Statement of Work for

Remedial Design/Remedial Action for Operable Unit 1 and Remedial Investigation/Feasibility Study for Operable Unit 2

Washington Gas East Station Site

National Capital Parks-East
Washington, DC

October 2011

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1.0 Introduction and Purpose

This Statement of Work (SOW) defines the response activities and obligations that the Washington Gas Light Company (Settling Defendant) shall perform and satisfy to address hazardous substances released at or from the Washington Gas East Station Property (Site), as defined in the Consent Decree to which this SOW is attached. The Site includes Operable Unit 1 (OU1) and Operable Unit 2 (OU2) as defined in the Consent Decree. Settling Defendant shall conduct a Remedial Design/Remedial Action (RD/RA) at OU1 and a Remedial Investigation/Feasibility Study (RI/FS) at OU2.

Section IV of the Consent Decree and Section 1.A of this SOW provide a definition of terms used in the Consent Decree and SOW. Section 1.B of this SOW contains a list of general requirements for all Work performed under this SOW. Section 2 of this SOW presents an overview of the RA for OU1 set forth in the Record of Decision (ROD) issued by the National Park Service (NPS) in August 2006. Section 3 of this SOW describes the specific requirements and deliverables Settling Defendant must complete in performing the OU1 RD/RA. Section 4 of this SOW describes the specific requirements and deliverables Settling Defendant must complete in performing the OU2 RI/FS. Section 5 of this SOW describes the Performance Standards and Institutional Controls that Settling Defendant must attain or implement in completing the OU1 RD/RA. Section 6 of this SOW describes the compliance monitoring and reporting requirements Settling Defendant must satisfy.

1.A. Definitions

The following definitions shall apply to this SOW. Definitions provided in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601 *et seq.*, and in the Consent Decree are incorporated herein by reference.

a. "ARARs" shall mean applicable or relevant and appropriate requirements, as defined in CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300.

b. "BTEX" shall mean benzene, toluene, ethylbenzene, and xylenes.

c. "Clean fill" and "clean native soil" shall mean soil-like materials that do not exhibit visual or olfactory evidence of tar, cinders, ash, stained woodchips, coal, petroleum products, or other waste products of coal gasification; asphalt; or building materials other than unpainted brick, concrete masonry units, or concrete.

d. "Consent Decree" or "CD" shall mean the Consent Decree between the United States, the District of Columbia, and Settling Defendant, to which this SOW is appended, and all appendices attached thereto.

e. "Manufactured Gas Wastes" shall mean tar, coke, or purifier box waste wood chips.

f. "Mass discharge" shall mean the total contaminant mass (including NAPL and the mass dissolved in groundwater) that discharges into the Anacostia River from hazardous substances released at or from the Washington Gas East Station Property (Site contamination) per unit time.

g. "Mass flux" shall mean the contaminant mass dissolved in groundwater that migrates or fluxes through a cross sectional area orthogonal to the mean groundwater flow direction per unit time.

h. "Tar" shall mean coal tar or coal-tar-like material that is a viscous, oily, dark brown or black material that can be identified visually, tactilely with protective gloves, or by odor, and which typically contains polynuclear aromatic hydrocarbons (PAHs), benzene, and heavy metals. Tar contains light and heavy fractions and can be present as DNAPL and/or LNAPL.

1.B. General Requirements

The following general requirements shall apply to all Work performed under this SOW.

a. Settling Defendant shall furnish all necessary and appropriate personnel, materials, and services needed for, or incidental to, performing and completing the tasks described herein, unless otherwise specified.

b. NPS, in consultation with the District, will provide oversight of Settling Defendant's activities throughout all tasks. NPS and the District will review deliverables to ensure compliance with the ROD, Consent Decree, and this SOW, and attainment of Performance Standards.

c. To ensure that all NPS comments are addressed satisfactorily, documents will be submitted for NPS review as draft, draft final (unless determined by NPS to be unnecessary), and final. Settling Defendant shall submit more than one draft final version if NPS's comments are not satisfactorily addressed in preceding draft final versions. The deadlines established in Sections 3 and 4 for Settling Defendant's submittal of documents are binding and enforceable pursuant to Section XVIII (Stipulated Penalties) of the Consent Decree, unless an extension is approved by NPS or required pursuant to Section XVI (Force Majeure) of the Consent Decree.

d. If weather conditions are unfavorable for completion of any activity in the specified time frame, NPS will consider an extension. Nothing in this paragraph shall limit the grounds on which an extension may be granted pursuant to the Consent Decree.

e. As provided by Section VI, Paragraph 10 (Selection of Supervising Contractor) of the Consent Decree, Settling Defendant's selection of the following personnel or

organizations will be subject to approval by NPS, after a reasonable opportunity for review by the District: Supervising Contractor; other Contractors.

f. Settling Defendant shall submit progress reports as specified in Section IX (Reporting Requirements) of the Consent Decree and Section 6 of this SOW.

g. The Project Operation Plan (POP) requirements are detailed in Attachment A of this SOW. Settling Defendant shall prepare separate POPs for the OU1 RD/RA and the OU2 RI/FS as specified herein.

h. All plans, reports, and other deliverables identified in this SOW for submittal to NPS and the District shall be delivered in accordance with the Consent Decree and this SOW.

i. Any plan, report, or other deliverable submitted to NPS for approval shall be: (a) printed using two-sided printing; (b) submitted digitally on a compact disc (or similar) in MSWord format and PDF (or similar); and (c) marked "Draft", "Draft Final", or "Final", as appropriate.

2.0 OVERVIEW OF WORK REQUIRED AT OPERABLE UNIT 1

Following is a detailed discussion of the RD/RA Settling Defendant shall design and implement at OU1. The required RA includes, as described herein: removal and offsite disposal of surface soil; removal and offsite disposal of subsurface soil; compliance monitoring and reporting; and implementation and monitoring of Institutional Controls.

2.A. SURFACE SOIL REMOVAL AND DISPOSAL OFF-SITE

The remedy for OU1 is set out in the ROD and calls for removal and disposal off-site of the top 1 foot of all surface soil within the boundaries described below except in the following cases: 1) if, during the 1 foot soil excavation, Manufactured Gas Wastes are found next to the foundation of an existing building or structure, shallow pits or probes will be excavated to 1.5 feet below ground surface and contaminated soil will be excavated following delineation; 2) soil beneath the existing hardwood canopy at the eastern side of the District property will not be excavated (unless Manufactured Gas Wastes are found up to that boundary, as discussed further below); and 3) portions of the U.S. Army Corps of Engineers (USACE)-managed property that have been previously excavated at least 1 foot and backfilled in the course of placing concrete, footers, or asphalt will not be excavated unless any Manufactured Gas Wastes have been previously identified at the bottom of a previous excavation (i.e., at 1 foot below ground surface) or in a contiguous excavation, in which case the 1 foot cover soils and concrete and asphalt will be removed and replaced and additional excavation will be performed consistent with the remainder of OU1. The current land surface elevation will be maintained. Soil will be removed, characterized for disposal, and disposed off-site. A right-of-way for the USACE to access their property must be maintained at all times. The excavated areas on portions of the District property that are to be revegetated will be filled up to 0.5 foot (6 inches) below the existing surface elevation with clean fill, then covered with 0.5 foot (6 inches) of topsoil. The topsoil will be planted with vegetation to prevent erosion and to ensure the integrity of the clean soil cover. On areas of the District property that will not be revegetated, as determined by NPS in

consultation with the District, clean fill will be placed in the excavations and other cover (such as gravel, blacktop, or concrete) appropriate to the area's use will be placed on the clean fill such that final grades match prior grades.

To the extent practicable, excavation and backfilling activities will be coordinated with bicycle and walking path design and construction to maximize efficiencies and cost savings without compromising health, safety, or SOW requirements. Such coordination is practicable if sufficient information is available and provided in a timely manner to Settling Defendant.

During removal of surface soil, the underlying soil will be observed for signs of coal tar or tar-like materials. Locations where coal tar or tar-like materials have been observed in borings or test pits are shown on Figure 2. Where coal tar or tar-like materials are observed, additional excavation will be required as described in Subsection 2.B of this SOW.

The boundaries of the area within which surface soil is to be excavated will be determined in the following manner:

1. The boundaries of the OU1 RA along Water Street will be surveyed and marked from the west side of the westernmost 11th Street Bridge to the tree line, as described below, at the east side of the District property, including the two separate enclaves north of Water Street (Reservation 298 and the portion of Reservation 343D at the junction of Water Street and 12th Street). Excavation will extend up to these boundaries, with the western extent south of Water Street to be determined as described below. After remediation, the revegetated areas will be fenced to control access until the vegetation is established.

2. The north and south boundaries of the OU1 RA south of Water Street will be fixed at the property line along Water Street to the north and the sea wall to the south and will include the USACE-managed property.

3. The provisional eastern boundary of the OU1 RA shall be the tree line at the western extent of the canopy created by existing live hardwood trees and ground vegetation. If Manufactured Gas Wastes are detected at the edge of the wooded area, excavation shall continue eastward beyond this provisional boundary concentrically in 10-foot increments until a 10-foot radius can be established around the last evidence of contamination without uncovering further Manufactured Gas Wastes contamination.

4. The provisional western boundary of the OU1 RA will be a line determined during excavation that shall extend west and north of and encompass the locations of the following pits and excavations in which tar or NAPL has been noted: TP- 46, TP-51, WGL-01S, and ST-4. The initial line of excavation shall then extend north from ST-4 towards the former location of TP-57 across Water Street and terminate at the District property line along the south side of Water Street. Excavation along the provisional western boundary will be limited by the presence of several new bridge spans and the associated supporting abutments that did not exist when the ROD was written. The Settling Defendant will consult with the DC Department of Transportation to propose for

Plaintiffs' consideration limits of excavation around bridge abutments and to confirm soil disturbance areas during RA activities.

5. If Manufactured Gas Wastes are observed or detected with a photoionization detector (PID) as described below in the uppermost 1 foot of soil at the western provisional boundary line established above, the western extent of excavation will be expanded in 10 foot increments. The extent of excavation will be expanded concentrically by increasing the radius 10 feet per iteration. Excavation will continue until a 10-foot radius can be established around the last evidence of contamination without uncovering further Manufactured Gas Wastes contamination. It is expected that no roads, bridge piers, existing catch basins, or other permanent structures will be impacted during excavation, and contamination around or likely to be under these structures will be recorded as part of an Institutional Control for the Site.

6. In the event that Manufactured Gas Wastes are found next to the foundation of an existing building or structure during the excavation of the top 1 foot of soil, shallow pits or probes will be excavated to 18 inches (1.5 feet) below the ground surface along the perimeter of the building or structure to establish the extent of Manufactured Gas Waste. If Manufactured Gas Wastes are found along the perimeter of the foundation, excavation shall continue away from the foundation until there is a 10-foot lateral radius of clean subsurface soil with a maximum depth of 1.5 feet from the last observed location of Manufactured Gas Wastes. Exploration for additional Manufactured Gas Wastes will be continued iteratively in all possible directions away from the building, with the maximum depth of three feet below the ground surface once the excavation is sufficiently far away from the building or foundation to not negatively impact its structural integrity (estimated at 2.5 feet away from the excavation or foundation, although this measurement should be field verified based on the building's condition).

7. The means and methods for all Site soil removal/clean soil placement pursuant to the SOW shall be specified within the OU1 RD/RA Work Plan, and shall be subject to NPS approval, so as to reduce, to the maximum extent possible, impacts to air, surface water, sediment, or adjacent areas that are not designated for remediation. Settling Defendant shall implement erosion and sedimentation controls, dust control, and volatile emissions control measures as determined by NPS to be necessary to limit migration of contaminants and habitat disturbances during soil removal and clean soil placement.

Settling Defendant shall conduct the following activities during the removal and disposal of surface soil:

- A survey of the area within the boundaries designated above for existing elevations (including establishment of temporary benchmarks that will not be disturbed during work), property boundaries, and locations on the USACE-managed property where soil was previously excavated to at least 1 foot and backfilled;
- Pre-excavation clearance from Miss Utility and non-member utilities;
- Submittal of preparatory documents as described in Sections 2 and 3 of this SOW;

- Obtain all necessary permits, if any, for off-site components of the RD/RA;
- Mobilization;
- Construction of a temporary on-land turbidity curtain or staked erosion control along the seawall and at the eastern and western OU1 boundaries to prevent the potential off-site surface migration of contaminants;
- Construction of a temporary fence around currently unfenced work areas to prevent unauthorized access during excavation;
- Excavation of soil to required depths (1 foot or 1.5 feet depending on the location) using best management practices to control fugitive dust and runoff;
- Institute a particulate monitoring program during excavation, with appropriate contingency measures in case of regulatory exceedences;
- Appropriate characterization of waste soils and disposal off-site at a permitted facility in accordance with applicable federal and state regulatory requirements and as provided in Paragraph 17 (Off-Site Shipment of Waste Material) of the Consent Decree;
- Field observations (visual, tactile, and olfactory) to identify the presence of coal tar; visual and/or olfactory observations can be supported with a PID or equivalent, but low PID readings shall not be used as evidence that Manufactured Gas Waste does not exist if visual and olfactory cues indicate otherwise. If PID readings at or greater than 1 ppm above ambient air background at a height of 4 inches above the ground surface are detected without visual or olfactory evidence of coal tar, additional 0.5 foot lifts of soil will be excavated over a circular area with a lateral radius of 10 feet until the bottom of observable contamination (or a PID reading of less than 1 ppm above background at a height of 4 inches above the bottom of excavation) is encountered or the maximum depth of excavation is reached, whichever is first;
- Written description of the methodology that will be used to establish background concentrations for naturally-occurring analytes for comparison of clean fill and topsoil analytical results;
- Collection and analysis of clean fill and topsoil samples for analysis of cyanide, polychlorinated biphenyls (PCBs), pesticides, metals, volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). Sampling results must be, to the extent practicable, at or below background levels for naturally occurring metals and at non-detectable levels for other contaminants;
- In areas that will be vegetated, placement of clean fill to a compacted height of 0.5 foot below the original grade and placement of clean topsoil above the clean fill up to original grade (compaction requirements for topsoil must create a suitable surface for planting and will be specified in the RD);
- In areas that will be paved or covered with gravel or concrete, placement of clean fill to a height of 0.5 foot below the original grade, and placement of clean subbase material and pavement or gravel up to original grade (compaction requirements for clean fill and subbase must create a suitable surface for the cover type and will be specified in the RD);

- Elevation survey to confirm correct material placement;
- Mapping locations where soil has been excavated and clean fill has been placed using a sub-meter GPS unit;
- Preparation of a GIS map showing the excavated areas as well as areas that did not require surface soil excavation;
- Where appropriate and consistent with future uses to be identified by the District in the course of development of the RD, planting appropriate species of grasses, emergent vegetation, shrubs, and tree saplings to replicate, as much as possible, the physical characteristics of a typical riparian border of the Anacostia River;
- Installation of a fence around excavated areas to control access during revegetation;
- Monitoring and maintenance of vegetation for 2 consecutive years to ensure an appropriate vegetative cover that will meet Performance Standards; and
- Monitoring and maintenance of pavement or gravel surfaces to ensure a competent cover over clean fill for 2 consecutive years.

2.B. SUBSURFACE SOIL REMOVAL AND DISPOSAL OFF-SITE

The RA for OU1 includes removal of Manufactured Gas Waste-contaminated subsurface soils either to a maximum depth of 3 feet below ground surface, or to the water table, whichever condition is encountered first. Removed soils will be replaced with clean soil and appropriate surface materials (topsoil and vegetation, or gravel, blacktop, or concrete). The former Washington Gas pump house will be removed prior to or as part of the RA. As specified by this Section 2.B., Settling Defendant must remove all Manufactured Gas Waste-contaminated soil and must verify complete removal by field observation (visual, tactile, and olfactory) as provided by this SOW. A right-of-way providing the USACE access to its property must be maintained at all times.

The subsurface soils RA will be combined and coordinated with the surface soils RA and subsequent backfilling of surface soil removal locations. Coordination of surface and subsurface soils excavation and backfilling will be determined in the Remedial Design. Settling Defendant shall conduct the following activities during the removal and disposal of subsurface soil:

- Submittal of preparatory documents as described in Sections 2 and 3 of this SOW;
- Review and pre-marking of areas where tar or tar-like-materials were identified during surface soil removal;
- Mobilization;
- Removal of soils as required using reasonable precautions to minimize the emission of any fugitive dust into the outdoor atmosphere and to prevent accelerated erosion and sedimentation or sediment deposit in the Anacostia River;
- Identification of tar and tar-like materials using visual, tactile, and olfactory observations with PID confirmation of visual and olfactory evidence;

- In areas where this is no evidence of tar or tar-like materials below the surface soil (1 foot below ground surface), subsurface soils may be removed to a depth of 3 feet below the ground surface at the discretion of the Settling Defendant Project Manager or RA contractor if they determine additional removal is advantageous.
- Mapping locations where tar is present at the bottom of the subsurface soil excavation using a sub-meter GPS unit, and measuring/recording the dimensions of the subsurface tar area;
- Amending the surface soil excavation map to show the areas where contaminated subsurface soils were identified and remain at the bottom of the filled excavation as well as areas that did not require subsurface soil excavation;
- Appropriate characterization of waste soils and disposal off-site at a permitted facility in accordance with applicable federal and state regulatory requirements, and as provided in Paragraph 17 (Off-Site Shipment of Waste Material) of the Consent Decree;
- Collection and analysis of clean fill samples if the source is different from that to be used for surface soil replacement; and
- In areas that will be vegetated, placement of clean fill to a compacted height of 0.5 foot below the original grade and placement of clean topsoil above the clean fill up to original grade (compaction requirements for topsoil must create a suitable surface for planting and will be specified in the RD).

2.C. COMPLIANCE MONITORING AND REPORTING

The remedy for OU1 includes documenting progress during RA and monitoring every 5 years after completion if residual contamination remains following the RA. Therefore, long-term compliance monitoring and reporting will be required to document the RA's effectiveness and achievement of Performance Standards (see Section 6 of this SOW for more details on compliance monitoring and reporting).

2.D. INSTITUTIONAL CONTROLS AT OPERABLE UNIT 1

Settling Defendant shall develop an Institutional Controls Implementation and Assurance Plan (ICIAP) that identifies appropriate Institutional Controls for OU1 (OU1 ICIAP), and provides for implementing, maintaining, monitoring, and reporting on the Institutional Controls identified in the OU1 ICIAP.

The OU1 ICIAP shall include all Institutional Controls necessary to ensure that the remedy implemented under the Consent Decree and this SOW remains protective of human health and the environment and compliant with Site ARARs. The OU1 ICIAP must also provide for the establishment of Institutional Controls under the District's Uniform Environmental Covenants Act, D.C. Official Code § 8-671.01, *et seq.* (2009).

Settling Defendant shall submit the OU1 ICIAP for review and approval by Plaintiffs. Upon approval of the OU1 ICIAP by Plaintiffs, Settling Defendant shall record the Institutional Controls with the Recorder's Office or Registry of Deeds or other office where land records are maintained in the District of Columbia. Settling Defendant shall monitor and enforce all

Institutional Controls at the Site by means of an agreement with the District, attached as Appendix E to the Consent Decree.

The OU1 ICIAP for the Site shall include, but is not limited to, Institutional Controls that address the following restrictions:

- Limitations, conditions, or prohibitions on post-remediation excavations in the location of the OU1 soil remedy; and
- Reporting requirements for any previously unmapped tar at the District Property discovered after the completion of the Work at OU1.

3.0 REQUIRED DELIVERABLES AND DEADLINES FOR OPERABLE UNIT 1 REMEDIAL DESIGN AND REMEDIAL ACTION

Settling Defendant shall conduct RD/RA activities required for OU1 in accordance with the Consent Decree and this SOW and shall timely submit all required deliverables as described herein and summarized in Table 1. In the event that this Section and Table 1 are inconsistent or conflict, this Section controls. The OU1 RA shall be completed with selective testing and inspection of materials, procedures, and equipment by the Oversight Contractor selected by NPS.

Settling Defendant shall prepare and submit an RD/RA Work Plan for review by NPS and the District, and approval by NPS. The RD/RA Work Plan shall include, or shall describe the process and schedule for conducting or completing, the following activities and deliverables.

1. All work performed by Settling Defendant shall be carried out by a qualified Contractor, selected and approved as specified in Paragraph 10 of the Consent Decree.
2. Within 75 days of NPS's issuance of an authorization to proceed pursuant to Section VI, Paragraph 10 (Selection of Supervising Contractor) of the Consent Decree, Settling Defendant shall submit to NPS and the District the draft OU1 RD/RA Work Plan, the draft OU1 Construction Quality Assurance Plan (CQAP), and the draft OU1 POP. The draft RD/RA Work Plan shall include the following: (1) schedule for completion of the RA; (2) schedule for developing and submitting any OU1 RA plans, not identified herein, that may be necessary as the RA proceeds; (3) monitoring plans; (4) methods for satisfying permitting requirements, if any; (5) methodology for implementing the Operation and Maintenance (O&M) Plan; (6) methodology for implementing the Contingency Plan; (7) tentative formulation of the OU1 RA team; (8) methodology for implementing the CQAP; and (9) procedures and plans for the decontamination of equipment and the disposal of contaminated materials. NPS must approve the proposed waste disposal facility in accordance with Paragraph 17 of the Consent Decree. NPS must approve the proposed clean fill and clean topsoil before RA activities commence.
3. Within 45 days of receipt of NPS's comments on the draft OU1 RD/RA Work Plan, CQAP, and POP, Settling Defendant shall submit a draft final OU1 RD/RA

Work Plan, CQAP, and POP that satisfactorily incorporates or otherwise complies with NPS's comments. Within 15 days of NPS's comments on the draft final OU1 RD/RA Work Plan, CQAP, and POP, Settling Defendant shall submit to NPS and the District a final OU1 RD/RA Work Plan, CQAP, and POP that satisfactorily incorporates or otherwise complies with NPS's comments.

4. Within 60 days of NPS's approval of the final OU1 RD/RA Work Plan or after removal by the District of existing buildings that are to be removed or 30 days after completion of the OU2 landside field work, whichever occurs later, and making appropriate allowances for field conditions and seasonality, Settling Defendant will hold a pre-construction conference before the start of RA construction that will be attended by the Contractor responsible for developing the RD (if different from the RA Contractor), the RA Contractor, the Oversight Contractor, NPS, the District, Settling Defendant, and other regulatory representatives, as appropriate. Nothing in this Section 3.0(4) shall preclude Settling Defendant from holding the pre-construction conference or starting RA construction at any point after NPS approval of the final OU1 RD/RA Work Plan, at Settling Defendant's option.

5. In accordance with the schedule provided in the OU1 RD/RA Work Plan, the RA Contractor shall provide a letter to NPS and the District documenting initiation of the field construction and begin work. Settling Defendant shall provide oversight of the RA Contractor.

6. Following substantial completion of field construction activities, Settling Defendant shall prepare during a pre-final inspection a punch list of outstanding items requiring correction before acceptance of Work, and provide the punch list to NPS and the District. Substantial completion shall be the point at which the Supervising Contractor states that they have completed the Work required for OU1 in accordance with the OU1 RD/RA Work Plan, and that the Performance Standards have been met.

7. Settling Defendant shall conduct with NPS and the District a final inspection of completed Work following completion of all items on the punch list.

8. Within 60 days of completion of the RA construction and the correction of all punch list items, Settling Defendant shall prepare for NPS and the District a draft OU1 RA Project Closeout Report that documents and certifies that Settling Defendant has successfully completed all items contained in the approved OU1 RD/RA Work Plan and OU1 POP and that all requirements of the Consent Decree and this SOW have been fulfilled. The OU1 RA Project Closeout Report shall document that the Performance Standards have been met. The OU1 RA Project Closeout Report also shall include Record Drawings of the project, documenting all changes made in the specifications and working drawings during the Work and showing the exact dimensions, geometry, and location of all elements of the Work completed.

9. Within 30 days of receipt of NPS's comments on the draft OU1 RA Project Closeout Report, Settling Defendant shall submit to NPS and the District a draft final OU1 RA Project Closeout Report that satisfactorily incorporates or

otherwise complies with NPS comments. Within 15 days of NPS's comments on the draft final OU1 RA Project Closeout Report, Settling Defendant shall submit to NPS and the District a final OU1 RA Project Closeout Report that satisfactorily incorporates or otherwise complies with NPS's comments.

10. Settling Defendant shall perform O&M as described in Section 6.B (Operation and Maintenance) of this SOW and the approved O&M Plan.

4.0 OVERVIEW OF WORK REQUIRED AT OPERABLE UNIT 2

Settling Defendant shall perform all activities necessary to complete a RI/FS of OU2. The purpose of the OU2 RI/FS is to determine the nature and extent of Site contamination in the groundwater that discharges to the Anacostia River and the nature and extent of Site contamination in surface water and sediments in the Anacostia River. The OU2 RI/FS will have the following objectives:

- Collect data of sufficient quality and quantity to enable the assessment of risk to human and ecological receptors from Site contamination;
- Identify and assess applicable or relevant and appropriate requirements (ARARs) for the Site;
- Identify and evaluate a reasonable array of remedial alternatives, including the No Action alternative, to address unacceptable risks and ARARs;
- Identify and evaluate remedial alternatives with respect to the nine criteria in the NCP; and
- Identify a preferred remedial action for OU2.

The OU2 RI/FS will incorporate, as appropriate, and add to relevant data from the 1999 East Station RI/FS and data subsequently collected at the Site. More specifically, for the purpose of determining Site contamination impacts to the Anacostia River surface water and sediments, additional data are required to determine the nature and extent of Site contamination vertically and horizontally in the vicinity along the seawall northeast of existing monitoring well MW-5, to the southwest of the 12th Street sewer outfall, the area between these two locations, and north of MW-18 approximately between MW-18 and MW-10.

The OU2 RI/FS will be undertaken in accordance with 40 CFR § 300.430(d) and (e), and will form the basis for selecting a RA for OU2, if a RA is determined by NPS to be necessary to meet Site Remedial Action Objectives (RAOs) as defined through the RI/FS process. The OU2 RI/FS activities required include, but are not limited to: (a) an RI that identifies the nature and extent of Site contamination in groundwater discharging to the Anacostia River, surface water, and River sediments and includes an investigation of contaminant transport (including transport rate and mass flux) to the Anacostia River; and (b) an FS to identify and evaluate remedial alternatives. The analysis and determination of Site ARARs along with the assessment of risk to human health and the environment will be considered in any remedy associated with the contaminant transport to the River and Site contamination in groundwater.

The OU2 RI/FS shall include the following:

- Installation and monitoring of additional wells and monitoring of select existing wells to the extent needed to address data gaps in areas not sufficiently addressed previously to determine whether Site contamination in groundwater or present as NAPL are discharging to the Anacostia River in the vicinity of the seawall at concentrations that exceed appropriate screening levels. Consistent with CERCLA and the NCP, Settling Defendant will perform human health and ecological risk assessments, as well as ARARs analysis, to enable NPS to establish preliminary Remediation Goals to be further evaluated in the Feasibility Study;
- Delineation of the extent of NAPL and its resulting dissolved contamination, and dissolved contamination in groundwater vertically and horizontally in the vicinity of the seawall and potentially upgradient of the seawall to the extent needed for the FS. More specifically, for the purpose of determining the impacts of Site contamination to the Anacostia River surface water and sediments, additional data are required to determine the nature and extent of Site contamination in groundwater vertically and horizontally in the vicinity along the seawall northeast of existing monitoring well MW-5, to the southwest of the 12th Street sewer outfall, the area between these two locations, and north of MW-18 approximately between MW-18 and MW-10. NAPL delineation may require continuous coring and in-situ analysis for the presence of NAPL;
- Determination of Site contamination NAPL source areas that may result in Site contamination migration to the Anacostia River at concentrations above Remediation Goals (to be determined by NPS through the RI/FS process), including source areas above the water table and below the remedial surface and subsurface soil removal depths on the Site;
- Determination of the presence of potential preferential pathways for Site contamination NAPL and dissolved contaminant transport into the Anacostia River (e.g., by implementing additional borings with particular emphasis on the sand and gravel unit's interface with the Arundel clay; the existence of preferential silt or sand pathways in the Arundel Clay and overlying silt will be evaluated; mass flux and mass discharge calculations will be re-evaluated following the additional delineation steps, which will quantify the relative contaminant mass discharge from defined hydrogeologic units contributing mass to the Anacostia River);
- Evaluation of existing available and relevant sediment data related to the Site summarized into one report to be used to identify data gaps;
- A bathymetric survey and selection of representative background sampling locations;
- Delineation of the area and depth of Site contamination in sediments;
- Fingerprinting/forensic analysis of PAHs present in groundwater and in sediment samples, and other methods that may be used to aid in distinguishing between Site contamination and contamination from other potential sources;
- A benthic organism study suitable for performance of an ecological risk assessment;
- Collecting sediment samples to sufficient depths to evaluate the connection, or lack thereof, between Site contamination signature PAHs and Anacostia River PAHs from upgradient, non-site-related sources if evidence from the terrestrial Site investigation indicates contaminant migration from the vicinity of the seawall to the Anacostia River;

- Pore water and/or soil analyses of riverbed core samples to evaluate the potential for Site contamination migration (including contaminated groundwater and NAPL) into the Anacostia River for purposes of the RI/FS, if warranted by other supporting data;
- Completion of sediment stability analysis in the vicinity of the Site;
- Submittal of preparatory documents as described in Section 4; and
- Development and evaluation of remedial alternatives following the requirements of 40 CFR Section 300.430 of the NCP.

4.A. REQUIRED DELIVERABLES AND DEADLINES FOR OPERABLE UNIT 2 RI

Settling Defendant shall develop and implement an OU2 RI/FS Work Plan and a POP (comprising a Site Management Plan (SMP), Sampling and Analysis Plan (SAP), and Health and Safety Plan (HASP)). The required document deliverables are detailed below and summarized in Table 2. In the event that this Section and Table 2 are inconsistent or conflict, this Section controls. The OU2 RI will delineate Site contamination in OU2, including PAHs, coal-tar related VOCs, and cyanide. The RI will conform to the following requirements:

1. All work performed by Settling Defendant shall be carried out by a qualified Contractor, selected and approved as provided in Paragraph 10 of the Consent Decree.
2. Within 90 days of NPS's authorization to proceed pursuant to Paragraph 10 of the Consent Decree, Settling Defendant shall submit to NPS and the District a draft OU2 RI/FS Work Plan that shall include the elements required by CERCLA guidance including: an introduction, discussion of Site background and physical setting, an initial evaluation, work plan rationale, and RI/FS tasks. The OU2 RI/FS Work Plan shall also include a schedule for all OU2 RI/FS-related activities.
3. Within 45 days of receipt of NPS's comments on the draft OU2 RI/FS Work Plan, Settling Defendant shall prepare and submit to NPS and the District a draft final OU2 RI/FS Work Plan that satisfactorily incorporates or otherwise complies with NPS comments. Within 15 days of NPS's comments on the draft final OU2 RI/FS Work Plan, Settling Defendant shall submit to NPS and the District a final OU2 RI/FS Work Plan that satisfactorily incorporates or otherwise complies with NPS's comments.
4. Within 90 days of submittal of the draft final OU2 RI/FS Work Plan, Settling Defendant shall submit to NPS and the District a draft OU2 RI/FS POP as outlined in Attachment A that comprises:
    a. a SMP;
    b. a SAP; and
    c. a HASP.
5. Within 45 days of receipt of NPS's comments on the draft OU2 RI/FS POP, Settling Defendant shall submit a draft final OU2 RI/FS POP that satisfactorily

incorporates or otherwise complies with NPS's comments. Within 15 days of NPS's receipt of NPS's comments on the draft final OU2 RI/FS POP, Settling Defendant shall prepare and submit to NPS and the District the final OU2 RI/FS POP that satisfactorily incorporates or otherwise complies with NPS comments.

6. Within 30 days of receipt of NPS's approval of the OU2 RI/FS POP, Settling Defendant shall initiate the RI field work. Settling Defendant shall implement and complete RI field work in accordance with the schedules approved in the Work Plan.
7. Within 180 days of the completion of the RI field work, Settling Defendant shall submit to NPS and the District a draft OU2 RI Report that, consistent with relevant CERCLA guidance, includes, inter alia, the following: an introduction, a description of the study area investigation, a narrative of the physical characteristics of the study area, an analysis of the nature and extent of contamination, a discussion of contaminant fate and transport, a baseline risk assessment to include a human health risk assessment and ecological risk assessment, preliminary remediation goals (PRGs), a preliminary list of ARARs, and a summary and conclusions section (including recommendations for future work).
8. Within 45 days of receipt of NPS's comments on the draft OU2 RI Report, Settling Defendant shall prepare and submit to NPS and the District the draft final OU2 RI Report that satisfactorily incorporates or otherwise complies with NPS's comments. Within 15 days of NPS's comments on the draft final OU2 RI Report, Settling Defendant shall submit to NPS and the District a final OU2 RI Report that satisfactorily incorporates or otherwise complies with NPS's comments.

4.B. REQUIRED DELIVERABLES AND DEADLINES FOR OPERABLE UNIT 2 FS

Settling Defendant shall prepare an OU2 FS that develops and evaluates remedial alternatives for Site contamination in OU2. The required document deliverables are detailed below and summarized in Table 2. In the event that this Section and Table 2 are inconsistent or conflict, this Section controls. The OU2 FS will conform to the following requirements:

1. Within 45 days of receiving NPS's comments on the draft OU2 RI Report, Settling Defendant shall develop and screen remedial alternatives in conformance with 40 CFR Section 300.430(e) and US EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, and evaluate whether a treatability study is appropriate to complete the screening of one or more remedial alternatives.
2. If NPS determines that a treatability study and POP is necessary, then within 60 days of receiving NPS's approval of the Alternatives Screening and Treatability Study Recommendation, Settling Defendant shall submit to NPS and the District a draft Treatability Study Work Plan and POP.
3. Within 30 days of receipt of NPS's comments on the draft Treatability Study Work Plan and POP, Settling Defendant shall prepare and submit to NPS and the

District the draft final Treatability Study Work Plan and POP that satisfactorily incorporates or otherwise complies with NPS's comments. Within 15 days of NPS's comments on the draft final Treatability Study Work Plan and POP, Settling Defendant shall submit to NPS and the District a final Treatability Study Work Plan and POP that satisfactorily incorporates or otherwise complies with NPS's comments.

4. Within 15 days of NPS's approval of the Treatability Study Work Plan and POP, whichever occurs later, Settling Defendant shall initiate the Treatability Study according to the schedules provided in the Work Plan.
5. Settling Defendant shall submit to NPS and the District a Draft OU2 FS Report within 60 days of completing the Treatability Study, if needed, or within 60 days of NPS's approval of the Final RI Report if a Treatability Study is not required. The Draft OU2 FS Report will include a summary of the OU2 RI Report and a detailed analysis of remedial alternatives based on the risk assessments, analysis of ARARs, and evaluation of the remedial alternatives against the nine criteria set out in NCP Section 300.430(e)(9)(iii), and consistent with US EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*.
6. Within 45 days of receipt of NPS's comments on the draft OU2 FS Report, Settling Defendant shall submit to NPS and the District a draft final OU2 FS Report that satisfactorily incorporates or otherwise complies with NPS's comments. Within 30 days of NPS's comments on the draft final OU2 FS Report, Settling Defendant shall submit to NPS and the District a final OU2 FS Report that satisfactorily incorporates or otherwise complies with NPS's comments. The final OU2 FS Report will be approved, or modified and approved, by NPS following review by NPS and the District.

4.C. INSTITUTION CONTROLS AT OPERABLE UNIT 2

Settling Defendant shall develop an ICIAP for OU2 (OU2 ICIAP) during the FS that identifies appropriate interim Institutional Controls for OU2, and provides for implementing, maintaining, monitoring, and reporting on the Institutional Controls identified in the OU2 ICIAP.

5.0 OU1 PERFORMANCE STANDARDS

5.A. REMEDY OVERALL

Settling Defendant shall design, implement, operate, monitor, and maintain the RA for OU1 in compliance with all ARARs, the ROD, the CD, and this SOW.

Settling Defendant shall ensure that the RA achieves the following Performance Standards from the ROD which are incorporated herein by reference. If NPS determines that a Performance Standard has not been or is no longer being attained, NPS may take additional action consistent with the terms of the Consent Decree.

1. Removal of Contaminants

    i. All surface soils that are the subject of the OU1 RD/RA (except those under the existing hardwood canopy and those that were previously replaced, unless they contain evidence of tar) shall be removed to a depth of 1 foot below ground surface.

    ii. During the excavation of surface soils, all subsurface soils that are the subject of the OU1 RD/RA containing visual, tactile (using protective gloves), or olfactory evidence of Manufactured Gas Waste shall be removed to a maximum depth of:

        1. three feet;
        2. the water table; or
        3. where clean fill or clean native material is encountered, whichever is encountered first.

    iii. If contaminated subsurface soils are encountered adjacent to an existing building or structure, excavation shall proceed only if the structural integrity is not at risk. Excavation shall continue radially until 10 feet of clean subsurface soil is uncovered.

2. Isolation of Contaminants

    i. All Manufactured Gas Waste-contaminated materials left in place that are the subject of the OU1 RD/RA, remaining after excavation shall be recorded on a map and covered by clean fill up to 6 inches below the existing grade and then covered by clean topsoil and vegetation or by asphalt or another durable material appropriate for Site use where the soil and waste, if present, will be covered with 1.5 feet of clean crushed stone. The fill and vegetated topsoil/cover material shall be installed to not erode or subside after placement.

    ii. Clean fill and clean topsoil materials shall be demonstrated to meet the clean fill requirements specified in Attachment B.

    iii. Revegetation, where required, shall meet the following Performance Standards:

        1. The seed mix used shall be subject to NPS approval.
        2. The planting of grasses and legumes will be deemed successful if the planted species meet the following revegetation Performance Standards as measured in two successive years from the date of completion of the seeding:

Coverage Class	Percent Vegetation	Standards
Good	76 to 100	At least 90 percent of the project area must fall in this class.
Fair	50 to 75	Maximum of 10 percent of project area may fall in this class.
Poor	Less than 50	Any areas falling in this class will not be

acceptable.

The vegetation will be quantified under the following procedures: as determined by NPS, transects of random alignment will be laid out over any barren area suspected of failing the revegetation Performance Standards. A string 100 feet long having 1 foot graduation will be placed along the transect line. The inspector will walk along the line counting only the markers that are in actual contact with vegetative species introduced by the reseeding. The number of count points are to be recorded as the percent vegetative cover for the transect.

3. If any areas are determined to fail the revegetation Performance Standards at the 1-year evaluation, a second evaluation of these areas will be conducted 1 year from the date of either such determination or completion of any additional reseeding determined advisable, whichever date is later. Such reseeding will consist of the original seed mix or a variation approved by NPS.
4. At the conclusion of the 2-year evaluation period, all areas failing to meet the revegetation Performance Standards will be deemed unacceptable, and Settling Defendant shall replant such areas in a manner determined by NPS. Settling Defendant's revegetation obligations will continue until the revegetation Performance Standards are met.
5. Settling Defendants' obligations with respect to revegetation Performance Standards pursuant to the 1 and 2-year evaluation periods are the subject of the agreement between the District and the Settling Defendant (attached to the Consent Decree at Appendix E).

5.B. INSTITUTIONAL CONTROLS

The Performance Standard for Institutional Controls shall be the establishment, maintenance, and enforcement, where necessary, of use restrictions on all media and areas for which Institutional Controls are required. The Institutional Controls required for the Site are detailed in Sections 2.D and 4.C of this SOW. Documentation of Institutional Control maintenance shall be included in the five-year review reports described in Section 6.C of this SOW. With respect to property owned or controlled by the United States or the District, Washington Gas shall design and implement Institutional Controls within the limits of Washington Gas's legal capabilities. Washington Gas' obligations with respect to Institutional Controls shall be implemented pursuant to the agreement between the District and the Settling Defendant attached to the Consent Decree at Appendix E.

6.0 COMPLIANCE MONITORING AND REPORTING

The purpose of compliance monitoring is to ensure that the remedy is constructed, operated, and maintained in compliance with ARARs and all requirements of the Consent Decree and this SOW. It also is to ensure that the Performance Standards are achieved.

Compliance monitoring and reporting activities shall include, but not be limited to, progress reports during remedy construction; annual O&M Reports; and five-year review reports. A summary of deliverables for compliance monitoring and reporting is included in Table 3.

6.A. PROGRESS REPORTS

Settling Defendant shall submit quarterly progress reports to NPS and the District consistent with the requirements specified in Section IX (Reporting Requirements) of the Consent Decree. Progress reports shall be submitted on a monthly basis, due the tenth day of the month following the reporting period, during field activities related to the OU1 RA or the OU2 RI.

6.B. OPERATION AND MAINTENANCE

OU1 O&M shall be initiated upon completion of the OU1 RA as described in Section 3 of this SOW. OU1 O&M shall be performed according to the schedule submitted in the OU1 RA Work Plan. An annual report documenting OU1 O&M shall be submitted each year until the first five-year review, and include the following, at a minimum:

1. a description of all remedy components, including all institutional controls;
2. an evaluation of institutional control effectiveness;
3. a description of actions performed to maintain achievement of Performance Standards; and
4. suggestions for modifications.

6.C. FIVE-YEAR REVIEW REPORTS

Settling Defendant shall conduct a review of whether the RA for OU1 is protective of human health and the environment at least every 5 years. The five-year review report shall be submitted in draft to NPS and the District for review and shall be finalized after NPS's approval and a reasonable opportunity for comment by the District.

TABLES

Note: Any deliverable may require more than one draft final version.

Table 1. OU1 Remedial Design/Remedial Action Document Requirement Summary		
Statement of Work Section	**Deliverable**	**Due Date (Calendar Days)**
3.1 (and CD Paragraph 10)	Notification of Contractor name, title, and qualifications	10 days after effective date of Consent Decree
3.2	Draft OU1 RD/RA Work Plan, CQAP, and POP	75 days after authorization to proceed
3.3	Draft Final (+ Final) OU1 RD/RA Work Plan, CQAP, and POP	45 (+ 15) days after receipt of NPS's comments on draft (and draft final)
3.4	Pre-construction conference before the start of RA	60 days after NPS approval of Final OU1 RD/RA Work Plan or after removal of District buildings, whichever occurs later; or 30 days after completion of the OU2 landside field work
3.5	Letter documenting initiation of field construction from RA Contractor	Upon initiation of field construction
3.6	Punch list of outstanding items discovered during pre-final inspection	Upon substantial completion of field construction activities
3.7	Final inspection of completed Work with NPS and the District	Upon completion of punch list
3.8	Draft OU1 RA Project Closeout Report	60 days after completion of the RA and correction of all punch list items
3.9 (and CD Para. 12)	Draft Final (+ Final) OU1 RA Project Closeout Report	30 (+ 15 days) after receipt of NPS's comments on draft (and draft final)
3.10	Perform O&M	N/A

Table 2. OU2 Remedial Investigation and Feasibility Study Document Requirement Summary		
Statement of Work Section	**Deliverable**	**Due Date (Calendar Days)**
4.A.1	Notification of Contractor name, title, and qualifications	10 days after effective date of Consent Decree
4.A.2	Draft OU2 RI/FS Work Plan	90 days after NPS's authorization to proceed
4.A.3	Draft Final (+ Final) OU2 RI/FS Work Plan	45 (+ 15) days after receipt of NPS's comments on draft (and draft final)
4.A.4	Draft POP for OU2 RI/FS	90 days after Draft Final OU2 RI/FS Work Plan submitted
4.A.5	Draft Final (+ Final) POP for OU2 RI/FS	45 (+ 15) days after NPS's approval of draft
4.A.6	Initiation of RI Field Work	30 days after NPS's approval of POP
4.A.7	Draft OU2 RI Report	180 days after completion of field work

Table 2. OU2 Remedial Investigation and Feasibility Study Document Requirement Summary		
Statement of Work Section	**Deliverable**	**Due Date (Calendar Days)**
4.A.8 (and CD Para. 14.a)	Draft Final (+ Final) OU2 RI Report	45 (+ 15) days after NPS's approval of draft (and draft final); Final Report
4.B.1	Alternatives screening and treatability study requirement recommendation	45 days of receiving NPS's comments on the draft OU2 RI Report
4.B.2	Draft Treatability Study Work Plan, if required, and revised POP	60 days of receiving NPS's approval of the Alternatives Screening and Treatability Study Recommendation
4.B.3	Draft Final (+ Final) Treatability Study Work Plan, if required	30 (+ 15) days after receipt of NPS's comments on draft (and draft final)
4.B.4	Initiate Treatability Study	15 days after NPS approval of Treatability Study Work Plan and POP, whichever occurs later
4.B.5	Draft OU2 FS Report	60 days of completing the Treatability Study or 60 days of NPS' approval of the Final RI Report if a treatability study is not required
4.B.6 (and CD Para 14.b)	Draft Final + Final OU2 FS Report	45 (+ 30) days after receipt of NPS's comments on draft (and draft final)

Table 3. Compliance Monitoring and Institutional Controls Document Requirement Summary		
Statement of Work Section	**Deliverable**	**Due Date (Calendar Days)**
2.D	Submit ICIAPs to Plaintiffs for approval	
2.D	Record ICIAPs	
6.A	Progress report	By the 10th day of the month following the reporting period
6.B	OU1 O&M Report	365 days after OU1 RA completion and every 365 days for five years
6.C	Five-Year Review Report (draft and final)	Every 5 years after OU1 RA completion

FIGURES

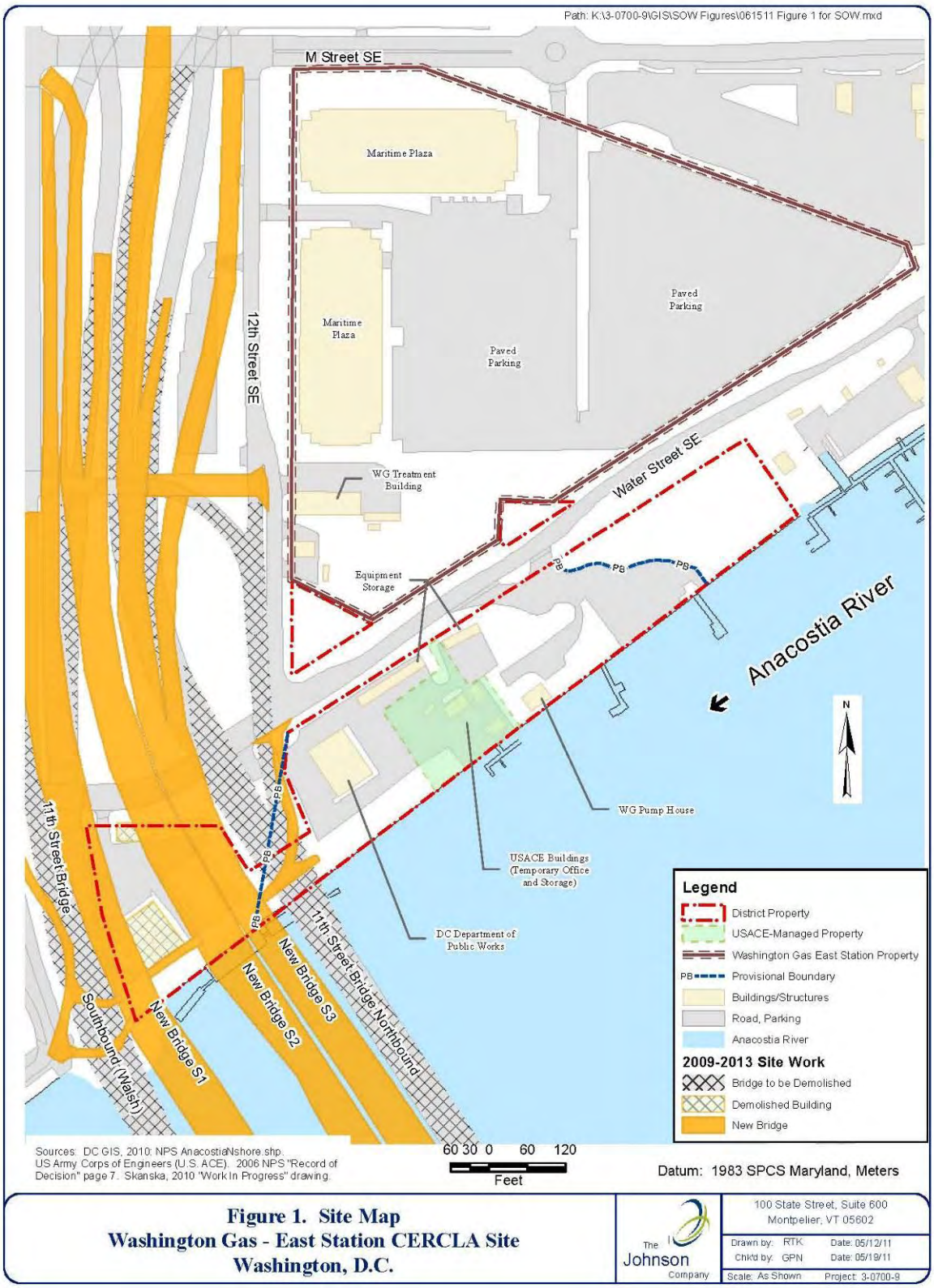
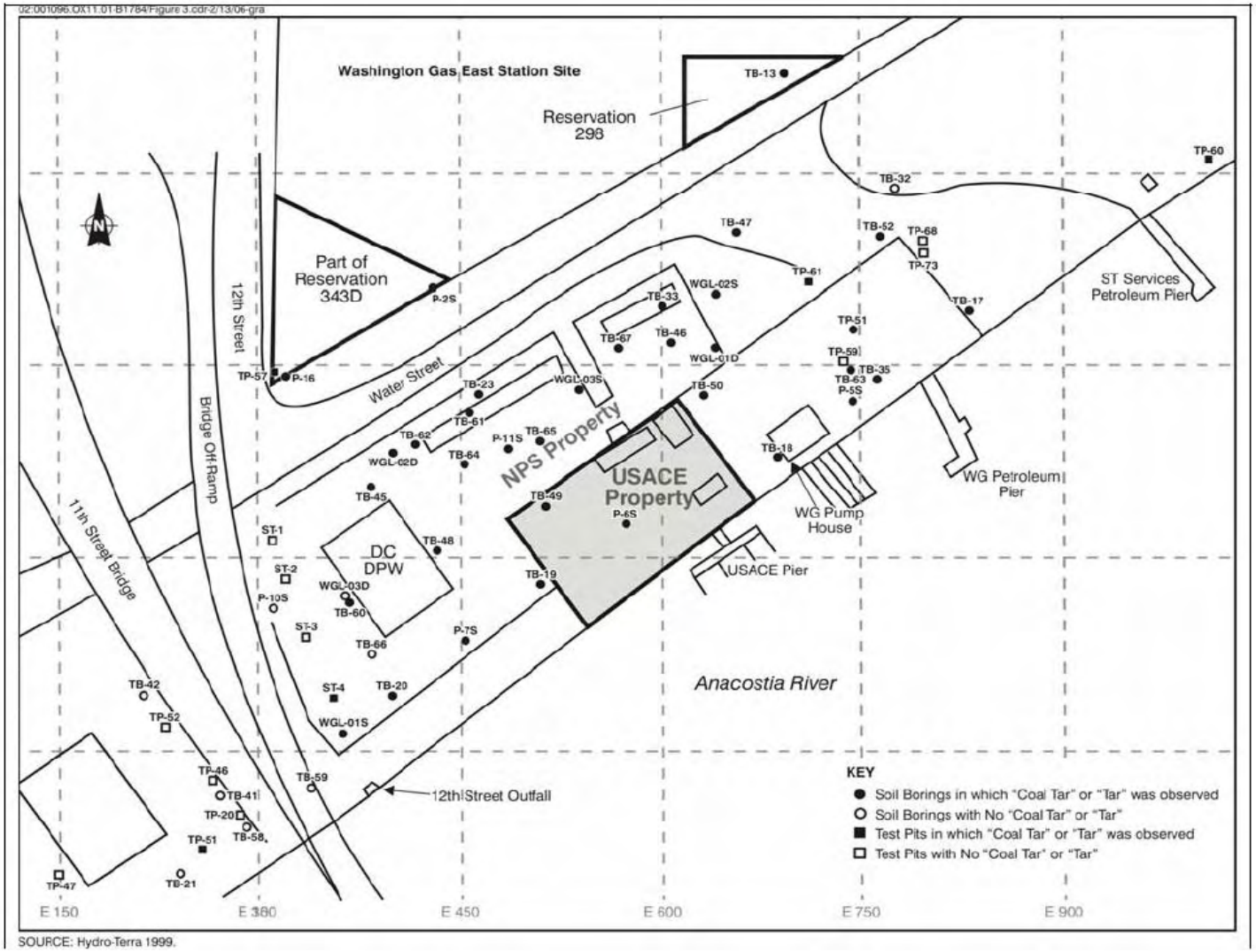


Figure 1. Site Map
Washington Gas - East Station CERCLA Site
Washington, D.C.

The Johnson Company

100 State Street, Suite 600
Montpelier, VT 05602

Drawn by: RTK Date: 05/12/11
Chkd by: GPN Date: 05/19/11
Scale: As Shown Project: 3-0700-9



SOURCE: Hydro-Terra 1999.

Figure 2. Pits and Boreholes Showing Tar (i.e., Manufactured Gas Waste)
Source: Figure 3, NPS Record of Decision, Washington Gas East Station Site, 2006.

ATTACHMENTS

ATTACHMENT A
PROJECT OPERATION PLAN

Prior to the commencement of any field activities, Settling Defendant shall prepare and submit a Project Operations Plan (POP) as specified in this SOW. A POP is required for both RD/RA activities and RI/FS activities. The POP comprises three Site-specific plans to establish procedures to be followed by Settling Defendant in performing field, laboratory, and analysis activities. The three Site-specific plans that comprise the POP are a Site Management Plan (SMP), a Sampling and Analysis Plan (SAP), and a Health and Safety Plan (HASP).

The SMP, SAP, and HASP are described in A. through C. herein.

Each Plan shall be subject to modifications, as necessary, to describe the sampling, analyses, and other activities that may be required as the Work progresses. NPS may modify the scopes of these activities at any time during Work performed pursuant to this SOW at the discretion of NPS in response to the evaluation of sampling results, changes in sampling requirements, and other developments or circumstances.

A. Site Management Plan (SMP)

The SMP shall describe how Settling Defendant will manage the project to complete the Work required at the Site. The overall objective of the SMP is to provide NPS and the District with a written understanding and commitment regarding how various project aspects such as access, security, contingency procedures, management responsibilities, waste disposal, and data handling are to be managed by Settling Defendant. Specific provisions of the SMP shall include, but are not limited to, the following:

1. A map and a list of properties, property owners, and addresses of owners whose property may need to be accessed.

2. Procedures to delineate sampling areas and activities and ensure workers and public safety.

3. Procedures to arrange field activities and to ensure NPS and the District are informed of access-related problems and issues.

4. Measures to ensure the security of government and private property on the Site.

5. Measures to prevent unauthorized entry to the Site that might result in exposure of persons to potentially hazardous conditions.

6. Process by which access agreements for all properties where field work is required will be obtained.

7. Structure of the organization and management of all work activities, including key personnel and their responsibilities.

9. Procedures to ensure the proper disposal of materials used and wastes generated during all work activities (e.g., drill cutting, extracted groundwater, protective clothing, and disposable equipment). These provisions shall be consistent with CERCLA, RCRA, and applicable District laws. Settling Defendant shall be identified as the generator of wastes for the purpose of regulatory or policy compliance.

10. Plans and procedures for organizing and presenting data and for verifying data quality before and during the RD/RA or RI/FS Sampling activities. The description shall include data input fields, examples of database management output from the coding of all RD/RA or RI/FS sampling data, appropriate quality assurance/quality control to ensure accuracy, and capabilities of data manipulation.

B. Sampling and Analysis Plan (SAP)

The SAP shall include both (1) a Quality Assurance Project Plan (QAPP) that describes the policy, organization, functional activities, and the quality assurance and quality control protocols necessary to achieve the data quality objectives dictated by the intended use of the data; and (2) a Field Sampling Plan (FSP) that provides guidance for all fieldwork by defining in detail the sampling and data-gathering methods to be used on the project. Components required by these two plans are described below.

The SAP shall be the framework of all anticipated field activities (e.g., sampling objectives, evaluation of existing data, standard operating procedures) and contain specific information on all field work and analysis (e.g., sampling locations and rationale, sample numbers and rationale, analyses of samples). During the RD/RA or RI/FS sampling activities, the SAP shall be revised as necessary to cover each round of field or laboratory activities. Revisions, or a statement regarding the need for revisions, shall be included in each deliverable describing all new field work.

The purpose of the SAP is to ensure that sampling data collection activities will be comparable to and compatible with previous data collection activities performed at the Site while providing a mechanism for planning and approving field activities. The overall objectives of the SAP are as follows:

1. to document specific objectives, procedures, and rationales for fieldwork and sample analytical work;

2. to provide a mechanism for planning and approving Site and laboratory activities;

3. to ensure that data of sufficient quality and quantity are obtained and used in a manner that satisfies the project objectives; and

4. to provide a common point of reference to ensure the comparability and compatibility of all objectives and the sampling and analysis activities.

To achieve this last objective, the SAP shall document all field and sampling and analysis objectives as noted above, as well as all data quality objectives and specific procedures/protocols for field sampling, analysis, data validation, data evaluation, and project quality assessments.

The following critical elements of the SAP shall be described for each sample medium (e.g., groundwater, surface water, soil, sediment, and air) and for each sampling event:

1. sampling objectives (e.g., engineering related, well yields, zone of influence, performance monitoring, demonstration of attainment, five year review, etc.);

2. data quality objectives, including data uses and the rationale for the selection of analytical levels and detection limits (see Guidance on Systematic Planning using the Data Quality Objectives Process, EPA QA/G-4 (EPA/240-B-06/001), February 2006; Data Quality Objectives Decision Errors Feasibility Trials (DEFT) Software QA/G-4D (EPA/240/B-01/007, September 2001); and Final Guidance Data Usability in Risk Assessment (Part A) (publication 9285.7-09A, April 1992, PB92-963356); Guidance for Data Usability in Risk Assessment (Part B) (publication 9285.7-09B, May 1992, PB92-963362).

3. Site background update, including an evaluation of the validity, sufficiency, and sensitivity of existing data;

4. sampling locations and rationale;

5. sampling procedures and rationale and references;

6. numbers of samples and justification;

7. numbers of field blanks, trip blanks, and duplicates;

8. sample media (e.g., groundwater, surface water, soil, sediment, and air);

9. sample equipment, containers, minimum sample quantities, sample preservation techniques, maximum holding times;

10. instrumentation and procedures for the calibration and use of portable air-, soil-, or water-monitoring equipment to be used in the field;

11. chemical and physical parameters in the analysis of each sample;

12. chain-of-custody procedures must be clearly stated (see EPA NEIC Policies and Procedures Manual, EPA 330/9-78 001-R May 1978, revised May 1986);

13. procedures to eliminate cross-contamination of samples (such as dedicated equipment);

14. sample types, including collection methods and if field and laboratory analyses will be conducted;

15. analytical procedures, equipment, and detection limits;

16. equipment decontamination procedures;

17. consistency with the other parts of work plans by having identical objectives, procedures, and justification, or by cross-reference;

18. analysis from each medium of selected analytes;

19. for any limited field investigation (field screening technique), provisions for the collection and laboratory analysis of parallel samples and for the quantitative correlation analysis in which screening results are compared with laboratory results;

20. data management, review, and validation procedures for field measurements, field screening, field analyses, and laboratory analyses; and

21. quality assessments to be performed for project activities (including but not limited to field activities, data management activities, and analytical activities).

The SAP and associated amendments shall allow for notifying NPS at least two weeks before field sampling or monitoring activities commence. The SAP shall also allow split, replicate, or duplicate samples to be taken by NPS (or their contractor personnel). At the request of NPS, Settling Defendant shall provide these samples in appropriately pre-cleaned containers to the NPS representatives. Identical procedures shall be used to collect Settling Defendant's and the parallel split samples unless otherwise specified by NPS. Several references have been used to develop the existing SAP and shall be used to develop the SAP addenda. These include:

1. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (OSWER Directive 9355.3-01, EPA/540/G-89/004, October 1988);

2. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA Pub. SW-846, Third Edition, through Update IVB, February 2008 or most recent update);

3. EPA Requirements for Quality Assurance Plans, QA/R-5 (EPA/240/B-01/003) March 2001, reissued May 2006;

5. Guidance on Systematic Planning using the Data Quality Objectives Process, EPA QA/G-4 (EPA/240-B-06/001), February 2006;

6. Uniform Federal Policy for Quality Assurance Project Plans (UFP), EPA-505-B-04-900C, March 2005;

7.. Guidance for Preparing Standard Operating Procedures (SOPs), EPA QA/G-6 (EPA/600/B-07/001), April 2007;

9. Region I, EPA-New England Data Validation Functional Guidelines for Evaluating Environmental Analyses, Revised December 1996;

10. Data Quality Assessment: A Reviewer's Guide, EPA QA/G-9R (EPA/240/B-06/002), February 2006;

12. EPA Requirements for Quality Management Plans, QA/R-2 (EPA 240/B-01/002) March 2001 and reissued May 2006; and

13. Guidance for Quality Assurance Project Plans, QA/G-5 (EPA/240/R-02/009) December 2002.

B.1. Quality Assurance Project Plan (QAPP)

The QAPP shall document the site-specific objectives, policies, organizations, functional activities, sampling and analysis activities, data evaluation activities, and specific quality assurance/quality control activities designed to achieve the data quality objectives (DQOs) of the RD/RA or RI/FS.

Project activities throughout the RD/RA and RI/FS shall comply with the QAPP. QAPP sampling and analysis objectives and procedures shall be consistent with appropriate handbooks, manuals, and guidelines including the Uniform Federal Policy for Quality Assurance Project Plans (EPA-UFP guidance, EPA-505-B-04-900C, March 2005).

Information in a plan other than the QAPP may be cross-referenced clearly in the QAPP provided that all objectives, procedures, and rationales in the documents are consistent, and the reference material fulfills requirements of the EPA-UFP guidance. NPS-approved references, or equivalent, or alternative methods approved by NPS shall be used, and their corresponding guidelines should be applied when they are available and applicable.

Laboratory QA/QC Procedures

The QA/QC procedures and Standard Operating Procedures ("SOPs") for any laboratory (both fixed and mobile) used during the RD/RA or RI/FS sampling activities shall be included in Settling Defendant's QAPP. When this work is performed by a contractor to the Settling Defendant, each laboratory performing chemical analyses shall meet the following requirements:

1. have successful performance in one of EPA's National Proficiency Sample Programs (i.e., Water Supply or Water Pollution Studies or the District's proficiency sampling program);

2. be familiar with the requirements of 48 C.F.R. Part 1546 contract requirements for quality assurance; and

3. have a QAPP for the laboratory including all relevant analysis. This plan shall be referenced as part of the contractor's QAPP.

Data Package Requirements

Settling Defendant must require and keep the complete data package and make it available to NPS upon request to enable NPS to conduct an independent validation of the data. The complete data package shall consist of all results, the raw data, and all relevant QA/QC information. The forms contained in the data validation functional guidelines must be utilized to report the data when applicable. Raw data include the associated chromatograms and the instrument printouts with area and height peak results. The peaks in all standards and samples must be labeled. The concentration of all standards analyzed with the amount injected must be included.

All internal and external laboratory sample tracking information must be included in the data package. An example data package deliverable is listed below:

1. a summary of positive results and detection limits of non-detects with all raw data;

2. tabulate surrogate recoveries and QC limits from methods 3500 and 8000 in SW-846 and all validation and sample raw data;

3. tabulated matrix spike/matrix spike duplicate recoveries, relative percent differences, spike concentrations, and QC limits from methods 3500 and 8000 in SW-846 and all validation and sample raw data;

4. associated blanks (trip, equipment, and method with accompanying raw data for tests);

5. tabulated initial and continuing calibration results (concentrations, calibration factors or relative response factors and mean relative response factors, % differences and % relative standard deviations) with accompanying raw data;

6. tabulated retention time windows for each column;

7. a record of the daily analytical scheme (run logbook, instrument logbook) which includes samples and standards order of analysis;

8. the chain of custody for the sample shipment groups;

9. a narrative summary of method and any problems encountered during extraction or analysis;

10. tabulated sample weights, volumes, and % solids used in each sample calculation;

11. example calculation for positive values and detection limits; and

12. SW-846 method 3500 and 8000 validation data for all tests.

The forms contained in Chapter 1 of SW-846 (Second Edition 1982 as amended by Update I, April 1984, and Update II, April 1985) or the current CLP SOW forms must be utilized to report the data when applicable.

B.2 Field Sampling Plan (FSP)

The objective of the Field Sampling Plan is to provide NPS with a common written understanding of all field work. The FSP should be written so that a field sampling team unfamiliar with the Site would be able to gather the samples and field information required. Guidance for the selection of field methods, sampling procedures, and custody can be acquired from the Compendium of Superfund Field Operation Methods (OSWER Directive 9355.0-14, EPA/540/P-87/001), December 1987, which is a compilation of demonstrated field techniques that have been used during remedial response activities at hazardous waste sites. The FSP shall be site-specific and shall include the following elements:

1. Site Background. If not included in another deliverable, a Site background description must be included in the FSP. This analysis shall include a description of the Site and surrounding areas and a discussion of known and suspected contaminant sources, probable transport pathways, and other information about the Site. The narration shall also include descriptions of specific data gaps and ways in which sampling is designed to fill those gaps. Including this discussion in the FSP will help orient the sampling team in the field.

2. Sampling Objectives. Succinctly states the specific objectives of the sampling effort describing the intended uses of data.

3. Sampling Location and Frequency. This section of the FSP identifies each matrix to be collected and the constituents to be analyzed. Tables shall be used to clearly identify the number of samples, the type of sample (water, soil, etc.), and the number of quality control samples (duplicates, trip blanks, equipment blanks, etc.). Figures shall be included to show the locations of existing or proposed sample points.

4. Sample Designation. A sample numbering system shall be established for the project. The sample designation should include the sample or well number, the sample round, the sample matrix (e.g., surface soil, ground water, soil boring), and the name of the Site.

5. Sampling Equipment and Procedures. Sampling procedures must be clearly written. Step-by-step instructions for each type of sampling that are necessary to enable the field team to gather data that will meet the DQOs. A list should include the equipment to be used and the material composition (e.g., Teflon, stainless steel) of equipment along with decontamination procedures.

6. Sample Handling and Analysis. A table shall be included that identifies sample preservation methods, types of sampling jars, shipping requirements, and holding times. Examples of paperwork such as traffic reports, chain-of custody forms, packing slips, and sample tags filled out for each sample as well as instructions for filling out the paperwork must be included. Field documentation methods including field notebooks and photographs shall be described.

Each FSP submitted as a part of the POP for the RI/FS sampling activities shall be sufficiently detailed to carry out the study, and shall provide data needed to address the objective of the study and to complete the study. Each study shall be designed to achieve a high performance on the first

attempt. Each work plan shall be related (by cross-references) to the other requirements in the POP.

C. Health and Safety Plan (HASP)

The objective of the HASPis to establish the procedures, personnel responsibilities and training necessary to protect the health and safety of all onsite personnel and the public during all work activities. The plan shall provide procedures and plans for routine but hazardous field activities and for unexpected Site emergencies.

The health and safety requirements and procedures in the HASP shall be updated based on an ongoing assessment of Site conditions, including the most current information on each medium. For each field task during all work performed under this SOW, the HASP shall identify:

1. possible problems and hazards and their solutions;

2. environmental surveillance measures;

3. specifications for personal protective equipment;

4. the appropriate level of respiratory protection;

5. the rationale for selecting that level; and

6. criteria, procedures, and mechanisms for upgrading the level of protection and for suspending activity, if necessary.

The HASP shall also include the delineation of exclusion zones on a map and in the field. The HASP shall describe the on-site person responsible for implementing the HASP for Settling Defendant's representatives at the Site, equipment and personnel decontamination procedures, air monitoring and medical surveillance. The following documents and resources shall be consulted:

1. OSHA e-HASP Software – Version 2.0, March 2006 (www.osha.gov/dep/etools/ehasp/index.html)

2. Hazardous Waste Operation and Emergency Response (Department of Labor, Occupational Safety and Health Administration, (OSHA) 29 C.F.R. Part 1910.120); and

3. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities: Appendix B (NIOSH/OSHA/EPA 1986).

OSHA regulations at 40 C.F.R. Part 1910, which describe the routine emergency provisions of a HASP, and the OSHA e-HASP Software shall be the primary references used by Settling Defendant in developing and implementing the HASP.

The measures in the HASP shall be developed and implemented to ensure compliance with all applicable District and federal occupational health and safety regulations. The HASP shall be updated at the request of NPS during the course of the RD/RA sampling activities and as necessary.

ATTACHMENT B

CONSTRUCTION SPECIFICATIONS

A. MATERIALS

1. Clean Fill

Clean fill shall be uncontaminated, nonwater-soluble, nondecomposable inert solid material. The term includes soil, rock, stone, dredged material, and brick, block, or concrete from construction and demolition activities that is separate from other waste and recognizable as such. Clean fill must be physically similar to the native material removed or must have physical characteristics specified in the remedial design for the site.

All clean fill shall be evaluated for evidence of potential contamination at the source area through due diligence. If the clean fill source is determined to be potentially suitable following due diligence, samples of clean fill shall be collected at a frequency detailed in Table A-a, below, and analyzed for the following analytes at a NELAP-certified laboratory:

1. Volatile organic compounds (VOCs; EPA CLP Target Compound List) by EPA Method 8260B or the most current version;

2. Semi-volatile organic compounds (SVOCs; EPA CLP Target Compound List) by EPA Method 8270 with SIM for polycyclic aromatic hydrocarbons or the most current version;

3. Pesticides (EPA CLP Target Compound List) by EPA Method 8081A or the most current version;

4. Polychlorinated biphenyls (PCBs; EPA CLP Target Compound List) by EPA Method 8082 or the most current version;

5. Metals (EPA 13 Priority Pollutant list) by EPA Method 6020 or the most current version;

6. Total cyanide by EPA Methods 9010/9012/9014 or the most current version; and

7. Phenols by EPA Method 8041A or the most current version.

Analysis for cyanide and phenols is required only if identified as a likely contaminant in prospective fill material.

If additional potential contaminants of concern are identified by due diligence (e.g., land near an asbestos mine may contain elevated asbestos concentrations) or are likely to be present based on the analytical results (e.g., 1,4-dioxane could be present if 1,1,1-trichloroethane is detected), additional analysis shall be performed for the potential contaminants.

Samples shall be collected based on the specific source and required volume, as detailed in Table A-a, below.

Table A-a. Fill Material Sampling Requirements	
Area of Individual Borrow Area	**Sampling Requirements**
Multi-increment (MI) sampling is preferred. 1 MI sample shall be collected from each 1 acre area using a minimum of 40 subsamples. If MI sampling is not performed, sampling shall be in accordance with the following areal requirements.	
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every ½ acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location (composites from one depth in homogenous areas is acceptable except for VOC and SVOC samples)
Volume of Borrow Area Stockpile	**Samples per Volume**
Multi-increment (MI) sampling is preferred. 1 MI sample shall be collected from each 1,000 cubic yards using a minimum of 40 subsamples. If MI sampling is not performed, sampling shall be in accordance with the following volumetric requirements.	
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1,000 cubic yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

Concentrations of analytes shall be less than the lower of 1) the concentration limits provided in Table A-b, attached, with appropriate consideration of Site background metals concentrations; or 2) the remediation goals established for the site.

Acceptance of clean fill shall be documented in a report that includes the following information:

1) Clean fill source origin address and owner contact information;
2) Description of clean fill source area use and host vicinity description;
3) Clean fill supplier and transporter contact information;
4) A description of sampling methodology and frequency, which must comply with Table A-a;
5) A list of analytes and methods, including all additional analytes;
6) All laboratory results; and
7) A comparison of laboratory analytical results with the concentration limits in Table A-b.

2. <u>Topsoil</u>

Topsoil shall be fertile, natural soil, typical of the locality, substantially free of stones, roots, sticks greater than 2 inches in diameter or length, clay, peat, weeds and sod, and obtained from upland areas or be treated to be free of exotic plant seeds. It shall contain between 2 % and 10% organic matter as determined in accordance with AASHTO-194. In addition, topsoil must meet all of the requirements of clean fill. A topsoil mixture, enriched or blended with organic compost, may be acceptable provided it meets the above defined specifications and it can be certified not to contain any waste materials (e.g., non-clean fill, sewage or other sludge).

Table A-b
Clean Fill Concentration Limits

Analyte	CASRN	Clean Fill Total Analysis mg/kg
ORGANICS		
ACENAPHTHENE	83-32-9	2700
ACENAPHTHYLENE	208-96-8	2500
ACEPHATE	30560-19-1	0.9
ACETALDEHYDE	75-07-0	0.23
ACETONE	67-64-1	41
ACETONITRILE	75-05-8	1.9
ACETOPHENONE	98-86-2	200
ACETYLAMINOFLUORENE, 2- (2AAF)	53-96-3	0.069
ACROLEIN	10-702-8	0.00062
ACRYLAMIDE	79-06-1	0.00057
ACRYLIC ACID	79-10-7	0.051
ACRYLONITRILE	107-13-1	0.0087
ALACHLOR	15972-60-8	0.077
ALDICARB	116-06-3	0.12
ALDRIN	309-00-2	0.10
ALLYL ALCOHOL	107-18-6	0.58
AMINOBIPHENYL, 4-	92-67-1	0.0012
AMITROLE	61-82-5	0.029
AMMONIA	7664-41-7	360
AMMONIUM SULPHAMATE	7773-06-0	24
ANILINE	62-53-3	0.16
ANTHRACENE	120-12-7	350
ATRAZINE	1912-24-9	0.13
BAYGON (PROPOXUR)	114-26-1	0.057
BENOMYL	17804-35-2	880.00
BENTAZON	25057-89-0	16
BENZENE	71-43-2	0.13
BENZIDINE	92-87-5	0.078
BENZO[A]ANTHRACENE	56-55-3	25
BENZO[A]PYRENE	50-32-8	2.5
BENZO[B]FLUORANTHENE	205-99-2	25
BENZO[GHI]PERYLENE	191-24-2	180
BENZO[K]FLUORANTHENE	207-08-9	250
BENZOIC ACID	65-85-0	2900
BENZOTRICHLORIDE	98-07-7	0.012
BENZYL ALCOHOL	100-51-6	400
BENZYL CHLORIDE	100-44-7	0.051
BHC, ALPHA-	319-84-6	0.046
BHC, BETA-	319-85-7	0.22
BHC, DELTA-	319-86-8	11
BHC, GAMMA (LINDANE)	58-89-9	0.072

Table A-b
Clean Fill Concentration Limits

Analyte	CASRN	Clean Fill Total Analysis mg/kg
BIPHENYL, 1,1-	92-52-4	790
BIS(2-CHLOROETHYL)ETHER	111-44-4	0.0039
BIS(2-CHLORO-ISOPROPYL)ETHER	108-60-1	8.0
BIS(CHLOROMETHYL)ETHER	542-88-1	0.00001
BIS[2-ETHYLHEXYL] PHTHALATE	117-81-7	130
BISPHENOL A	80-05-7	700
BROMACIL (BROMAX)	314-40-9	2
BROMOCHLOROMETHANE	74-97-5	1.6
BROMODICHLOROMETHANE	75-27-4	3.40
BROMOMETHANE	74-83-9	0.54
BROMOXYNIL	1689-84-5	63
BROMOXYNIL OCTANOATE	1689-99-2	360
BUTADIENE, 1,3-	106-99-0	0.0062
BUTYL ALCOHOL, N-	71-36-3	12.00
BUTYLATE	2008-41-5	51.0
BUTYLBENZENE, N-	104-51-8	950
BUTYLEBENZENE, SEC-	135-98-8	350
BUTYLEBENZENE, TERT-	98-06-6	270
BUTYLBENZYL PHTHALATE	85-68-7	10000
CAPTAN	133-06-2	12
CARBARYL	63-25-2	41
CARBAZOLE	86-74-8	21
CARBOFURAN	1563-66-2	0.87
CARBON DISULFIDE	75-15-0	160
CARBON TETRACHLORIDE	56-23-5	0.26
CARBOXIN	5234-68-4	53
CHLORAMBEN	133-90-4	1.6
CHLORDANE	57-74-9	49
CHLORO-1, 1-DIFLUOROETHANE, 1-	75-68-3	2300
CHLORO-1-PROPENE, 3- (ALLYL CHLORIDE)	107-05-1	0.065
CHLOROACETOPHENONE, 2-	532-27-4	0.0093
CHLOROANILINE, P-	106-47-8	19.00
CHLOROBENZENE	108-90-7	6.1
CHLOROBENZILATE	510-15-6	1.60
CHLORBUTANE, 1-	109-69-3	2300
CHLORODIBROMOMETHANE	124-48-1	3.20
CHLORODIFLUOROMETHANE	75-45-6	2.6
CHLOROETHANE	75-00-3	5.00
CHLOROFORM	67-66-3	2.50
CHLORONAPHTHALENE, 2-	91-58-7	6200
CHLORONITROBENZENE, P-	100-00-5	4.9
CHLOROPHENOL, 2-	95-57-8	4.40

Table A-b
Clean Fill Concentration Limits

Analyte	CASRN	Clean Fill Total Analysis mg/kg
CHLOROPRENE	126-99-8	0.45
CHLROPROPANE, 2-	75-29-6	21
CHLOROTHALONIL	1897-45-6	15
CHLOROTOLUENE, O-	95-49-8	20
CHLORPYRIFOS	2921-88-2	23
CHLORSULFURON	64902-72-3	25
CHLORTHAL-DIMETHYL (DACTHAL) (DCPA)	1861-32-1	650
CHRYSENE	218-01-9	230
CRESOL(S)	1319-77-3	3.1
CRESOL, O-(METHYLPHENOL, 2-)	95-48-7	64
CRESOL, M-(METHYLPHENOL, 3-)	108-39-4	36
CRESOL, P-(METHYLPHENOL, 4-)	106-44-5	4.2
CRESOL, P-CHLORO-M-	59-50-7	37
CROTONALDEHYDE	4170-30-3	0.00099
CROTONALDEHYDE, TRANS-	123-73-9	0.00099
CUMENE (ISOPROPYL BENZENE)*	98-82-8	780
CYCLOHEXANONE	108-94-1	1400
CYFLUTHRIN	68359-37-5	33
CYROMAZINE	66215-27-8	84
DDD, 4,4 -	72-54-8	6.8
DDE, 4,4 -	72-55-9	41
DDT, 4,4 -	50-29-3	53
DI(2-ETHYLHEXYL)ADIPATE	103-23-1	10000
DIALLATE	2303-16-4	0.15
DIAMINOTOLUENE, 2,4-	95-80-7	0.0042
DIAZINON	333-41-5	0.082
DIBENZO[A,H]ANTHRACENE	53-70-3	2.50
DIBROMO-3-CHLOROPROPANE, 1,2-	96-12-8	0.0092
DIBROMOBENZENE, 1,4-	106-37-6	150
DIBROMOETHANE, 1,2- (ETHYLENE DIBROMIDE)	106-93-4	0.0012
DIBROMOMETHANE	74-95-3	3.7
DI-N-BUTYLPHTHALATE, N-	84-74-2	1500
DICHOLOR-2-BUTENE, 1,4-	764-41-0	0.0009
DICHLOROBENZENE, 1,2-	95-50-1	59
DICHLOROBENZENE, 1,3-	541-73-1	61
DICHLOROBENZENE, P-	106-46-7	10
DICHLOROBENZIDINE, 3,3 -	91-94-1	8.3
DICHLORODIFLUOROMETHANE (FREON 12)	75-71-8	100
DICHLOROETHANE, 1,1-	75-34-3	0.65
DICHLOROETHANE, 1,2-	107-06-2	0.10
DICHLOROETHYLENE, 1,1-	75-35-4	0.19
DICHLOROETHYLENE, CIS-1,2-*	156-59-2	1.6

Table A-b
Clean Fill Concentration Limits

Analyte	CASRN	Clean Fill Total Analysis mg/kg
DICHLOROETHYLENE, TRANS-1,2-	156-60-5	2.3
DICHLOROMETHANE (METHYLENE CHLORIDE)	75-09-2	0.076
DICHLOROPHENOL, 2,4-	120-83-2	1
DICHLOROPHENOXYACETIC ACID, 2,4- (2,4-D)	94-75-7	1.8
DICHLOROPROPANE, 1,2-	78-87-5	0.11
DICHLOROPROPENE, 1,3-	542-75-6	0.12
DICHLOROPROPIONIC ACID (DALAPON), 2,2-	75-99-0	5.30
DICHLORVOS	62-73-7	0.012
DICYCLOPENTADIENE	77-73-6	0.12
DIELDRIN	60-57-1	0.11
DIETHYL PHTHALATE	84-66-2	160
DIFLUBENZIRON	35367-38-5	52
DIMETHOATE	60-51-5	0.28
DIMETHOXYBENZIDINE, 3,3-	119-90-4	16
DIMETHYLAMINOAZOBENZENE, P-	60-11-7	0.037
DIMETHYLANILINE, N,N-	121-69-7	4.1
DIMETHYLBENZIDINE, 3,3-	119-93-7	0.4
DIMETHYLPHENOL, 2,4-	105-67-9	32
DINITROBENZENE, 1,3-	99-65-0	0.049
DINITROPHENOL, 2,4-	51-28-5	0.21
DINITROTOLUENE, 2,4-	121-14-2	0.050
DINITROTOLUENE, 2, 6,- (2,6-DNT)	606-20-2	1.10
DINOSEB	88-85-7	0.290
DIOXANE, 1,4-	123-91-1	0.073
DIPHENAMID	957-51-7	12
DIPHENYLAMINE	122-39-4	12
DIPHENYLHYDRAZINE, 1,2-	122-66-7	0.15
DIQUAT	85-00-7	0.24
DISULFOTON	298-04-4	0.078
DIURON	330-54-1	0.86
ENDOSULFAN	115-29-7	30.00
ENDOSULFAN I (ALPHA)	959-98-8	110
ENDOSULFAN II (BETA)	33213-65-9	130
ENDOSULFAN SULFATE	1031-07-8	70
ENDOTHALL	145-73-3	4.1
ENDRIN	72-20-8	5.5
EPICHLOROHYDRIN	106-89-8	0.056
ETHEPHON	16672-87-0	2.1
ETHION	563-12-2	39
ETHOXYETHANOL, 2- (EGEE)	110-80-5	7.80
ETHYL ACETATE	141-78-6	220
ETHYL ACRYLATE	140-88-5	0.12

Table A-b
Clean Fill Concentration Limits

Analyte	CASRN	Clean Fill Total Analysis mg/kg
ETHYL BENZENE	100-41-4	46
ETHYL DIPROPYL THIOCARBAMATE, S- (EPTC)	759-94-4	65
ETHYL ETHER	60-29-7	53
ETHYLMETHACRYLATE	97-63-2	14
ETHYLENE GLYCOL	107-21-1	170
ETHYLENE THIOUREA (ETU)	96-45-7	0.034
ETHYL P-NITROPHENYL PHENYLPHOSPHOROTHIOATE	2104-64-5	0.12
FENAMIPHOS	22224-92-6	0.17
FENVALERATE (PYDRIN)	51630-58-1	94
FLUOMETURON (FLUORNETRON IN EPA FEB 96)	2164-17-2	2.5
FLUORANTHENE	206-44-0	3200
FLUORENE	86-73-7	3000
FLUOROTROCHLOROMETHANE (FREON 11)	75-69-4	87
FONOFOS	944-22-9	2.9
FORMALDEHYDE	50-00-0	12
FORMIC ACID	64-18-6	210
FOSETYL-AL	039148-24-8	9700
FURAN	110-00-9	0.42
FURFURAL	98-01-1	1.4
GLYPHOSATE	1071-83-6	620
HEPTACHLOR	76-44-8	0.68
HEPTACHLOR EPOXIDE	1024-57-3	1.1
HEXACHLOROBENZENE	118-74-1	0.96
HEXACHLOROBUTADIENE	87-68-3	1.20
HEXACHLOROCYCLOPENTADIENE	77-47-4	91
HEXACHLOROETHANE	67-72-1	0.560
HEXANE	110-54-3	500
HEXYTHIAZOX (SAVEY)	78587-05-0	820
HYDRAZINE/HYDRAZINE SULFATE	302-01-2	0.000098
HYDROQUINONE	123-31-9	20
INDENO[1,2,3-CD]PYRENE	193-39-5	25
IPRODIONE	36734-19-7	430
ISOBUTYL ALCOHOL	78-83-1	76
ISOPHORONE	78-59-1	1.90
KEPONE	143-50-0	0.56
MALATHION	121-75-5	34
MALEIC HYDRAZIDE	123-33-1	47
MANEB	12427-38-2	2
MERPHOS OXIDE	78-48-8	6.6
METHACRYLONITRILE	126-98-7	0.031
METHAMIDOPHOS	10265-92-6	0.022

Table A-b
Clean Fill Concentration Limits

Analyte	CASRN	Clean Fill Total Analysis mg/kg
METHANOL	67-56-1	58.00
METHOMYL	16752-77-5	3.20
METHOXYCHLOR	72-43-5	630
METHOXYETHANOL, 2-	109-86-4	0.41
METHYL ACETATE	79-20-9	690
METHYL ACRYLATE	96-33-3	27
METHYL CHLORIDE	74-87-3	0.038
METHYL ETHYL KETONE (2-BUTANONE)	78-93-3	54
METHYL ISOBUTYL KETONE	108-10-1	2.90
METHYL METHACRYLATE	80-62-6	26.0
METHYL METHANESULFONATE	66-27-3	0.083
METHYL PARATHION	298-00-0	0.42
METHYL STYRENE (MIXED ISOMERS)	25013-15-4	120
METHYL TERT-BUTYL ETHER (MTBE)	1634-04-4	0.28
METHYLENE BIS(2-CHLOROANILINE), 4,4 -	101-14-4	3.9
METHYLNAPHTHALENE, 2-	91-57-6	2900
METHYLSTYRENE, ALPHA	98-83-9	120
NAPHTHALENE*	91-20-3	25
NAPHTHYLAMINE, 1-	134-32-7	0.30
NAPHTHYLAMINE, 2-	91-59-8	0.01
NAPROPAMIDE	15299-99-7	860
NITROANILINE, M-	99-09-2	0.033
NITROANILINE, O-	88-74-4	0.038
NITROANILINE, P-	100-01-6	0.031
NITROBENZENE	98-95-3	0.79
NITROPHENOL, 2-	88-75-5	5.90
NITROPHENOL, 4-	100-02-7	4.1
NITROPROPANE, 2-	79-46-9	0.000260
NITROSODIETHYLAMINE, N-	55-18-5	0.000018
NITROSODIMETHYLAMINE, N-	62-75-9	0.000041
NITROSO-DI-N-BUTYLAMINE, N-	924-16-3	0.0033
NITROSODI-N-PROPYLAMINE, N-	621-64-7	0.0013
NITROSODIPHENYLAMINE, N-	86-30-6	20.00
NITROSO-N-ETHYLUREA, N-	759-73-9	0.000054
OCTYL PHTHALATE, DI-N-	117-84-0	4400
OXAMYL (VYDATE)	23135-22-0	2.60
PARATHION	56-38-2	130
PCB-1016 (AROCLOR)	12674-11-2	15
PCB-1221 (AROCLOR)	11104-28-2	0.63
PCB-1232 (AROCLOR)	11141-16-5	0.50
PCB-1242 (AROCLOR)	53469-21-9	16
PCB-1248 (AROCLOR)	12672-29-6	9.90

Table A-b
Clean Fill Concentration Limits

Analyte	CASRN	Clean Fill Total Analysis mg/kg
PCB-1254 (AROCLOR)	11097-69-1	4.40
PCB-1260 (AROCLOR)	11096-82-5	30
PEBULATE	1114-71-2	300
PENTACHLOROBENZENE	608-93-5	180
PENTACHLORONITROBENZENE	82-68-8	5.00
PENTACHLOROPHENOL	87-86-5	5.00
PHENACETIN	62-44-2	12.00
PHENANTHRENE	85-01-8	10000
PHENOL	108-95-2	66.00
PHENYLENEDIAMINE, M-	108-45-2	3.10
PHENYLPHENOL, 2-	90-43-7	490
PHORATE	298-02-2	0.41
PHTHALIC ANHYDRIDE	85-44-9	2300
PICLORAM	1918-02-1	7.4
PRONAMIDE	23950-58-5	3.1
PROPANIL	709-98-8	9.2
PROPHAM	122-42-9	17
PROPYLBENZENE, N-	103-65-1	290
PROPYLENE OXIDE	75-56-9	0.049
PYRENE	129-00-0	2200
PYRIDINE	110-86-1	0.11
QUINOLINE	91-22-5	0.018
QUIZALOFOP (ASSURE)	76578-14-8	47
RONNEL	299-84-3	280
SIMAZINE	122-34-9	0.15
STRYCHNINE	57-24-9	0.89
STYRENE	100-42-5	24
TEBUTHIURON	34014-18-1	83
TERBACIL	5902-51-2	2.2
TERBUFOS	13071-79-9	0.12
TETRACHLOROBENZENE, 1,2,4,5-	95-94-3	5.1
TETRACHLORODIBENZO-P-DIOXIN, 2,3,7,8- (TCDD)	1746-01-6	0.00012
TETRACHLOROETHANE, 1,1,1,2-	630-20-6	18
TETRACHLOROETHANE, 1,1,2,2-	79-34-5	0.0093
TETRACHLOROETHYLENE (PCE)	127-18-4	0.43
TETRACHLOROPHENOL, 2,3,4,6-	58-90-2	450.00
TETRAETHYL LEAD	78-00-2	0.0046
TETRAETHYLDITHIOPYROPHOSPHATE	3689-24-5	0.73
THIOFANOX	39196-18-4	0.12
THIRAM	137-26-8	47
TOLUENE	108-88-3	44

Table A-b
Clean Fill Concentration Limits

Analyte	CASRN	Clean Fill Total Analysis mg/kg
TOLUIDINE, M-	108-44-1	0.13
TOLUIDINE, O-	95-53-4	0.32
TOLUIDINE, P-	106-49-0	0.32
TOXAPHENE	8001-35-2	1.20
TRIALLATE	2303-17-5	240
TRIBROMOMETHANE (BROMOFORM)	75-25-2	4.4
TRICHLORO- 1,2,2-TRIFLUOROETHANE, 1,1,2-	76-13-1	26000
TRICHLOROBENZENE, 1,2,4-	120-82-1	27
TRICHLOROBENZENE, 1,3,5-	108-70-3	31
TRICHLOROETHANE, 1,1,1-	71-55-6	7.20
TRICHLOROETHANE, 1,1,2-	79-00-5	0.15
TRICHLOROETHYLENE (TCE)	79-01-6	0.17
TRICHLOROPHENOL, 2,4,5-	95-95-4	2300
TRICHLOROPHENOL, 2,4,6-	88-06-2	3.1
TRICHLOROPHENOXYACETIC ACID, 2,4,5- (2,4,5-T)	93-76-5	1.50
TRICHLOROPHENOXYPROPIONIC ACID, 2,4,5- (2,4,5-TP) (SILVEX)	93-72-1	22
TRICHLOROPROPANE, 1,1,2-	598-77-6	3.1
TRICHLOROPROPANE, 1,2,3-	96-18-4	1.6
TRICHLOROPROPENE, 1,2,3-	96-19-5	11
TRIFLURALIN	1582-09-8	0.96
TRIMEHTYLBENZENE, 1,3,4- (TRIMETHYLBENZENE, 1,2,4-)	95-63-6	9
TRIMETHYLBENZENE, 1,3,5-	108-67-8	2.8
TRINITROTOLUENE, 2,4,6-	118-96-7	0.023
VINYL ACETATE	108-05-4	6.50
VINYL BROMIDE (BROMOMETHANE)	593-60-2	0.068
VINYL CHLORIDE	75-01-4	0.03
WARFARIN	81-81-2	2.60
XYLENES (TOTAL)	1330-20-7	990
ZINEB	12122-67-7	29
Metals and Inorganics		
Antimony	7440-36-0	27
Arsenic	7784-72-1	12
Barium and compounds	7440-39-3	8,200
Beryllium	7440-41-7	320
Boron and compounds	7440-42-8	6.7
Cadmium	7440-43-9	38
Chromium III	7440-47-3	190,000
Chromium VI	18540-29-9	94
Cobalt	7440-48-4	8.1
Copper	7440-50-8	8,200

Table A-b
Clean Fill Concentration Limits

Analyte	CASRN	Clean Fill Total Analysis mg/kg
Cyanide, free	57-12-5	200
Lead	7439-92-1	450
Manganese	7439-96-5	31,000
Mercury	7439-97-6	10
Nickel	7440-02-0	650
Selenium	7782-49-2	26
Silver	7440-22-4	84
Thallium	7440-28-0	14
Tin	7440-31-5	240
Vanadium	7440-62-2	1,500
Zinc	7440-66-6	12,000