7.0 – Preparation and Submittal of Interim Data Summary Technical Memorandum

After the analytical results for the soil and piezometer groundwater samples have been validated Shaw will prepare an Interim Data Summary Technical Memorandum. The Limited SI data (July 2000) will be included as part of this summary. Only data necessary to generate the reports (i.e., detected analytes and corresponding detection limits) will be manually entered into the database under this scope. If deemed necessary, the full data reports for the sites will be entered into the database under a future delivery order. Data

summaries for each medium will include a data summary (both Limited SI and RI data) of all sample identifications, sample locations, sample dates, detected chemical concentrations, method detection limits, 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 as those that will be used in a data screening portion of a human health risk assessment (unless subsequently updated prior to the risk assessment). Shaw will present the investigation results in a report, which will include a brief narrative that details the nature of work performed during the investigation, problems encountered, and conclusions and recommendations. Shaw will also identify in the report when Method Detection Limits for individual analytes and sample locations were higher than the appropriate screening value.

Shaw will prepare figures that show sampling locations (including depths) for each sample collected. Additionally, Shaw will prepare figures for sampling results showing those values that exceed screening criteria and for reference purposes only, a table showing PBOW background concentrations of inorganic analytes. The Technical Memorandum will be submitted to USACE, OEPA, and NASA for review. Shaw will prepare and issue responses to any review comments. Upon resolution of the comment responses, the recommendations will be incorporated into future work plans (if needed) and the Site Characterization Report (Part I of the RI). The Site Characterization Report which will be scoped under a separate delivery order.

Task 8.0 – 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 9.0 – Project Management

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

Task 10.0 – Alkaline Hydrolysis Bench-Scale Treatability Study for Nitroaromatics-Contaminated Soil.

Alkaline hydrolysis has been recently identified as a potential technology for soil remediation at PBOW TNT Area C and TNT Area A. Therefore, in accordance with the Scope of Work, a bench-scale feasibility study will be conducted on nitroaromatic-contaminated soil.

Shaw will collect a composite sample from TNT Area C and TNT Area A from areas of known contamination on which to perform the treatability study. Relative levels of contamination will be determined by field colorometric test kits to assure that the sample is collected from areas with high levels of nitroaromatics to provide for a meaningful study. The sample will be sent for laboratory analysis to be homogenized and analyzed for total solids, pH, bulk density, nitrate, explosives, and PAHs.

Portions (~1,000g) of the homogenized sample will be mixed with a variety of alkaline reagents known to be effective at increasing pH to above 12, such as caustic soda and calcium oxide. The quantity of each reagent added to the sample will be based on the amount required to increase the pH above 12. Each soil/reagent formulation will be mixed using a planetary mixer operating at 30-40 rpm for 45 to 60 seconds, with water added to bring the soil formulations close to saturation. The treated material from each formulation shall be split into two parts. One part will be amended with ferric chloride and the other half will remain unamended. All portions shall be allowed to cure for 7 days, with daily turning. After 7 days, each portion will be sampled and analyzed for pH, nitrate, explosives, and PAHs.

Based on the results of the alkaline hydrolysis testing, a 2-kilogram batch of the homogenized soil will be treated with the alkaline hydrolysis reagent judged to be the most effective. Portions (~500 grams) of the alkaline hydrolysis-treated soil will be amended with reagents known to decrease the pH of soils. These reagents may include anhydrous citric acid, ferrous sulfate, aluminum sulfate, and elemental sulfur. The quantity of each reagent will be based on the amount required to decrease the pH below 8. The batches will be sampled and analyzed for pH, nitrate, explosives, and PAHs.

A bench-scale treatability study report will be developed identifying results and recommendations. The report will include:

- Executive Summary
- Study approach
- Composite characterization data
- Alkaline hydrolysis testing results
- Neutralization testing results, and
- Recommendations for full-scale remediation.

Shaw will respond to and incorporate comments on the draft report into the final treatability study report.

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.
- **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 concept, or approach, may be needed for the following:

- 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 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 it to the PM; a copy of these review documents will also be placed in the project files. Technical review comments will be responded to in writing by the preparer of the document, incorporated into the document as appropriate, and submitted with the document to the USACE.

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

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
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

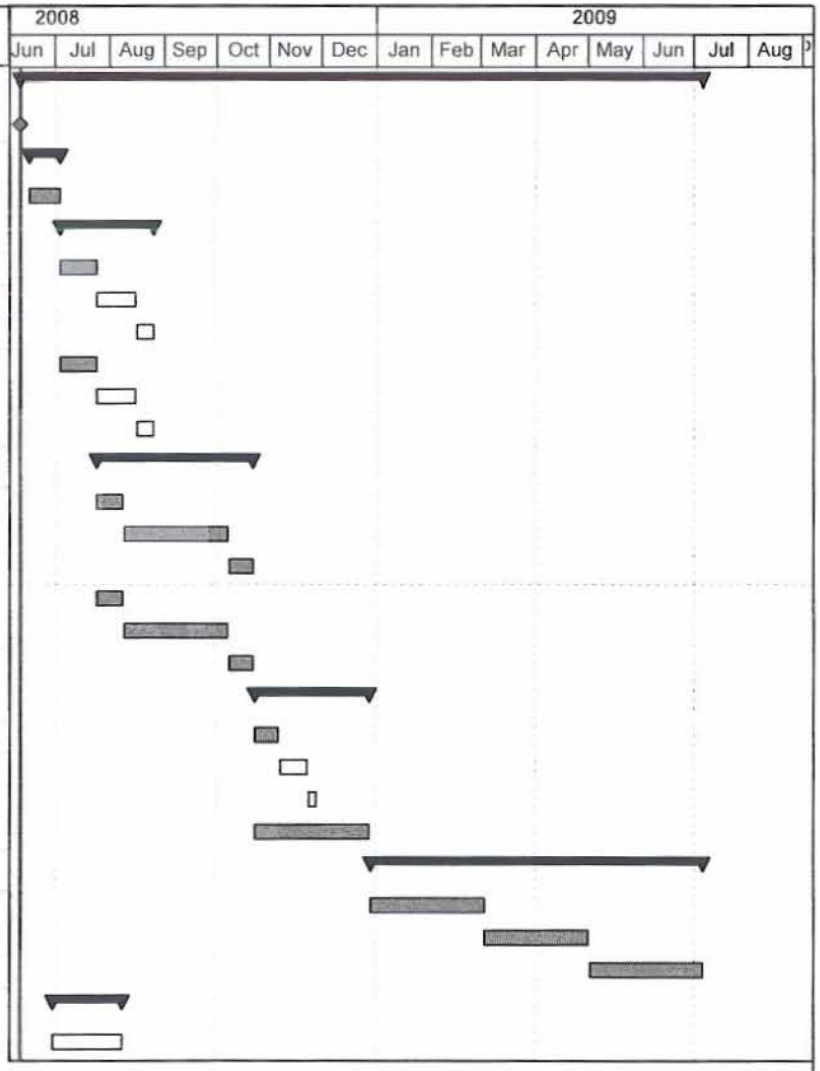
The Shaw Project Records Clerk is responsible for maintaining control and retention for project-related records. Record control includes receipt from external and internal sources, transmittal,

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.

Activity ID	Activity Name	Remaining Duration	Start	Finish
RI Part I, Waste Water Treatment Plants ...		385	11-Jun-08 A	05-Jul-09
A1060	Notice To Proceed	0	11-Jun-08 A	
QCP		18	16-Jun-08	03-Jul-08
A1000	QCP	18	16-Jun-08	03-Jul-08
Site-Wide Plans		53	04-Jul-08	25-Aug-08
A1020	Prepare & Submit Draft Site-Wide SHP	21	04-Jul-08	24-Jul-08
A1030	Review Site-Wide SHP	22	25-Jul-08	15-Aug-08
A1040	Prepare & Submit Final Site-Wide SHP	10	16-Aug-08	25-Aug-08
A1050	Prepare & Submit Draft Site-Wide SAP	21	04-Jul-08	24-Jul-08
A1070	Review Site-Wide SAP	22	25-Jul-08	15-Aug-08
A1080	Prepare & Submit Final Site-Wide SAP	10	16-Aug-08	25-Aug-08
SSHP & SSAP Addenda		90	25-Jul-08	22-Oct-08
A1090	Prepare Draft SSHP	15	25-Jul-08	08-Aug-08
A1100	External Review Draft SSHP	60	09-Aug-08	07-Oct-08
A1110	Prepare & Submit Final SSHP	15	08-Oct-08	22-Oct-08
A1120	Prepare Draft SSAP Addenda	15	25-Jul-08	08-Aug-08
A1130	External Review Draft SSAP Addenda	60	09-Aug-08	07-Oct-08
A1140	Prepare & Submit Final SSAP Addenda	15	08-Oct-08	22-Oct-08
Field Work & Sample Analysis		66	23-Oct-08	27-Dec-08
A1150	Soil Remedial Investigation	14	23-Oct-08	05-Nov-08
A1160	GW Piezometer Remedial Investigation	17	06-Nov-08	22-Nov-08
A1170	Investigation Derived Waste	5	23-Nov-08	27-Nov-08
A1171	Analytical	66	23-Oct-08	27-Dec-08
Interim Data Deliverable Report		190	28-Dec-08	05-Jul-09
A1200	Prepare Draft Report	65	28-Dec-08	02-Mar-09
A1210	External Review Draft Report	60	03-Mar-09	01-May-09
A1220	Prepare & Submit Final Report	65	02-May-09	05-Jul-09
Alkaline Hydrolysis Treatability Study		40	30-Jun-08	08-Aug-08
A1190	Alkaline Hydrolysis Treatability Study	40	30-Jun-08	08-Aug-08



Remaining Level of Effort
Start Miles...
Actual Level of Effort
Summary
Actual Work
Remaining Work
Critical Remaining Work
Milestone

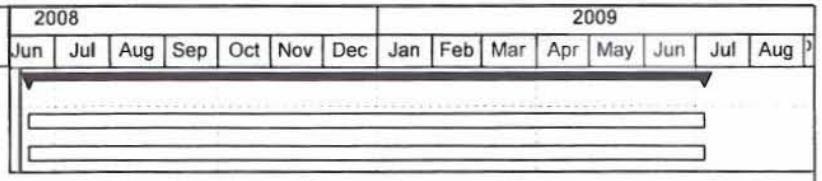
Figure 1

Baltimore A/E Contract #W912DR-05-D-0026

DX10 - RI Part I, WWTP 1&3, Ash Pits 1&3 and TS @ PBOW

Shaw Environmental, Inc. Project Schedule

Activity ID	Activity Name	Remaining Duration	Start	Finish
Project Management		385	16-Jun-08	05-Jul-09
A1230	Miscellaneous Task Team Support	385	16-Jun-08	05-Jul-09
A1240	Project Management	385	16-Jun-08	05-Jul-09



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Start Miles...
Summary

Figure 1

Baltimore A/E Contract #W912DR-05-D-0026

DX10 - RI Part I, WWTP 1&3, Ash Pits 1&3 and TS @ PBOW

Shaw Environmental, Inc. Project Schedule

Shaw® Shaw Environmental, Inc.

DISCIPLINE SIGN-OFF REVIEW

Client Name: U.S. Army Engineer District, Nashville; CELRN-EC-R

Project Description: Phase 1 RI at Waste Water Treatment Plants (WWTP) 1 and 3 and Ash Pits 1 and 3 and Nitroaromatic Treatability Study
Former Plum Brook Ordnance Works, Sandusky, Ohio

Contract No. W912DR-05-D-0026 Delivery Order No. DX02

Project No. 132288 Task/Phase Number:

Document Type	Identify specific section or segment covered by this checkprint	Document Origin
☐ Technical / Cost Proposal		☐ Originator Developed
☐ RFP		☐ Edited Standard
☐ Contract / Subcontract		☐ Client Furnished
☐ SHP, SSAP, CDAP, or QAPP		
☐ Report		**Document Status**
☐ Risk Assessment / Evaluation		☐ Preliminary
☐ Specifications & Plans		☐ Internal Draft
☐ Design Calculations		☐ Draft
☐ Tables		☐ Draft Final
☐ Drawings / Figures		☐ Final
☐ Other:		☐ Other:

	Required Person	Signature	Date
Originator			
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Peer Review (QC)			
Technical Review			
Technical Review			
Quality Assurance Mgr			
Project Manager			

NOTICE: By signature above, parties certify that the subject document has been prepared by and/or reviewed by them (as appropriate), that all review comments have been resolved, and that the document is ready for submittal.

FIGURE 2

Table 1

Preparation and Review Process for Required Project Deliverables
Remedial Investigation Part 1 of
Waste Water Treatment Plants 1 and 3, Ash Pits 1 and 3, and
Nitroaromatics Treatability Study
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
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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.