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Mr. John Romeo CEHND-PM-E U.S. Army Corps of Engineers Huntsville Division Huntsville, AL 35807-4301

SUBJECT: Ash Landfill RI/FS Work Plan

Dear Mr. Romeo:

In response to the comments received from Carla Struble of the U.S. Environmental Protection Agency (EPA), Amelia Jackson of the EPA, Kamal Gupta of the New York State Department of Environmental Conservation (NYSDEC) and Keith Hoddinott of the U.S. Army Environmental Hygiene Agency (AEHA), Chas. T. Main, Inc. (MAIN) submits the following corrections to the Ash Landfill Work Plan originally submitted by Environmental, Science and Engineering (ESE) in May of 1991. The comments received from the above referenced agencies are underlined and followed by MAIN's responses. In addition, MAIN is submitting the pages from the ESE workplan showing the original text, with a line though it, and the proposed changes highlighted. The changed text is also submitted, without the strikes and highlights.

The EPA comments (from Carla Struble) are provided below and are accompanied by MAIN's responses and corrections to the document.

According to the EPA, the following comments were not addressed:

1. Comment 5 concerned RCRA clean-up values for Table 3.3-1.

RCRA clean-up values for soils have not been added to Table 3.3-1 (p. 3-28).

RCRA clean-up values were added to Table 3-3.1.

2. Comment 13 concerned the methodology for completing the proposed soil gas surveys and the geophysical surveys in the Field Sampling and Analysis Plan (FSAP).

ESE has not included the methodology for completing the proposed soils gas surveys or geophysical surveys; it is stated in Section 4.2.2.2(p. 4-13) only that the "RI contractor will provide soil gas procedures."

> On March 2, 1991, EPA participated in a conference call with representatives of SEAD, ESE, Alliance Technologies Crop. (Alliance) Chas. T. Main, Inc. (MAIN) (the RI contractor) to discuss what type of soil gas procedures and geophysical survey methods would be utilized during the RI. At that time, it was decided that the procedures and methods proposed by MAIN were more appropriate for the project than those proposed by ESE. EPA was under the impression that MAIN was going to forward these procedures to ESE, and that the Revised Work Plan would incorporate these items.

> MAIN should forward all such procedures to EPA so that a formal review of these procedures can be completed prior to initiation of the RI.

The methodology for completing these surveys has been incorporated into Appendix A, The Field Sampling and Analysis Plan of the Work Plan.

3. Comment 14 concerns the flexibility of the proposed soil gas survey to allow for greater sampling in areas where elevated soil gas readings are obtained.

Section 4.2.2.2(p. 4-13) does not specifically state that the lateral extent of the soil gas survey will be expanded, if necessary, to delineate any "hot spots" which are identified. This point should be clarified with the RI contractors.

Section 4.2.2.2(p. 4-13) states that the soil gas survey will be flexible with regard to the above comment. Since no specific locations are identified and specified for soil gas sampling, the actual sampling locations will be sufficient to delineate the extent of the geophysical anomoly. This point is described in Section A.8.1 of Appendix A.

4. Comment 22 concerns the groundwater sampling program which should contain a maximum of three rounds of sampling. It also concerns confirmation of tentatively identified compounds (TICs).

No methodology for different rounds of sampling has been presented in the relevant sections: Section 4.2.1.3, Well and Analysis (p. 4-8) and Appendix A, Section A.2.3, Groundwater Sampling (p. A-14). The only mention of subsequent rounds of sampling occurs on page C-39 of the OAPP and in Section 4.5 (p. 4-41). The confirmation of TICs is also not stated.

The rationale for three different rounds of groundwater sampling has been incorporated into Section 4.2.1.3, Well Sampling and Analysis (p. 4-8) and Appendix A, Section A.2.3, Groundwater Sampling (p. A-14). The confirmation of TICs is also stated.

5. Comment 33 concerns the Cultural Resource Survey.

No mention of a proposed cultural resources survey, or one that has already been competed, was noted in the work plans.

"An Archeological Overview and Management Plan for Seneca Army Depot", which is currently in effect, has been forwarded to Steven Petruccelli of the EPA. Pertinent information from this report has been added to the Work Plan. The information suggests that there are no significant cultural resources on the ash landfill site. The plan is referenced in Section 3.3.2.1 (p. 3-32).

6. Comment 34 concerns a survey of significant agricultural lands.

No proposal for a Significant Agricultural Lands survey was noted in the Work Plan.

An overview of significant agricultural lands has been incorporated in the Work Plan (Section 3.3.2.4, P. 3-33). The information suggests that there are no significant agricultural lands on the ash landfill site or in the immediate vicinity of the site.

According to the EPA, the following comments were partially addressed:

7. Comment 1 concerns the conceptual site models for the nine source areas and primary and secondary release mechanisms.

Conceptual site models have been modified and now include all nine source areas (p. 3-11, 3-12, 3-13, 3-14, 3-15).

Figure 3.1-2 incorporates five primary sources into single figure. It is questionable as to whether all sources will actually display the same release mechanisms and migration pathways as suggested by this figure. It is questionable whether direct contact is a concern for Buried Debris Piles, or if leaching is truly a concern for the Construction Debris Pile Area. The complexities of the individual sources could have been better illustrated. The RI/FS Guidance (EPA 1988) also specifies the inclusion of secondary sources and secondary release mechanisms in conceptual models. These items are not included in ESE's models. Further revisions are not essential at this stage as the scope of the RI field program has already been established.

MAIN agrees that further revisions are not essential at this stage as the scope of the RI field program has already been established.

8. Comment 7 concerns the Remedial Action Objectives (RAOs) and preliminary remediation goals for groundwater and soils for the primary contaminants known to be at the site based on ARARS and/or other criteria.

Table 3.2-1 mentions SWDA MCLs (Safe Drinking Water Act - Maximum Contaminant Levels) for surface and groundwater, and RCRA action Levels for soils. Table 3.3-1 (p. 3-28) provides the MCL values, but the RCRA clean-up values for soils are not listed. The RI/FS Guidance (EPA 1988) specifies that the RAOs should cite a quantitative preliminary remediation goal based on ARARs, and therefore, Table 3.2-1 is not in full compliance with EPA requirements as specific values are not cited. Preliminary remediation goals should be cited during project planning to assist in establishing the Data Quality Objectives (DQOs) for the project.

Decisions regarding the DQOs for this project have been made at the February 1991 conference attended by representatives of SEAD; NYSDEC; the EPA Edison, NJ Office; and Alliance, and the appropriate analytical methods for the project have been established. Therefore, although the RAOs may not be in full compliance with EPA policy, the formulated RAOs are acceptable at this stage of the project. Ongoing development and refinement of remedial goals should occur as RI data becomes available.

MAIN agrees that the formulated RAOs are acceptable at this stage of the project. Ongoing development and refinement of remedial goals will occur as RI data becomes available.

9. Comment 8 concerns data needs of the feasibility study, including those required to support the development and analysis of groundwater treatment technologies and capping the landfill.

Sections 3.4. (Data Needs and DQO's, p. 3-35) and 3.5 (Data Gaps p. 3-37) have been revised and now contain an expanded discussion of data needs.

Table 4.3-1 has incorporated the following engineering parameters into the analytical program for groundwater which should be of use in determining treatment options in the FS: alkalinity, BOD, COD, TOC, hardness, and total, dissolved, and suspended residue.

The RI/FS Work Plan still remains deficient in defining data needs for soils, especially those situated within the landfill. For instance, if capping is considered an option for the landfill, the following data needs in the cited EPA Fact Sheet, "Streamlining the RI/FS for CERCLA Municipal Landfill Sites" (Directive 9355.3-11FS, 1990) are likely to apply:

- o determination of the thickness and lateral extent of fill materials;
- <u>o</u> <u>estimate of landfill settlement rate;</u>
- o rate of landfill gas production/composition;
- o climatic conditions (frost depth, precipitation); and
- o soil characteristics including permeability, atterberg limits, grain size and erosion rates.

In addition, soils subject to treatment by incineration or soil washing will probably require analysis for grain-size distribution at a minimum (ASTM D-422-63).

Data deficiencies for soils may be encountered during the FS stage. It is possible that the FS could be competed without such data; however, it is likely that estimates of cost would not be entirely accurate if key design parameters must rely on assumptions rather than field data. Further, a follow-up pre-Remedial Design (RD) field investigation will likely be required to gather this type of data before RD work can be completed. Therefore, although it may not be mandatory at this stage, it would be advisable to expand on engineering data collection effort for soils.

The RI/FS Work Plan addresses information pertinent to the scope of the project. MAIN feels that the Work Plan defines an appropriate level of investigation for soils within the ash landfill area. With regard to the data needs outlined in the EPA fact sheet, "Streamlining the RI/FS CERCLA Municipal Landfill Sites", MAIN has prepared the following responses:

- o The thickness and lateral extent of the fill materials will be investigated through the proposed boring program for the site described in Section 4.2.2.3(p. 4-13).
- o The estimation of landfill settlement rate is considered beyond the scope of the project as the site is not a municipal landfill site. The settlement rates of a municipal landfill (which contains considerable amounts of easily compressible materials--newspaper and other domestic paper goods), are not expected to be pertinent to the ash landfill site, which contains mostly ash materials and fewer easily compressible material.
- o MAIN proposed to conduct a soil gas survey at the ash landfill sites to determine the presence of areas of significant concentrations of volatile organic compounds (p. 4-13). The nature of the ash landfill suggests that landfill gas production, similar to that associated with a municipal landfill, is not applicable to the ash landfill site.
- o Pertinent climatic conditions information will be collected during the RI (e.g., precipitation from a nearby airport gauging station).
- o Soil characteristics will be investigated during the RI. Grain size analysis will be conducted to determine slot size of well screens. Permeability will be investigated in selected wells. Because there is good vegetative cover on the ash landfill site, erosion is not considered to be a major issue. Therefore, erosion rates will not be investigated. However, total dissolved solids in surface water will be determined. High total dissolved solids can indicate that erosion is occuring at the site. Determination of Attenberg Limits is not believed to be applicable to the scope of the Work Plan. Attenberg Limits will be determined on clay which may be considered for capping.

> In general, MAIN agrees that complete engineering data on soils is not complete to evaluate every possible remediation strategy. MAIN also agrees that a follow-up investigation could be proposed based on the information collected to further define the points raised above.

10. Comment 16 concerns the investigation of geophysical anomalies through test pits or boring and sampling if necessary.

ESE has proposed that geophysical anomalies which cannot be explained will be investigated through test pits or borings (Section 4.2.2, p. 4-10), and that any point contributors encountered will undergo analytical sampling.Specific procedures for completing test pits operations are not provided in the Work Plan, or the Field Sampling and Analysis Plan (FSAP). This information should be provided by the RI contractors prior to initiation of the RI. Decisions regarding the use of test pits to investigate subsurface anomalies can be conveyed to EPA and DEC, prior to initiating these operations.

Specific procedures for completing the test pits operations have been incorporated into the Work Plan, Appendix A, p. A-5.

11. Comment 17 concerns previous interpretations of the completed geophysical work and a complete summary and analysis of all geophysical work.

Section 4.6, RI Reporting (p. 4-41) has been expanded and now contains a more detailed summary of what the RI report will consist of. A preliminary site characterization will also be included in the RI report.

Specific requirements for the RI report, such as those identified in the above comment (e.g., geophysical presentations), may need to be conveyed directly to the RI contractors.

MAIN agrees that specific requirements for the RI report may need to be conveyed directly to the RI contractors.

12. Comment 24 concerns handling and disposal of RI-generated waste materials and modification of the sampling and analysis plan.

The discussion of the handling and disposal of RI-generated waste materials presented in Appendix A (p. A-27) has been modified to state that "RI-generated waste handling/disposal will be conducted in accordance with all applicable RCRA requirements."

Prior to initiating the RI, the RI contractor should outline the specific RCRA regulations which apply to this program, and their proposal for meeting such requirements.

RI-generated waste materials are not classified and they will be characterized using TCLP. SEAD is currently regulated under RCRA with an interim status permit. They are a licensed TSD facility. Wastes generated during the RI exploration will be disposed of in compliance with their permit program.

13. Comment 25 concerns reporting requirements established in the IAG, specifically, the preparation of monthly reports.

Section 4.6 (p. 4-41) has been revised to include the adherence of reporting requirements established in the IAG. Also stated in Section 4.6.2 is the requirement that, "at the conclusion of field work, a Preliminary Site Characterization Summary in the format of the first four chapters of an RI report will be prepared." There is no mention of monthly reports, only that reports will be made after each round of sampling.

The Work Plan (Section 4.6, p. 4-42) has been revised to include the preparation of monthly reports.

14. Comment 27 concerns the completeness of the acronym list in the front of the Work Plan.

The acronym list provided in front of the work plan has been updated and expanded. (Does not include "TAL".)

TAL has been added to the acronym list.

15. Comment 30 concerns containerizing, sampling and disposal of drill cuttings. In addition, closure of borings and test pits is mentioned.

ESE has updated Section 4.2.9 of the Work Plan (p. 4-28) and Section A.6 of the FASP (p. A-27) to state that waste containerization and disposal will be conducted in accordance with applicable RCRA requirements. Note that specific regulations are not cited. This information should be provided by the SEAD contractors.

Appendix A has been amended to include the grouting of all borings (p. A-3). Section 4.2.2, Soil Investigation (p. 4-10) mentions the backfilling of test pits; specific test pittings procedures are not provided.

SEAD is currently regulated under RCRA with an interim status permit. They are a licensed TDS facility. Wastes generated during the RI exploration will be disposed of through their permit program. Specific procedures for completing the test pit operations have been incorporated into the Work Plan (p. A-5).

16. Comment 31 concerns the 500-year floodplain delineation and assessment.

The Work Plan states in Item 2 that wetlands and floodplains will be delineated within the extent of contamination in accordance with EOs 11990 and 11988. Clarification of whether this includes a 500-year floodplain delineation should be provided by the RI contractors.

The Work Plan has been modified to include a delineation of a 500-year floodplain (p. 3-33).

17. Comment 32 concerns rare and endangered species.

The Work Plan proposes to survey for the presence of rare or endangered species (if necessary) (Section 4.5, p. 4-40); however, no reference is provided to a specific letter from federal regulating agencies.

An "Installation Assessment of the Seneca Army Depot" (January 1980) was performed and did not indicate that any endangered species were present at SEAD. Further information from this study is provided on P. 3-32.

A "Fish and Wildlife Management Plan" was prepared for the SEAD (including the ash landfill site). A copy of this plan was forwarded to Steven Petrucelli of the EPA. The Work Plan has been revised to include information from this plan.

The comments of Amelia Jackson are provided below and are accompanied by MAIN's responses and corrections to the document.

1. Comment 55 concerns TCLP.

As agreed upon in the meeting of 2/18/91, TCLP will be used in lieu of the EPTOX. Please justify deleting any reference to the TCLP in the May 1991 document.

RI-generated waste materials are not classified. TCLP will be used to classify the drill cuttings and development water. TCLP will be performed to determine if the drill cuttings and development water is hazardous waste.

2. Comment 56a concerns the decontamination procedures in the QAPP.

Please correct the OAPP, p. C-71, step 6 of the decontamination procedure to read "rinse thoroughly with deionized, demonstrated analyte free water." Demonstrated analyte free water is defined as water which has been tested prior to the start of the sampling event for the organic and inorganic parameters of interest and found to contain less than the reported quantitation limits of these compounds.

The Work Plan was corrected to read "rinse thoroughly with deionized, demonstrated analyte-free water."

3. Comment 58a concerns the CLP inorganic reporting forms in the QAPP.

Please provide the CLP inorganic reporting forms in the OAPP.

The CLP inorganic reporting forms have been included in the QAPP.

4. Comment 59 concerns soil gas sampling procedures.

The soil gas sampling procedures must be incorporated into these plans, as agreed upon during the 2/28/91 meeting.

Soil gas sampling procedures have been incorporated into the Work Plan.

5. Comment 62b concerns consistency between p. C-92 and p. A-14 regarding the purging procedure.

Please be consistent between p. C-92 and p. A-14 regarding the purging procedure.

The Work Plan has been corrected so that p. C-92 and p. A-14 are consistent with regard to purging procedure.

6. Comment 63b concerns Table 4.2-1 of the QAPP and Table 4.3-1 of the Work Plan.

Table 4.2-1 of the OAPP and Table 4.3-1 of the WP are inconsistent. Table 4.2-1 does not include Method 8150 for herbicides and Table 4.3-1 does not contain Method 9010 for cyanide.

Method 8150 for herbicides has been included in Table 4.2-1 of the QAPP. NYSDEC CLP for cyanide has been included in Table 4.3-1 of the Work Plan.

7. Comment 65 concerns the ACE Missouri River Division laboratory validation results.

I am still awaiting receipt of the ACE Missouri River Division laboratory validation results. Please provide them to me as soon as they are available.

The ACE Missouri River Division laboratory validation results will be provided to Amelia Jackson as soon as they are available.

8. Comment 68 concerns deleting reference to I-Chem bottle supplier in the Work Plan.

Please delete all references to I-Chem as the bottle supplier as this company will not be used as per Kevin Healy, ACE Project Manager. Include the name of the new bottle supplier as well as their cleaning and OC procedures used on the bottles.

All reference to I-Chem bottle supplier have been deleted. The new bottle supplier is Environmental Sampling Supply (ESS). ESS cleaning and QC procedures used on the bottles are provided in the QAPP.

9. Comment 69 concerns referencing the use of demonstrated analyte-free water in both the Work Plan and the FSAP.

The WP and the FSAP should reference the QAPP, p. C-6 regarding the use of demonstrated analyte free water (as defined in Comment 2 above).

The document has been changed so that both the Work Plan (p. 4-26) and the FSAP (p. A-16) reference the QAPP.

10. Comment 70a is similar to that in Item 2 above.

Correct OAPP, p. C-71 as per Comment 2 above.

The QAPP has been corrected to read as in Item 2 above.

11. Comment 72 concerns Appendix D and consistency with the QAPP regarding volatile organic sample preservation.

The original comment applied to Appendix D, p. D-2 which has not been made consistent with the OAPP regarding volatile organic sample preservation.

Appendix D has been made consistent with the QAPP regarding volatile organic sample preservation (p. D-2a).

12. Comment 74 concerns sample handling protocol in Appendix D.

This original comment also applied to Appendix D, Sample Handling Protocol. Please make this document consistent with the OAPP, FSAP, and the WP.

Appendix D (p. D-5a) has been made consistent with the QAPP, FASP, and the WP.

13. Comment 75 concerns referencing Appendix D for the chain of custody forms in the QAPP.

The QAPP should reference Appendix D for the Chain of Custody forms. Page C-105 only references sample log sheets.

Page C-105 has been corrected so that chain of custody forms are referenced.

14. Comment 80 concerns RI-generated waste handling/disposal under RCRA and analytical testing by TCLP.

This comment was generally addressed by stating that all RI-generated waste handling/disposal will be conducted in accordance with RCRA requirements. If this is to include analytical testing by the TCLP, or any other specific tests required, then these details must be stated in the Plans.

RI-generated waste materials are not listed as hazardous wastes and they will be characterized as hazardous waste using TCLP. The Work Plan includes this statement (p. 4-28).

15. Comment 83 concerns identification of the personnel involved in implementing the RI, the SEAD management structure or appropriate EPA contacts in the Work Plan and QAPP.

This comment was not addressed. The WP and the OAPP do not identify the personnel involved in implementing the RI (C.T. Main), the SEAD management structure or the appropriate EPA contacts. As previously requested, any deviations to the approved Plan(s) must be approved by Kevin Healy (ACE Project Manager), Randy Battaglia (Seneca Project Manager), and currently, Carla Struble (EPA Project Manager). This should be explicitly stated in the documents.

The information described above has been included in the Work Plan and the QAPP.

16. Comment 88 concerns the results from the ACE-MRD.

I am still awaiting results from the ACE-MRD as per Comment 7 above.

The results of the ACE-MFD will be forwarded to the EPA as soon as they are available.

17. Comment 90 concerns the sampling procedures in the QAPP.

The QAPP must be explicit in stating that the first round of sampling will undergo full TCL/TAL analyses and subsequent rounds will test for those parameters positively detected during the first round.

The QAPP has been corrected to include the sampling procedure described above (p. 4-8).

18. Additional comments concerning QC samples.

The intent of the original comment (Comment 42 of my 3/15/91 memo to Miriam Martinez) was to ensure that the lab will prepare all QC samples stated in the analytical methods being used (in addition to those stated on Table 9.1-1) for each batch of 20 samples prepared at the same time. Please incorporate this into the Plan.

References to SW 846 methods have been deleted. Instead NYSDEC CLP methods have been specified ensuring all QA/QC requirements will be met.

The NYSDEC comments are provided below and are accompanied by MAIN's responses and corrections to the document.

1. Comment 1 concerns real-time monitoring for volatile organic compounds and particulates

During the meeting held at New York City on February 27 and 28, 1991, it was stated that the Seneca Army Depot boundary is far away from the site. Upon measurement from the Facility Site Plan, we find the Depot boundary is about 1000 feet away from the site. In addition, Seneca Army Depot (SEAD) employees may also be working in the adjacent areas of the Ash Landfill site and may be subject to the effects of site activities. We, therefore, once again recommend that whenever field activities occur at the site, there must be continuous real-time monitoring conducted for Volatile Organic Compounds (VOCs) and particulates at the downwind Ash Landfill site boundary. If the level of VOCs at the downwind Ash Landfill site boundary. If the level of VOCs at the downwind Ash Landfill site boundary exceeds 5 ppm above background levels measured upwind from the work area, then all activities must be stopped and corrective measures implemented to control the source of the release. If the level of airborne particulates at the downwind site boundary exceeds the action level of 150 ug/m³, all work activities must be stopped and corrective measures implemented to control the release of airborne particulates.

During field activities at the site, real-time monitoring for volatile organic compounds (VOC's) and particulates will be conducted at the downwind Ash landfill site boundary. If the level of VOCs at the downwind Ash landfill site boundary exceeds 5 ppm above background levels measured upwind from the work area, then all activities must be stopped and corrective measures implemented to control the source of the release. If the level of airborne particulates at the downwind site boundary exceeds the action level of 150 μ g/m³, all work activities must be stopped and corrective measures implemented to control the source of the release.

2. Comment 2 concerns the Safety, Health and Emergency Response Plan.

We acknowledge the receipt of Safety, Health and Emergency Response Plan. However, it should be understood that our review of this document is limited to ensure the health and safety of our employees and does not extend beyond it. The review and acceptance of this document for the health and safety of site workers is the sole responsibility of the Department of the Army.

MAIN and SEAD agree with this comment.

The U.S. AEHA comments (from Keith Hoddinott) are provided below and are accompanied by MAIN's responses and corrections to the document. Primary concerns are presented first and followed by detailed comments and recommendations by AEHA.

AEHA primary concerns:

1. Comment 1 concerns background soil samples.

Insufficient Background Soil Samples

The contractor does not plan to collect an adequate number of soil samples to determine background chemical concentrations.

MAIN appreciates AEHA's comment regarding background soil samples and believes it is helpful. However, this comment is not being addressed in the work plan, which was originally developed by ESE, as the plan was recently approved by the EPA with some minor comments. MAIN received no comments regarding the adequacy of the number of soil samples to determine background chemical concentrations from the EPA. Background soil sampling has been planned for the OB grounds. MAIN believes that this information is applicable for determination of background for the entire SEAD facility.

2. Comment 2 concerns Risk Assessment Methodology.

Inappropriate Risk Assessment Methodology

The contractor does not plan to use the EPA's approved Risk Assessment methodology.

MAIN appreciates AEHA's comment regarding Risk Assessment Methodology. However, this comment has not been addressed in the work plan, as it was recently approved by the EPA with some minor comments. MAIN received no comments regarding inappropriate Risk Assessment Methodology from the EPA. The risk assessment methodology proposed for the OB ground workplan will be same for the Ash Landfill workplan. This methodology is EPA approved.

3. Comment 3 concerns justification for additional sampling.

Lack of Justification for Additional Sampling

The contractor has not provided enough justification for the samples they plan to collect.

MAIN appreciates AEHA's comment regarding additional justification for the sample collection plan. MAIN received no comments from the EPA regarding further justification of sampling. In MAIN's opinion, the explanation for additional sampling is adequately presented in Table 4.2-1 and on Page 4-14.

AEHA detailed comments and recommendations:

1. Comment 1 concerns use of the term BDL in Table 2.4-2.

<u>Comment:</u> Use of the term "BDL" is not defined by values in this table. The detection limits should be listed in order to make this table of data useful for completion and data evaluation purposes.

Recommendation: Define the detectable limit for each compound or reference where these values can be found.

MAIN agrees that the detection limits for the compounds would make the data in the table more useful for comparison and data evaluation purpose's. MAIN does not have this information but will obtain this data prior to the RI report preparation.

2. Comment 2 concerns the use of the term ug/l in Table 2.4-2.

<u>Comment:</u> Sample results are for soils, yet concentration is defined in terms of ug/L. The correct term should be ug/Kg or ug/g.

Recommendation: Check terms and make correction.

MAIN has reviewed the data and the table contains the correct units of ug/g.

3. Comment 3 concerns ARAR's in Table 3.3-1.

Comment: Many of the values depicted in this table are not ARARs. Items such as MCLGs, 10^{-6} risk level, Health Advisories, etc., are to be considered guidance not ARARs. Also, the 10^{-6} risk level assumes an exposure scenario which may not be realistic to this site.

Recommendation: Separate the ARARs from the "to be considered" guidance.

MAIN agrees with AEHA's comment, however, separation of ARAR's from the "to be considered" guidance on this table is not considered to be a necessity.

4. Comment 4 concerns characterization of contaminants in the lower aquifer and the subsurface soils.

Comment: It is hard to believe that the amount of prior sampling has not adequately characterized the contamination in the shallow aquifer and the subsurface soils.

Recommendation: Delete or justify further characterization of the shallow aquifer and the subsurface soils. Characterization of the lower aquifer should not be performed at this time. No evidence has appeared indicating that the lower aquifer is affected. Also, any evaluations of additional potential sources need to be justified. Aimlessly searching for unknown sources of contamination is a fruitless waste of time, energy, and money.

In order to fully characterize the presence of contamination in the shallow aquifer, and meet the goals of the RI/FS, additional data points (ie. monitoring wells) are necessary on the site. Rationale for installation of new wells is provided in Section 4.2.2.1.

Further characterization of the lower aquifer is necessary even though no groundwater contamination was detected in the privately owned offpost deep well. The contaminated groundwater has been investigated only in the shallow aquifer extending down to competent bedrock at a depth of approximately 10 ft-bls on the ash landfill SEAD property.

The evaluation of additional potential sources is necessary as part of the RI/FS study. These have only been preliminary investigated in the previous reports, and new sources may be uncovered during the RI/FS investigation. This approach was agreed upon by SEAD, ACE, MAIN, EPA and DEC during the Feb. meeting in NYC.

5. Comment 5 concerns further explanation regarding monitoring well placement.

<u>Comment:</u> If additional monitoring wells are required, several observations about the monitoring well placement needs further explanation. It is unknown what additional information will be obtained from proposed Well 36 that cannot be obtained from Wells 17, 29, 30, 31, and 25. Proposed deep Well 35D can be sited near one of the several downgradient shallow wells to determine the connection between shallow and deep aquifers. Proposed deep Well 38D is located in one of the potential contamination sources. This poses a high risk of either driving contamination into the lower aquifer or providing a preferred conduit for migrating contamination or both. All three of the proposed deep wells are in line, making it impossible to calculate the direction and planar gradient of the groundwater table.

Recommendation: Delete Well 36, move Well 35D near Well 31, and move Well 38D near Well 37.

The purpose for installation of the shallow well MW-36 and deep well MW-35D is to evaluate offpost groundwater quality in the shallow and deep wells. Previous sampling of downgradient wells MW-24, MW-28 and MW-31 indicate the presence of TRCLE, therefore, more downgradient wells are necessary.

Proposed deep well MW-38D will be installed in an appropriate manner such that minimal cross contamination will occur. Creation of a preferred avenue for migration of contamination into the lower aquifer will be prevented through grouting of the annular space between the well casing and the borehole (p. A-8).

The three proposed deep wells are not in a line according to Figure 4.2-1. Furthermore, the location of the monitoring well has been agreed upon by EPA and DEC. To change these locations is risking disapproval by EPA or DEC and will cause more unnecessary delays in the fieldwork. If the fieldwork is not performed this fall (1991) then it may not be performed until late spring or early summer of 1992.

6. Comment 6 concerns sampling and analyses for semivolatile organics in the wells.

<u>Comment:</u> Sampling and analysis for semivolatile organics should also be conducted to fully characterize the environmental conditions. There are sites in the area that could contribute semivolatiles like the landfill, grease pits, and other activities related to the operation of the incinerator.

> Recommendation: Add a requirement here and elsewhere in the document to sample and analyze for semivolatile organics in the well samples.

> According to Table 4.3-1, groundwater samples from the wells will be sampled and analyzed for semivolatile organics.

7. Comment 7(1) concerns a statistical justification for the number of soil samples to be collected.

Comment 1: The discussion of the soil sampling does not explain how the number of additional sample locations was determined. The number of samples need to be statistically justified based on the variability of contamination at each depth of the soil.

Recommendation: Statistically justify the number of additional samples.

MAIN does not believe that a statistical application is necessary to justify the proposed soil sampling locations in each boring. Soil sampling locations were chosen based on identified source areas of contamination. The depths of the sampling in each boring are chosen to provide data from four important zones in the stratigraphy of the site. These locations will provide data necessary to evaluate the vertical persistence of contamination in soil on-site.

Comment 7(2) concerns the sampling interval for surface soil and its application to the risk assessment.

Comment 2: The sampling interval for the surface soil is not adequate to determine a surface soil exposure concentration for a risk assessment. Compositing the soil over a 2-foot depth will not provide a representative concentration for dermal, ingestion, or dust inhalation exposure.

Recommendation: Shorten the sampling interval for the surface soil to 0-6 inches or less.

While a 0-6" sampling interval might better reflect surface soil, the sample interval will remain from 0-2' as this is the interval defined as surficial soil in the "Interim Final, RCRA Facilities Investigation (RFI) Guidance, Volume 1 - Development of an RFI Work Plan and General Considerations for RCRA Facility Investigations" EPA 530/SW-89-031, May 1989.

8. Comment 8 concerns adequacy of soil sampling to determine background concentrations.

Comment: The sampling for this site does not include an adequate determination of the soil background chemical concentrations. This determination is critical to the risk assessment and should be performed IAW EPA guidance. The EPA guidance suggests collecting 20 percent of the total number of other soil samples with a minimum of 12-15 samples to adequately determine background.

<u>Recommendation: This study must include an adequate determination of soil background</u> concentrations.

MAIN appreciates AEHA's comment regarding background soil samples and believes it is helpful. However, this comment is not being addressed in the work plan, which was originally developed by ESE, as the plan was recently approved by the EPA with some minor comments. MAIN received no comments regarding the adequacy of the number of soil samples to determine background chemical concentrations from the EPA. Furthermore, MAIN anticipates using the background soil data collected as part of the OB program for background at the Ash Landfill.

9. Comment 9 concerns risk assessment methodology.

<u>Comment:</u> The method planning to be used by the contractor to assess human risk does not follow EPA methodology.

Recommendation: The contractor must follow EPA methodology for the risk assessment.

MAIN appreciates AEHA's comment regarding Risk Assessment Methodology. However, this comment has not been addressed in the work plan, as it was recently approved by the EPA with some minor comments. MAIN received no comments regarding inappropriate Risk Assessment Methodology from the EPA. The methodology to be followed for Risk Assessment at the Ash Landfill will be the same as that proposed by MAIN for the OB grounds, which will follow EPA methodologies.

10. Comment 10 concerns procedures for collecting dust-wipe samples.

Comment: This paragraph mentions a requirement to know the weight of the material collected to ensure that a sufficient quantity is collected. While I am not familiar with the Region II OA manual referenced at the top of the page, it was my understanding that the contamination standard was based upon a weight of contaminant per area wiped rather than a weight per wipe. Therefore, a minimum area to be wiped should be specified, like 100-400 square centimeters, rather than a weight of material collected. Weight of material collected would be appropriate for a bulk sample where contamination is measured on a contaminant weight per sample weight basis.

<u>Recommendation:</u> If a wipe sample is desired, delete the reference to collecting a minimum weight of material and add a requirement to wipe a certain known area. This area wiped must also be recorded.

The SOP provided on p. C-101 for a dust-wipe sample is required by Region II.

11. Comment 11 concerns an error in referencing.

<u>Comment:</u> Reference to "(Figure 4.7-1)" appears to be an error; the proper reference appears to be Table 4.7-1.

<u>Recommendation:</u> Check reference and make correction. The reference was checked and is correct.

12. Comment 12 concerns "service records" and "maintenance log" for equipment.

<u>Comment:</u> Reference is made on p. C-121 to "service records" and "maintenance log", but I could find no further specifications as to what will be kept in these and how they will be kept. Throughout this section, there is no specific requirement to document maintenance and repairs to equipment. There is also no requirement for an instrument function check and documentation of it prior to use.

Recommendation: Add a requirement to use a maintenance and repair log for each instrument that lists, at a minimum, the date, instrument status versus a standard function check, function check failures, actions taken to correct the problem, repairs/maintenance, and the person performing the work/entry.

The contents of the instrument logs is included on page C-167a.

13. Comment 13 concerns review of documents.

<u>Comment:</u> The reviewer should also check for analyst transcription and calculation errors. These types of errors are significant and checks must be incorporated into the review process.

Recommendation: Add as the first sentence, "The analyst's supervisor or a designated reviewer will check analyst calculations and transcriptions for errors."

MAIN agrees with this comment and the suggested language has been included in the documents (p. C-151).

14. Comment 14 concerns the review of explanations of data qualification statements.

<u>Comment:</u> The QA supervisor should also review the explanation of any data gualification statements.

Recommendation: Add as item #6, "Statements about qualified data."

The comment has been addressed on (p. C-151).

15. Comment 15 concerns documentation of maintenance actions.

<u>Comment:</u> There are a lot of good maintenance actions specified here, but there is no requirement to document the actions. To be legally defensible, these actions must be documented.

Recommendation: Add requirements under each section, 11.1 - 11.8, to document actions. This could be done in the maintenance logbook for each instrument. See above related comment on page C-119. Actions will be documented in the instrument logbooks (p. C-167a)

Copies of all written comments are attached for your review. Please feel free to contact me at 617-859-2492 if you have any questions regarding this letter.

Very truly yours,

CHAS. T. MAIN, INC. 1 Salence

Michael Duchesneau, P.E. Project Manager

Response Requested _____ Yes ___ No Date Requested ______

MD/jmf/D#6

General Suggestion Aquatec

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through 7.2-5 list the detection limits for each analytical method that will be used in this project. Matrix spike duplicates and matrix spike blanks for volatile organic compounds will have the same QC limits as the sample.

Comment 27 (EPA)

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LIST OF ACRONYMS AND ABBREVIATIONS

| AIHA | American Industrial Hygiene Association | | |
|-------------------|---|--|--|
| AOC | area of concern | | |
| ARAR | applicable or relevant and appropriate requirement | | |
| AWQC | ambient water quality criteria | | |
| BACT | Best Available Control Technology | | |
| Ва | barium | | |
| BDL | below detection limit | | |
| BOD ₅ | 5-day biochemical oxygen demand | | |
| °C | degrees Celsius | | |
| CaCO ₃ | calcium carbonate | | |
| Cd | cadmium | | |
| CERCLA | Comprehensive Environmental Response, Compensation, and | | |
| | Liability Act | | |
| CFR | Code of Federal Regulations | | |
| CH2CL2 | methylene chloride | | |
| CHCL3 | chloroform | | |
| C2H3CL | vinyl chloride | | |
| C2H5CL | chloroethane | | |
| cm/sec | centimeters per second | | |
| COD | chemical oxygen demand | | |
| CPF | cancer potency factor | | |
| Cr | chromium | | |
| Cu | copper | | |
| 12DCE | cis-1,2-dichloroethene | | |
| 12DCLE | 1,2-dichloroethane | | |
| DOW | Division of Water | | |

C-SEADRIFS.2/WP-FM.11 12/04/90

LIST OF ACRONYMS AND ABBREVIATIONS (Continued, Page 2 of 6)

| DQO | data quality objective |
|----------------------------|--|
| DTCH | ditch sample |
| EM | electromagnetic |
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| EPA/NYSDEC | U.S. Environmental Protection Agency/New York State Department of Environmental Conservation |
| ESE | Environmental Science & Engineering, Inc. |
| eV | electron volt |
| FID | flame ionization detector |
| FR | Federal Register |
| FS | feasibility study |
| ft | foot |
| ft ³ cubic foot | |
| ft-bls | feet below land surface |
| ft/day | feet per day |
| ft/ft | feet per foot |
| ft/mile | feet per mile |
| ft/sec | feet per second |
| ft/yr | feet per year |
| gal | gallon |
| gpm | gallons per minute |
| GC | gas chromatography |
| GPR | ground-penetrating radar |
| HEA | Health Effects Assessment |
| HNO3 | nitric acid |

C-SEADRIFS.2/WP-FM.14 12/04/90

LIST OF ACRONYMS AND ABBREVIATIONS (Continued, Page 5 of 6)

| RAO | Remedial Action Objective |
|---------------|--|
| RCRA | Resource Conservation and Recovery Act |
| RfD | reference dose |
| RFI | RCRA Facility Investigation |
| RI | remedial investigation |
| RI/FS | remedial investigation/feasibility study |
| ROD | record of decision |
| RSCC | Regional Sample Control Center |
| SARA | Superfund Amendments and Reauthorization Act of 1986 |
| SBR | sequencing batch reactor |
| SCHD | Seneca County Health Department |
| SDWA | Safe Drinking Water Act |
| SEAD | Seneca Army Depot |
| SHERP | Safety, Health, and Emergency Response Plan |
| SOW | scope of work |
| SPT | standard penetration test |
| SSsoil sample | |
| STP | sewage treatment plant |
| SW | surface water sample |
| SWMU | solid waste management unit |
| TAGM | Technical and Administrative Guidance Memorandum |
| TAL | Target Analyte List |
| T12DCLE | trans-1,2-dichloroethene |
| TCL | total compounds list |
| TCLP | toxicity characteristics leaching procedure |

Comment 74 (Amelia J.)

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b) Soils/Sediments. (Organic and Inorganics)

1) Bottle and Preservative Requirements (Corrected)

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o Two 8-ounce glass wide mouth jars at least 3/4 full (Teflon-lined caps), no preservation, and iced to 4°C - one jar for organics and one jar for inorganics. For analysis of volatiles in soil, 2-40 ml VOA vials with Teflon septa completely full with no headspace are needed in addition (preferably). No preservatives and iced to 4°C are also required for volatile samples.

Comment 5 (EPA)

Comment 25 (Amelia J.)

| C-SEADI | RIFS.4/ | QAP | P-5.10 | 5 |
|---------|---------|------|--------|---|
| Sectio | n No. | _ 5 | | _ |
| Revisi | ion No. | | | _ |
| Date | 04/2 | 8/91 | | |
| Page | 105 | of | 6 | |

Each sample is identified by affixing the pressure-sensitive gummed label. Each label will have a unique combination of field group name and sequence number, a standardized sample preservation code (e.g., C for chilled, N for nitric acid), and the station identification (ID). Each label must have spaces for the field team to write in the date and time of sample collection, sampler's signature, and a new station ID if different from the original station ID. A new station ID may be necessary due to changes in field and/or sampling conditions which require substitution of sampling stations. All changes in station ID are clearly noted in permanent ink on the sample label and logsheet and must be approved by the field team leader.

The sample container is then placed in a transportation case along with chain of custody forms and logsheets (see Appendix D). Each collected sample fraction contained in the transportation case is specified on the logsheet by circling the appropriate fraction code. Other field information such as sample type, sample collection time and date, new station code (if different from tentative station ID), and field analysis results (e.g., pH, temperature) also are entered onto the logsheet. The shipment method is entered on the bottom of the logsheet, and the sampler signs and dates the logsheet. The logsheet is placed in a waterproof container and sealed in the transportation case along with the samples to which it applies. The transportation seal or lock will not be opened until the samples arrive in the analytical laboratory and are checked in by the laboratory sample custodian. The field team leader will alert the laboratory coordinator to pertinent shipping information at the end of each sampling day.

Comment 72 (Amelia J.)

a) Bottle and Preservation Requirements (Continued)

Water samples submitted for volatile analysis should be preserved with hydrochloric acid (HCl) to a pH of <2. VOC samples should be preserved by adjusting the pH of the sample to <2 by carefully adding 1:1 HCl, drop by drop, to the required two [40 milliliter (mL)] volatile organic analysis (VOA) sample vials. The number of drops of 1:1 HCl required should be determined on a fourth VOA sample vial of equal volume (prior to filling the three vials for laboratory analyses). If acidification of the sample causes effervescence, the sample should be submitted without preservation except for cooling to 4 degrees Celsius (°C).</p>

Comment 15 (AEHA) 12 (AEHA)

C-SEADRIFS.4/QAPP-10.167 Section No. 10 Revision No. 1 Date 04/29/91 Page 167 of 4

10.0 PERFORMANCE AND SYSTEM AUDITS

Two types of audit procedures will be used to assess and document performance of project staff: system audits and performance audits. These are performed at frequent intervals under the direction of the project QA supervisor. These audits form one of the bases for corrective action requirements and constitute a permanent record of the conformance of measurement systems to QA requirements.

System audits are inspections of training status, records, QC data, calibrations, and conformance to SOPs without the analysis of check samples. System audits will be performed periodically on laboratory, office, and field operations.

The system audit protocol is summarized as follows:

- 1. Field Operations--The project QA officer will periodically check:
 - a. Field notebooks, logsheets, bench sheets, tracking forms, and report any inconsistencies and/or omissions;
 - b. Field sampling plans; and
 - c. Sample site briefing package.
- 2. Laboratory Operations--The project QA officer will periodically check:
 - a. Parameter and/or laboratory notebooks;
 - Instrument logbooks; (which will document the date, instrument status, function features, actions taken to correct the problem, repair/maintenance, person performing the work (entry);
 - c. Sample log-in, dispensing, and labeling for analysis; and
 - d. Updating of QC criteria for spike recoveries.

Comment 58a (Amelia J.)
Comment 68 (Amelia J.)

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C-SEADRIFS.4/QAPP-4.69 Section No. <u>4</u> Revision No. <u>1</u> Date <u>04/23/91</u> Page 69 of 46

4.5 LABORATORY CLEANING PROCEDURES

The contractor will use commercially cleaned sample containers (i.e., from I-Chem Environmental Sampling Supply (Ess). Any containers prepared in-house will conform with the cleaning procedures specified in Table 4.5-1. Sample-kit containers are stored in clean, dust-free areas segregated from the analytical laboratory and solvent/reagent storage areas. Occasional audits of containers to document freedom from contaminants will be performed to supplement the various blanks that are frequently and routinely analyzed to provide similar QC data.

Demonstrated analyte-free water will be used for trip blanks, equipment rinse blanks, and decontamination procedures. EPA must be supplied with the test results for TCL/TAL analyzed for the detection levels of interest. The water will then be analyzed monthly during field activities.

4.6 LABORATORY/FIELD DECONTAMINATION OF SAMPLING EQUIPMENT

4.6.1 GENERAL CONSIDERATIONS

Sampling equipment to be used by field sampling teams may be decontaminated prior to mobilization to the sampling site or in the field. When possible, field equipment should be decontaminated prior to mobilization. In either case, the decontamination procedures listed in this section will be used. Sampling equipment that cannot be efficiently decontaminated with these procedures, due to heavy organic contamination, will be discarded.

Comment 636

| Analyte | | Number of ical Background od Samples | Number of Field Samples | Number of QC Samples Analyzed by RI Contractor | | | Number of QA Samples Analyzed by USACE | | |
|-----------------------|----------------------|--|-------------------------------|---|---------------------------------|--|---|---------------------------------|--|
| | Analytical Method | | | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks ⁺ | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks ⁺ |
| Groundwater | | <u>.</u> | | | | | | | |
| Volatile Organics | NYSDEC CLP | 2 | 32 | 3 | * | 2 | 3 | * | 2 |
| Mercury, Total | NYSDEC CLP | 2 | 32 | 3 | * | 0 | 3 | * | 0 |
| Arsenic, Total | NYSDEC CLP | 2 | 32 | 3 | * | 0 | 3 | * | 0 |
| Selenium, Total | NYSDEC CLP | 2 | 32 | 3 | * | 0 | 3 | * | 0 |
| ICAP: Metals, | 000000000 | | | | | | | | |
| Total | NYSDEC CLP | 2 | 32 | 3 | * | 0 | 3 | * | 0 |
| Cyanide | NYSDEC | 2 | 32 | 3 | • | 0 | 3 | • | 0 |
| Semivolatiles | NYSDEC | 2 | 32 | 3 | * | 0 | 3 | * | 0 |
| Herbicides | SW8150 | 2 | 32 | 3 | * | 0 | 3 | * | 0 |
| Pesticides/PCBs | NYSDEC CLP | 2 | 32 | 3 | * | 0 | 3 | * | 0 |
| Alkalinity | EPA 310.1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| COD | HACH 8000 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| BOD | EPA 405.1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chloride | EPA 325.3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sulfate | EPA 375.4 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOC | EPA 9060 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hardness | EPA 130.2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Residue, Total | EPA 160.3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Residue, Dissolved | EPA 160.1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Residue, Suspended | EPA 160.2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 4.3-1. Sample Matrix and Analytical Requirements for SEAD Burning Pits/Incinerator Ash Landfill

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| Analyte | | | umber of Number of ackground Field Samples Samples | Number of QC Samples Analyzed by RI Contractor | | | Number of QA Samples Analyzed by USACE | | |
|------------------------|----------------------|------------------------------------|--|---|---------------------------------|------------------------------|---|---------------------------------|------------------------------|
| | Analytical Method | Number of Background Samples | | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ |
| Surface/Spring Wa | iter | | | | | | | | |
| Volatile Organics | NYSDEC CLP | 1 | 9 | 1 | * | 1 | 1 | * | 1 |
| Mercury, Total | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Arsenic, Total | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Selenium, Total | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| ICAP: Metals, Total | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Cyanide | NYSDEC | I | 9 | 1 | | U | 1 | | Q |
| Semivolatiles | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Herbicides | SW8150 | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Pesticides/PCBs | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Sediments | | | | | | | | | |
| Volatile Organics | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Mercury, Total | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Arsenic, Total | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Selenium, Total | NYSDEC CLP | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| ICAP: Metals, Total | NYSDEC | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Ovanide | NYSDEC | Î | ģ | 1 | • | 0 | 1 | • | O |
| Semivolatiles | NYSDEC | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Herbicides | SW8150 | 1 | 9 | 1 | * | 0 | 1 | * | 0 |
| Pesticides/PCBs | NYSDEC | 1 | 9 | 1 | * | 0 | 1 | * | 0 |

Table 4.3-1. Sample Matrix and Analytical Requirements for SEAD Burning Pits/Incinerator Ash Landfill (Continued, Page 2 of 4)

| | | | mber of Number of kground Field amples Samples | Number of QC Samples Analyzed by RI Contractor | | | Number of QA Samples Analyzed by USACE | | |
|--|--------------------------|------------------------------------|--|---|---------------------------------|------------------------------|---|---------------------------------|--|
| Analyte | Analytical Method | Number of Background Samples | | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks ⁺ |
| Soils Borings 1) Surficial and In mediate Sample | nter- | | | | | | | | |
| Volatile Organics | NYSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| ICAP: Metals, Total | NYSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Cyanide Semivolatiles | N YSDEC NYSDEC CLP | 4 2 4 | 56 56 | 5 5 | * | 0 | 5 5 | * | 0 0 |
| Herbicides Pesticides/PCBs | SW8150 NYSDEC | 4 4 | 56 56 | 5 5 | * | 0 0 | 5 5 | * | 0 0 |
| Mercury | NYSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Arsenic | NYSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| 2) Above Water 7 | CLP CLP | ş 4 | 30 | 5 | | 0 | 5 | , | 0 |
| and Deep Sam Volatile N Organics | ples YSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| ICAP: Metals, Total | YSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Cyanide | NYSDEC | 4 | 56 | 5 | • | 0 | 5 | • | 0 |
| Semivolatiles | NYSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Herbicides | CLP SW8150 | 4 | 56 | 5 | * | 0 | 5 | * | 0 |

Table 4.3-1. Sample Matrix and Analytical Requirements for SEAD Burning Pits/Incinerator Ash Landfill (Continued, Page 3 of 4)

| Analyte | | Number of 1 Background Samples | Number of Field Samples | Number of QC Samples Analyzed by RI Contractor | | | Number of QA Samples Analyzed by USACE | | |
|--|-------------------------|--------------------------------------|-------------------------------|---|---------------------------------|------------------------------|---|---------------------------------|--|
| | Analytical Method | | | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks ⁺ |
| Soil Borings (Con | ntinued) | | | | | | | | |
| 2) Above Water and Deep San | Table aples (Continu | ued) | | | | | | | |
| Mercury | NYSDEC | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Arsenic | NYSDEC | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Selenium | NYSDEC | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| 3) Diesel Underground Storage Tank | | | | | | | | | |
| TRPH | SW8476 | 0 | 4 | 1 | * | 0 | 1 | * | 0 |
| Dust/Wipe | | | | | | | | | |
| Semivolatiles | NYSDEC | 0 | 2 | 0 | * | 0 | 0 | * | 0 |
| Pesticides/PCBs | NYSDEC CLP | 0 | 2 | 0 | * | 0 | 0 | * | 0 |

Table 4.3-1. Sample Matrix and Analytical Requirements for SEAD Burning Pits/Incinerator Ash Landfill (Continued, Page 4 of 4)

*One rinsate sample will be collected per decontamination event, not to exceed one sample per day. +The actual number of field QC blanks shipped will depend on the duration of field activity.

Source: ESE.

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| Matrix | Sampling Device | Analysis | Sample Container | Sample Preservation | Holding Time from Collection | Analytical Method |
|--|--------------------------------------|--|--|--|--|---|
| Groundwater/ surface water/ blanks | Stainless steel or Teflon® bailer | TCL VOCs | 3 40-mL glass vials with Teflon [®] septum | HCl to pH<2 Cool to 4 C | 14 days analyze | SW8240 NYSDEC CLP |
| | Stainless steel or Teflon® bailer | TCL BNAs, pesticides, PCBs, and herbicides | 4 1-L amber glass, Teflon®-lined cap | Cool to 4 C | 7 days extract 40 days analyze | SW8270, 8080 NYSDEC CLP SW8150 |
| | Stainless steel or Teflon® bailer | TAL metals | 1 1-L polyethylene | HNO ₃ to pH<2 Cool to 4 C | 6 months | NYSDEC CLP SW6010, 7060, 7420, 7740 SW7471 |
| | Stainless steel or Teflon® bailer | Cyanide | 1 1-L polyethylene | NaOH to pH>12 Cool to 4°C | (Fig - 28 days) 14 days analyze | SW9010 NYSDEC CLP |
| | Stainless steel or Teflon® bailer | Alkalinity COD | 1 1-L polyethylene 1 1-L polyethylene | Cool, 4 C Cool, 4 C HaSQ to $pH \leq 2$ | 14 days 28 days | EPA 310.1 HACH 8000 |
| | | BOD Chloride Sulfate TOC | 1 1-L polyethylene 1 1-L polyethylene 1 1-L polyethylene 1 1-L polyethylene | Cool, 4 C Cool, 4 C Cool, 4 C Cool, 4 C HCL <2 | 48 days 28 days 28 days 28 days | EPA 405.1 EPA 325.3 EPA 375.4 EPA 9060 |
| | | Hardness Residue (total, dissolved, suspended) | 1 1-L polyethylene 1 1-L polyethylene | HNO ₃ to pH<2 Cool, 4 C | 6 months 7 days | EPA 130.2 EPA (160.3, 160.1, 160.2) |

Table 4.2-1. Summary of Analytical Methods, Preservation, and Holding Times

C-SEADRIFS.5/QAPP-H.15

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| Matrix | Sampling Device | Analysis | Sample Container | Sample Preservation | Holding Time from Collection | Analytical Method |
|----------|----------------------------|---|---|------------------------|--|---|
| Soil | Split-spoon | TCL VOCs | 2 40-mL glass vial with Teflon®-lined cap | Cool to 4 C | Sample reservationHolding Time from CollectionAnalytica Methodool to 4 C10 days analyzeSW8240 NYSDEC 0ool to 4 C7 days extract 40 days analyzeSW8270, 8 NYSDEC 0ool to 4 C6 monthsNYSDEC 0 SW8150ool to 4 C6 monthsSW7474 NYSDEC 0ool to 4 C14 days analyzeSW9010 NYSDEC 0ool to 4 C14 days analyzeSW9010 | SW8240 NYSDEC CLP |
| | Split-spoon | TCL BNAs, pesticides, PCBs, and herbicides | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 7 days extract 40 days analyze | SW8270, 8080 NYSDEC CLP SW8150 |
| | Split-spoon | TAL metals | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 6 months | NYSDEC CLP SW6010, 7060, - 7420, 7740 |
| | | Mercury | 1 8-oz glass with Teflon®-lined cap | Cool to 4°C | 28 days | SW7471 NYSDEC CLP |
| | Split-spoon | Cyanide | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 14 days analyze | SW9010 NYSDEC CLP |
| Sediment | Stainless steel spatula | TCL VOCs | 2 40-mL glass vial with Teflon®-lined cap | Cool to 4 C | 14 days analyze | SW8240 NYSDEC CLP |
| | Stainless steel scoop | TCL BNAs, pesticides, PCBs, and herbicides | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 14 days extract 40 days analyze | SW8270, 8080 NYSDEC CLP SW8150 |
| | Stainless steel scoop | TCL metals | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 6 months | NYSDEC CLP SW6010, 7060, 7420, 7740 |

Table 4.2-1. Summary of Analytical Methods, Preservation, and Holding Times (Continued, Page 2 of 3)

C-SEADRIFS.5/QAPP-H.16

| Matrix | Sampling Device | Analysis | Sample Container | Sample Preservation | Holding Time from Collection | Analytical Method |
|---|---|-------------------------------|---|------------------------|--|-----------------------------------|
| Sediment (Continued) | Stainless steel scoop | Mercury | 1 8-oz glass with Teflon®-lined cap | Cool to 4°C | 28 days | SW7471 NYSDEC CLP |
| | Stainless steel scoop | Cyanide | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 14 days analyze | SW9010 NYSDEC CLP |
| Note: $BNA = b$ C = c g = g HCl = b $HNO_3 = 1$ | oase/neutral/acid. legrees Celsius. gram. hydrochloric acid. nitric acid. | Hg mL NaOH oz PCB | mercury. milliliter. sodium hydroxide. ounce. polychlorinated biphenyl. | RC T T | RA = Resource Cons Recovery Act. AL = target analyte 1 CL = target compound | ervation and list. nd list. |

| Table 4.2-1. Summary of Analytical Methods, | Preservation, and H | Holding Times (| (Continued, | Page 3 of | 3) |
|---|---------------------|-----------------|-------------|-----------|----|
|---|---------------------|-----------------|-------------|-----------|----|

Source: ESE.

C-SEADRIFS.5/QAPP-H.17

Comment 69 (Amelia J.)

- b. Rinse the downhole well tubing, hoses, and submersible pumps with copious amounts of tap water followed by deionized water.
- 3. Drilling tools and excavation equipment:
 - a. Before personnel begin drilling activities and entering or leaving the site, large equipment not directly used for sampling will be decontaminated by steam cleaning at a designated area. This includes drilling rigs, augers, backhoes, and drilling tools. The steam cleaning area will be designated to contain decontamination wastes and waste water.
 - b. Downhole sampling tools will be rinsed with deionized water and air dried.

Demonstrated analyte-free water will be used for decontamination procedures. Decontamination procedures are provided in the QAPP. EPA must be supplied with the test results from TCL/TAL analysis (analyzed for the detection levels of interest).

Tap water used for decontamination purposes will be obtained from SEAD. SEAD obtains the potable water source from Seneca Lake. A sample of the water will be collected and analyzed for the TCL scan prior to the field effort.

Runoff from decontamination/rinse waters and drilling operations will be collected onsite and placed in suitable containers. The contractor will be responsible for the subsequent management and disposal of the decontamination rinse waters.

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collect analytical samples through centrifugal pumps and/or drop pipes.

- c. If bailers are used to evacuate wells, decontaminate the bailers as described in Section 4.6.2.
- 2. Drilling tools:
 - a. Steam clean all drilling equipment prior to shipment to a site.
 - b. Between borings, steam clean drilling tools using tap water to remove traces of soil, rock, or other contaminants. In addition, rinse downhole tools with DI water and air-dry.
 - c. Steam clean well casings and screens prior to installation.
- 3. Well casings: Steam clean well casings prior to installation to ensure that oils, greases, and waxes have been removed. Place well casings on clean polyethylene sheeting to prevent contamination.
- 4. Field instrumentation: Clean instrumentation as per manufacturer's instructions. Rinse probes like those used in pH and conductivity meters after each use with DI water.

Tap water used for decontamination purposes will be obtained from SEAD. A sample of the water will be collected and analyzed for the TCL compounds prior to the field effort. The deionized water (used for cleaning procedures), the ultrapure water (used for equipment rinsate blanks), or the organic-free water (used to prepare trip blanks) will be analyzed or sent to Region II. The water will be analyzed for all parameters of concern monthly during field activities.

4.7 SAMPLING PROCEDURES

4.7.1 SOIL BORINGS

A series of soil borings will be drilled in the landfill area to evaluate the extent of soil contamination. The final locations for the borings will be determined following completion of the proposed geophysical

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and soil gas surveys. The USACE project manager, EPA, and New York State Department of Environmental Conservation (NYSDEC) will be consulted for approval prior to the initiation of soil sampling operations.

This information, in conjunction with the proposed geophysical and soil-gas surveys, will be used by the field team leader to locate soil borings to determine maximum, average, and background concentrations of metals and VOCs at the site. Figure 4.7-1 illustrates the proposed soil borings as determined from the site investigation to date. One soil boring will be located directly downgradient of the diesel tank located on the eastern side of the incinerator building. These samples will be analyzed for TRPH. Additional soil borings will be selected based on the proposed geophysical and soil gas surveys.

Four samples will be obtained from each soil profile using a split-spoon sampler. In each boring, discrete samples will be taken from the surface (0 to 2 ft-bls), at an intermediate zone (3 to 4 ftbls), from the top of the water table to 1 ft above the water table, and from the zone of weathered shale (2-ft interval above the competent shale unit) (see Table 4.7-1). Samples obtained from the soil borings will be transferred to a laboratory for analysis. Samples will be analyzed for TCL organic compounds (volatiles, semivolatiles, pesticides/PCBs) herbicides, and TAL metals.

A VOC grab sample from each sampling interval will be collected using a stainless steel spatula and containerized as previously described. The remaining material will be placed into a stainless-steel bowl and homogenized in a

Comment 13 (EPA)

APPENDIX A

FIELD SAMPLING AND ANALYSIS PLAN

The proposed field operations for the Seneca Army Depot (SEAD) burning pits/incinerator ash landfill area site will consist of the following major tasks:

- 1. Soil sampling,
- 2. Monitor well installation and sampling,
- 3. Surface water/sediment sampling,
- 4. Incinerator dust sampling,
- Sampling containers, preservation techniques, holding times, shipping and handling,
- 6. Waste containerization,
- 7. Geophysical survey, and
- 8. Soil gas survey.

The following sections describe the objectives and techniques associated with the previously mentioned tasks.

A.1 SOIL SAMPLING

A.1.1 OBJECTIVES

A series of soil borings will be drilled in the landfill area to evaluate the extent of soil contamination. The final locations for the borings will be determined following completion of the proposed geophysical and soil gas surveys. The USACE project manager will be consulted for approval prior to the initiation of soil sampling operations.

A.1.2 BORING TECHNIQUES

The borings will be drilled to bedrock, which has an anticipated average depth of 15 feet below land surface (ft.-bls). Samples will be collected continuously using a split-

spoon sampler. Soil samples will be collected from each boring using a split-spoon sampler (ASTM-D 1586-84) and will be taken continuously to the top of the unweathered shale unit, at 2-foot (ft.) intervals.

Borings will be terminated at the top of competent bedrock. Four samples for laboratory analysis will be obtained from each soil boring using a split-spoon sampler. In each boring, discrete samples will be collected from the surface (0 to 2 ft-bls), at an intermediate zone (3 to 4 ft-bls), from the top of the water table to 1 ft. above the water table, and from the weathered shale zone at the interval from the competent shale unit to 2 ft. above the competent shale unit. Samples obtained from the soil borings will be sent to the USACE Missouri River Division-approved laboratory for analysis.

Soil sampling techniques will involve the use of a truck-mounted drill rig to advance hollow-stem augers and to drive split-spoon samplers. The surface samples at the burning pits will be collected using a stainless steel bucket auger.

The continuous hollow-stem augering technique entails rotary advancement of a hollowstem auger equipped with an auger plug, which is removed prior to split-spoon collection. A split-spoon sampler will be employed for collecting soil samples [American Society for Testing and Materials (ASTM)-D 1586-84]. This technique involves driving a 2-ft-long, split-spoon sampler into undisturbed soil with a rig-mounted hammer. Following removal of the split-spoon sampler, the hollow-stem auger is advanced to the top of the next sample interval. If cobbles or boulders are encountered impeding splitspoon sampler advancement, an attempt will be made to auger past this interval of the borehole. If advancement is still not possible, the borehole will be backfilled and a new location chosen. Between soil borings, the augers and split-spoons will be decontaminated using a highpressure steam cleaner. The water for the steam cleaner will be obtained from a preapproved source at SEAD.

All borings will be logged by the site geologist using a standardized boring log form (Figure A-1). Soil samples will be classified according to USCS. Each boring log will record:

- 1. Boring identification and location,
- 2. Type and manufacturer's name of drilling equipment,
- 3. Type and size of sampling and drilling equipment,
- 4. Starting and ending dates of drilling,
- 5. Length and depth of each sampled interval,
- 6. Length of each recovered sample,
- 7. Blow counts of the split-spoon samples,
- 8. Depth of all stratigraphic changes,
- 9. Lithologic description according to standard rock nomenclature,
- 10. Depth at which groundwater is first encountered,
- 11. Depths and rates of any water losses,
- 12. Depth to static water level,
- 13. Depths at which drilling problems occur and how the problems are solved,
- 14. Total boring depth,
- 15. Reason for terminating borehole, and
- 16. Surface elevation.

Upon completion of sampling, all borings will be grouted to the surface and the soil containerized as described in Section A.6.

A.1.3 TEST PITTING TECHNIQUES

If unidentified anomalies are located in the geophysical survey, test pits will be used to further investigate these anomalous areas. Test pits will be performed to verify the data obtained during the geophysical surveys. Additionally, a greater area can be exposed for visual examination and collection of contaminated materials.

An appropriate area will be excavated using a backhoe in each anomalous area to provide an adequate level of investigation. The excavation will extend to a distance of 2 feet on either side of the subsurface anomaly. The width, length, and depth will be based on the size of the geophysical anomaly with applicable considerations for prevailing conditions such as flooding or stability of the excavation. Based on consultation with the MAIN Project Leader, a decision will be made at which point to cut off the excavation. The maximum depth of the excavation will be 5 feet, or until the top of the weathered shale is encountered. The boom and bucket of the backhoe will be operated in such a manner as to not exert impact or shock to the soil or its contents. The depth of the excavation increment will be at the discretion (not to exceed 2 feet) of the MAIN Project Leader. The contents of each bucket of material removed from the excavation will be gently placed on the ground and spread out so as to expose the contents as much as possible for a visual inspection. If at any time during the excavation the MAIN Project Leader determines that the risk and hazards are too great to proceed with the excavation, the excavation will be halted.

The excavation will be continuously monitored by MAIN with a PID. At no time will any personnel be permitted to enter the excavation. Soil from the test pit will be returned to the excavation. If the pit is not to be closed immediately after the required samples have been obtained, the excavation will be barricaded to prevent accidental entry by personnel working on the site. Each excavation will be marked after closure as needed for identification of the site.

A log containing the location of each excavation site will be maintained by MAIN. The log at a minimum will contain site and records pertaining to sampling, geological data and associated requirements. The excavation equipment will be cleaned between cross section site sampling operations in accordance decontamination procedures.

A.1.34 SAMPLING TECHNIQUES

At each of the four selected intervals to be sampled from each borehole, before the soil samples are screened, a volatile organic compound (VOC) grab sample from each sampling interval will be collected using a stainless steel spatula and containerized. The remaining material will be placed into a stainless-steel bowl, homogenized with a stainless steel spoon prior to being placed into the sample containers and thoroughly mixed with a stainless-steel trowel. A portion of the mixture then will be transferred to laboratory-prepared amber-glass containers with Teflon®-lined lids. All soil sample containers will be labeled with a preprinted label, chilled to 4 degrees Celsius (C), and shipped to an EPA-approved analytical laboratory. All sampling equipment will be decontaminated between samples, as specified in the Quality Assurance Project Plan (QAPP).

A.2 MONITOR WELL INSTALLATION AND SAMPLING A.2.1 OBJECTIVES

This task involves the evaluation of groundwater contamination within the uppermost permanent water-bearing stratum through the installation of five shallow wells and four deep wells. The nine newly installed wells and existing monitor wells in the ash landfill area (including PT-26) will then be sampled.

A.2.2 MONITOR WELL INSTALLATION

The shallow monitor wells will be installed using rotary-drill rig techniques with hollowstem augers. The deep monitor wells will be installed using air rotary techniques.

Soil samples will be collected from each boring using a split-spoon sampler (ASTM-D 1586-84). Soil samples will be taken continuously to the top of the unweathered shale unit, at 2-ft. intervals, and classified by the USCS system.

Monitor wells will be constructed in accordance with the general details presented in Figure A-2. All monitor wells will be installed in boreholes having a minimum 6-inch - diameter. Well risers and screens will consist of new, threaded, flush-joint, 2-inch--diameter, Schedule 40 PVC. The PVC wells will be used for the current investigatory phase. If long-term monitoring is proposed as part of the ROD, then EPA will make a decision at that time as to the construction material of the wells. It is anticipated that the well screens will be 10 ft. long for the shallow wells and 20 ft. long for the deep wells and will be factory slotted (0.010 inch).

Information from split-spoon samples, standard penetration testing, observations regarding the moisture content of recovered soil samples, and direct measurement with a water-level tape of the water table in each boring will be used to screen the shallow wells from the top of bedrock to greater than 3 ft. above the water table. Bedrock wells will be screened from approximately 3 ft. above the lower water table to 17 ft. below the lower water table. The deep wells will be installed to a maximum depth of 200 ft-bls or the first water zone encountered, once having penetrated at least 20 ft. into the bedrock (unweathered shale). If no water is encountered to a depth of 200 ft-bls, the boring will be grouted to the surface and a new location chosen. The 0.010-inch slot size has been selected based on the known lithology at the site (i.e., poorly sorted glacial till). Well casings and screens will be set plumb by using a level on

the drill-rig prior to drilling. In constructing the deep wells, a stainless steel centralizer will be used at the top of the screened interval to ensure that the monitor well remains in the center of the borehole.

For installing the deep monitor wells, a PVC surface casing will be set approximately 5 ft. into the unweathered shale unit. The annular space between the casing and the borehole will then be grouted and allowed to set for a minimum of 48 hours before drilling is resumed.

The filter pack will consist of clean 20/30 silica sand pack. During installation of the deep wells, a tremie pipe will be used to introduce the filter pack material into the annular space around the well screen. During installation of the shallow wells, the augers will be raised gradually as the sand builds up around the well screen. The filter pack will extend a minimum of 2 ft. above the well screen.

A minimum 2-ft-thick bentonite seal will be installed above the sand filter pack. The bentonite seal, consisting of bentonite pellets, will be wetted and allowed to hydrate in accordance with the manufacturer's recommendations before the remaining annular space is grouted. A cement/bentonite grout seal will be placed from the top of the bentonite seal to approximately 3 ft-bls by means of a tremie pipe. The grout mixture will consist of Portland® cement (ASTM C 150-86) and water in the proportion of not more than 7.0 to 8.0 gallons (gal) of clean water per bag of cement [1 cubic foot (ft.³) or 94 pounds (lb)]. Additionally, 3 percent by weight of bentonite powder will be added to help reduce shrinkage of the grout mixture. The grout will be allowed to set a minimum of 48 hours. A bentonite backfill consisting of bentonite pellets will be placed from the top of the cement/bentonite grout seal to the ground surface and allowed to hydrate. The purpose of the pure bentonite backfill is to protect the well from damage associated with frost heaving. A 2- by 2-ft concrete pad will then be constructed,

followed by development of the well. This pad will not be attached to the casing. All monitor wells will be provided with a locking protective casing as shown in Figure A-2.

A qualified site geologist will oversee all drilling, well installation, well development, and sampling/testing operations. Drilling data will be recorded on boring log forms as shown in Figure A-1. A graphic log showing monitor well construction details will be provided. Well construction logs will include:

- 1. Boring preparation prior to well installation;
- 2. Depth of completed well;
- 3. Change in lithology;
- 4. Type and diameter of well casing;
- 5. Filter pack gradation, depth, and method of emplacement;
- 6. Type of seal and manufacturer's name and product name;
- 7. Amount, formula, and method of grout emplacement;
- 8. Elapsed time between grouting and well development initiation;
- 9. Method of development;
- 10. Quantity of water extracted during development;
- 11. Criteria used in determining completion of development;
- 12. Depth of the protective cover below ground;
- 13. Amount of stickup of protective cover; and
- 14. Height of cement protective pad.

Figure A-3 contains a monitor well installation form. The original and one copy of the boring log and well construction form will be submitted to USACE no later than 10 calendar days after the well is completed.

All monitor well locations and elevations at the top of well casings will be surveyed by a New York registered land surveyor. The coordinates will be to the closest 1 ft. and referenced to the state planar coordinate system. If the state planar coordinate system is not readily available, an existing local grid system will be established. Monument elevations and the top of the PVC casing to the closest 0.01 ft. will be determined for each well. Elevations will be referenced to the NGVD of 1929. If the 1929 datum is not readily available, the existing local vertical datum will be used. A permanent tag or marking that clearly identifies the well number, USACE, and top-of-casing elevation will be affixed to the outer steel casing of each well.

The well development will be performed as soon as practical after well installation, but no sooner than 48 hours after placement of the internal grout collar. Well development will be documented on a standard form as shown in Figure A-4.

Shallow well development will be accomplished by pumping with a gasoline-powered centrifugal pump connected to decontaminated stainless steel drop pipe; or they will be developed using a Teflon® bailer. The deep wells will be developed using a submersible stainless steel pump or a Teflon® bailer. Development will continue until the water is clear and the well as free of sediment as practical. If well yields cannot sustain the flow rate of the submersible or centrifugal pump, a Teflon® bailer will be used. Water will not be added to the well to aid in development. All development equipment will be decontaminated as outlined in the QAPP prior to use in the first well and between use in each well.

Development operations shall be performed until the following conditions are met:

- The turbidity of the well water is below 50 nephelometric turbidity units (NTUs). This will be a goal of the development operations.
- 2. The sediment thickness remaining in the well is less than 5 percent of the screen length.
- 3. At least five well volumes (including the saturated filter material in the annulus) have been removed from the well.

- 4. The temperature, specific conductivity, and pH of the well water have stabilized (two consecutive readings are within 10 percent of each other).
- 5. The cap and all internal components of the well casing above the water table are rinsed with well water to remove all traces of soil/sediment/cuttings. This washing will be conducted before and/or during development.

Because the wells may be slow to recharge due to the low permeability of the formation, surging and overpumping may need to be performed numerous times on each well, with complete recharge between each episode. Every attempt will be made to remove excessive turbidity from the wells, because high turbidity is believed to be responsible for elevated metal concentrations detected in the groundwater at the site during previous sampling events. The shallow wells will be developed using a decontaminated stainless steel drop pipe attached to a centrifugal pump or a decontaminated Teflon® bailer. The deep wells will be developed using a decontaminated stainless steel pump or a decontaminated Teflon® bailer. Any proposed changes to the approved drilling methods and well installation plan will be submitted to USACE for approval.

A.2.3 GROUNDWATER SAMPLING

The nine new monitor wells, existing monitor wells, and privately owned wells as determined from the well inventory will be sampled during this investigation. Groundwater samples will be analyzed for TCL organic compounds (volatiles, semivolatiles, pesticides/PCBs), TAL metals, and herbicides. Ten percent of the site wells (at the discretion of the RI contractors) will be analyzed for the following parameters: alkalinity, chloride, sulfate, TOC, hardness, residual (total), residual (dissolved), and residual (suspended). Additionally, all wells will be analyzed for BOD₅ and COD. These parameters will aid in evaluating potential remediation alternatives at the site.

A maximum of three rounds of sampling will be conducted in the groundwater wells. All wells will be sampled initially and the wells which show "hits" will be sampled a second time for confirmation. If there is a discrepancy between the initial sampling round and the second confirmation round, a third round will be performed. Tentativelyidentified-compounds (TICs) identified during round one will also be confirmed by subsequent analyses.

Prior to groundwater sample collection, water levels in all monitor wells will be measured relative to the top of the well casing. Measurement will obtained using the U.S. Geological Survey (USGS) wetted-tape method (using a decontaminated steel tape).

A plastic ground cloth will be placed beneath all sampling-equipment-during-well purging and sampling to prevent contamination. Well purging will consist of pumping or bailing three to five submerged well volumes and will continue until the pH, temperature, and specific conductivity are observed to vary less than 5 percent over 2 successive readings. Evacuation of at least 3 to 5 well volumes is required for high vielding wells; however, in wells with low recoveries, this may not be practical. In this case, the well will be purged to near dryness (not completely dry) once and allowed to recharge sufficiently (about 75 percent of its static level) for samples to be collected. Purging may be accomplished by manual bailing, drop pipe and centrifugal pump, or a submersible pump. The well will be sampled within 3 hours of purging, if it has recovered sufficiently to yield a sample. If a well is allowed to sit longer than 3 hours after evacuation, it will be re-purged because the water in the casing may no longer be representative of the aquifer conditions. Low-yield wells will be sampled for each parameter as soon as water is available for that parameter. All purge water will be containerized in DOT-approved 55-gal drums. Each drum of material will be labeled as hazardous materials until the RI contractor has completed analyses and provided

documentation to USACE, as well as submitted recommendations for disposal based on chemical analyses, evaluation of site conditions, and appropriate regulations.

Whenever feasible, wells expected to be uncontaminated or least contaminated will be sampled first and followed by wells with increasing levels of contamination. In order to obtain a representative sample of groundwater, the water that has stagnated in the well casing will be purged prior to sampling. Evacuating the well allows for fresh formation groundwater to enter the well. Water will be purged from the top of the water column resulting in upward movement of water within the well casing and the removal of all stagnant water within the well.

Purge water will be screened for VOAs [using a photoionization detector (PID) or FID] and pH, temperature, and specific conductance will be measured. When indicator parameters such as pH, temperature, and specific conductance are observed to vary less than 5 percent over two successive readings, the well is presumed to be adequately flushed for representative sampling. Evacuation of at least 3 to 5 well volumes is required for high yielding wells; however, in wells with very low recoveries this may not be practical. In this case, the well will be purged to near dryness (not completely dry) once and allowed to recharge sufficiently (about 75 percent of its static level) for samples to be collected. Purging may be accomplished by: manual bailing, use of a drop pipe and centrifugal pump, or a submersible pump. The well will be sampled within 3 hours of purging, if it has recovered sufficiently to yield a sample. If a well is allowed to sit longer than 3 hours after evacuation, it will be re-purged since the water contained in the casing may no longer be representative of the aquifer conditions. Lowyield wells will be sampled for each parameter as soon as water is available for that parameter. All purge water will be containerized in DOT-approved 55-gallon drums. Each drum of material will be labeled as hazardous materials until the contractor has completed analyses and provided documentation to USACE, as well as submitted

recommendations for disposal based on chemical analyses, evaluation of site conditions, and appropriate regulations.

After purging the well, the sampling team will change to new PVC gloves for sample collection. Samples will be obtained using a decontaminated Teflon® bailer. Groundwater samples collected for volatile analyses will be obtained in a manner that will minimize the loss of volatile compounds. Well samples will be collected with the required quality assurance/quality control (QA/QC) samples being transmitted to the laboratory for chemical analysis in accordance with the QAPP.

Groundwater samples collected for VOC analysis will be the first fractions collected at each well. The VOC samples will be placed in 40-mL glass bottles with Teflon® septum caps. Each vial will be filled carefully until a positive water meniscus is achieved, and then each vial will be capped. Each vial will then be checked for air bubbles. If a bubble is discovered, the cap should be removed and the sample discarded. The sample must then be retaken and new preservatives added. Then, the sample is resealed, and the bubble must not be evident.

Samples will be preserved and packed in ice for shipment to the laboratory. Field groundwater sampling logs (Figure A-5) will include onsite measurements of water quality (pH, specific conductance, and temperature), volume purged, method of purging, static water level, sample time and date, and fraction sampled. Chain-of-custody records will be maintained.

A.3 <u>SURFACE/SPRING WATER AND SEDIMENT SAMPLING</u> A.3.1 OBJECTIVES

As described in the WP, surface/spring water and sediment sampling at the site will be performed to determine the nature and areal extent of contamination in the site area drainage system, seeps, and springs. Samples will be collected using the procedures described in the following subsections. Data generated in the field during the surface/spring water and sediment sampling will be recorded both in the site logbook and on the sample data sheets (Figure A-6).

A.3.2 TECHNIQUES

Surface/spring water and sediment sampling equipment will be decontaminated prior to use in accordance with the procedures outlined in the QAPP. Volatile organic monitoring equipment will be calibrated prior to each day's activities in accordance with the manufacturer's recommended procedures. Instrument calibration data will be recorded on the appropriate log sheets. Surface/spring water and sediment sampling will be obtained from the previously designated locations. The sampling will be accomplished by using the following procedure:

- Establish the exact location of each sampling station in the field. The sample site will be noted on a site plan and marked in the field with flagging and a 4-ft. wooden stake. The stake will be labeled with the sample site number.
- Measure the volatile organic vapors in the atmosphere above the water body with the HNU. If the concentration at breathing level is steadily elevated above background levels, use appropriate health and safety equipment as described in the Safety, Health, and Emergency Response Plan (SHERP) (Appendix B).
- 3. Collect the sample from the surface/spring water body by immersing a clean beaker or the sample bottle. The sample bottle should be completely submerged in an inverted position and then turned in an upstream direction and allowed to fill without collecting any surface debris. If the sample is collected by sampling personnel wading into the waterbody, the downstream samples will be collected first. Also, all parts of the sampler's body should remain downstream of the sample container during sample collection (however, wading will be avoided if possible). The sediment sample will be

collected from the same location as the surface water was collected from. This will be accomplished using a stainless steel trowel to collect the sample and transfer it to the sample container.

- 4. Fill all appropriate sample containers (listed in Appendix C) directly or from the intermediate sample collection container, if necessary.
- 5. Measure the following parameters by direct immersion of instrument probes into the waterbody, if possible:
 - a. Temperature,
 - b. pH, and
 - c. Specific conductance.

If direct measurement is not possible, measure these parameters from water obtained from a field sample container separate from the analytical sample container.

6. Complete the Surface/Spring Water and Sediment Field Sample Data Record and initiate chain-of-custody records.

A.4 INCINERATOR DUST SAMPLING

The following standard operating procedure (SOP) has been developed by Region II for use in taking wipe samples.

- 1. Materials needed:
 - a. Cotton swabs, solvent rinsed and completely air dried; (use of synthetic materials requires checking for compatibility with solvents)
 - b. Acetone, pesticide grade;
 - c. Hexane, pesticide grade;
 - d. Deionized water;
 - e. HCl or HNO3, redistilled

- f. Stainless steel clamps or plastic clamps (only for taking metals samples); and
- g. Appropriate sample bottles.
- 2. A square area, of a size sufficient to give the required amount of sample for each fraction as provided in the analytical methodology to be used, should be marked off. This may require taking cotton swabs and a balance into the **field**, beifting ancentation acceleration incident area should be wiped to give the required weight of sample.
- 3. Swabs for semivolatile, pesticide, and PCB samples should be moistened in a 1:4 acetone/hexane mixture. While holding the swab in a clean, metal clamp, moisten the cotton swab with the appropriate solution.
- 4. While still holding the cotton swab in the clamp, wipe the sampling area back and forth repeatedly, applying moderate pressure. Wipe the entire area so that all the sample material is picked up.
- 5. Place the used swab in the appropriate sample container and seal.
- Clean the clamps between each sample with both solvent and 10 percent HCl or HNO3.
- 7. As a blank, moisten a clean swab with the solvent or water (for each collection medium), place it in a separate jar, and submit it with the other samples.
- 8. When samples are submitted for analysis, the laboratory should be told to rinse the sample jars with solvent or 10 percent HCl or HNO3, depending on the analysis to be performed, when transferring sample to the extraction glassware.

The samples should be analyzed with the appropriate methodology for a soil/sediment matrix, and a sufficient quantity of material must be collected as called for in the analytical methodology in order for method detection limits to be achieved.

A.5 <u>SAMPLING CONTAINERS, PRESERVATION TECHNIQUES, HOLDING</u> <u>TIMES, SHIPPING, AND HANDLING</u>

The field team leader is responsible for proper sampling, sample labeling, preservation, and shipment of samples to the laboratory to meet required holding times. Table A-1 identifies the proper containers, preservation techniques, and maximum holding times established by EPA [40 Code of Federal Regulations (CFR), Part 136]. The maximum holding times in Table A-1 apply to water and soils. Any analyses that have exceeded holding times will be noted in the final deliverable.

Trial preservation may be necessary for concentrated hazardous/industrial wastes to ensure adequate preservation, and if reactions are suspected, the volume of preservative added should be recorded in the field notes. For example, acidification of some wastes may liberate toxic gases (e.g., cyanide gas) or result in foaming. In such cases, preservation should be omitted, samples should be shipped to the laboratory as soon as possible, and appropriate comments must be included on the sample logsheet. The volume of preservative added to extreme pH or highly buffered samples should not exceed 5 percent of the original sample volume.

Water samples submitted for volatile analysis should be preserved with HCl to a pH of <2. VOC samples should be preserved by adjusting the pH of the sample to <2 by carefully adding 1:1 HCl, drop by drop, to the required two [40 milliliter (mL)] volatile organic analysis (VOA) sample vials. The number of drops of 1:1 HCl required should be determined on a fourth VOA sample vial of equal volume (prior to filling the three vials for laboratory analyses). If acidification of the sample causes effervescence, the sample should be submitted without preservation except for cooling to 4 degrees Celsius (°C).

With hazardous samples, it may be necessary to rinse the outer portion of sample containers with deionized (DI) water prior to packaging for shipment. The latest DOT

procedures for shipment of environmental samples will be used in all cases. The quantity of acids or bases added as preservatives generally should not exceed 15 percent by weight, or the samples must be shipped as corrosives.

Before samples are packaged for shipment, the sample container will be checked for proper identification and compared to the site logbook for accuracy. The samples then will be wrapped with a cushioning material and placed in a plastic Ziploc[®] bag before being put into the plastic cooler. A sufficient amount of bagged ice will be placed in the cooler to keep the samples at 4°C until arrival at the laboratory.

All necessary documentation required to accompany the samples during shipment will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler then will be sealed with fiber tape, and custody seals will be placed so any opening of the cooler prior to arrival at the laboratory can be detected.

Samples being sent to the USACE QA laboratory will be packaged and shipped in accordance with USACE Sample Handling Protocol, Medium Concentration Sample (Appendix D). The USACE QA laboratory will be notified 5 working days prior to samples being sent.

A.6 WASTE CONTAINERIZATION

All drill cuttings, well development water and rinsate will be contained in approved 55-gal drums. All RI-generated waste handling/disposal will be conducted in accordance with all applicable RCRA requirements. RI-generated waste materials are not classified and they will be characterized using TCLP. SEAD is currently regulated under RCRA with an interim status permit. They are a licensed TSD facility. Wastes generated during the RI exploration will be disposed of in compliance with SEAD's RCRA permit. All drums will be labeled as to contents and origins. At the end of each phase of drilling, documentation (based on results of the required chemical analyses, evaluation of

site conditions, and knowledge of regulatory requirements) will be provided that recommends the disposition of each drum. For each drum considered to contain contaminated material, a specific, optimum method of disposal, along with a price for disposal, will be recommended. Actual disposal shall be the responsibility of the RI contractor.

A.7 GEOPHYSICAL SURVEY

Electromagnetic Induction Survey (EM)

An EM Survey will be performed to delineate areas of high ground conductivity and buried metal wastes. The EM survey will be completed across the area designated No. 1 shown on Figure 4.2-2, located to the north of the geophysical surveyed area completed by ICF (1989) and Hunter/ESE (1989). Also, a smaller area designated No. 2 will be surveyed at the former construction debris landfill, located southeast of the completed geophysical survey area completed by ICF (1989) and Hunter ESE (1989).

The EM survey will be performed using a Geonics EM31 terrain conductivity meter equipped with an EM31DL data logger. The EM survey will be completed along survey lines spaced every 100 feet, as shown on Figure 4.2-2. Readings will be taken every 50 feet along each survey line. Field calibration of the EM instrument's sensitivity will be performed prior to the start of the survey in an area considered to represent background readings.

This area will be the same area used to calibrate the EM instrument during the previous EM surveys performed by ICF (1989) and Hunter ESE (1989).

Both the quadrature component and in-phase component of the electromagnetic field will be recorded by the data logger at each station. The quadrature component of the electromagnetic field is linearly proportional to the apparent ground conductivity, and is used to delineate areas of past waste disposal. The in-phase component of the electromagnetic field is sensitive to electrically conductive materials, such as metals, and will be used to delineate areas of buried metals or drums. All work will be performed in accordance with the manufacturer's operation manual for the EM31.

The quadrature and in-phase readings will be downloaded daily from the digital data logger to a laptop computer for further processing and contouring. Contour maps of both the quadrature and in-phase component readings will be prepared for the survey areas.

Ground Penetrating Radar (GPR) Survey

*

A Ground Penetrating Radar (GPR) survey will be performed to identify the boundaries of any EM anomaly and to characterize the nature of subsurface materials. Any anomalies detected during the EM survey will be further investigated by continuous GPR profiling. Data will be recorded along the entire length of anomalies delineated by the EM survey in the two proposed geophysical survey areas shown on Figure 4.2-2.

A GPR System operates by generating low power electromagnetic energy (80 Mhz to 1,000 Mhz) into the subsurface from a transducer. Differences in the electrical properties of the subsurface materials cause some of the electromagnetic energy to be reflected back to the surface. This reflected energy is detected by the transducer, recorded and displayed by the system.

The GPR survey will be completed using a Geophysical Survey Systems, Inc. (GSSI) subsurface interface radar (SIR) system 3. The SIR-3 consists of a control unit, graphic recorder, and transducer (antenna). The survey procedure will consist of towing a transducer, either by vehicle or by hand over EM anomalies located along the survey lines. The control unit and graphic recorder are operated from the survey vehicle. The survey lines will have to be cleared of all vegetation to ground level so the transducer can maintain constant contact with the ground to provide the best radar imaging. Vehicle or walking speed averages from 1 to 3 miles per hour (mph) while the SIR system scans at a rate of 25.6 or 32 scans per second. At these survey speeds and scan rates, reflections are received every 0.7 inches (at 1 mph) to every 2.1 inches (at 3 mph) of ground travel along the survey lines. The data is displayed on the graphic recorder in the survey vehicle.

Based on the subsurface conditions identified during previous surveys performed by ICF (1989) and Hunter/ESE (1989), characterization of subsurface anomalies will be performed using a 300 megahertz (Mhz) transducer. The maximum depth of subsurface penetration with a 300 Mhz transducer is about 30 feet, under ideal conditions. Attenuation of the transmitted electromagnetic pulse in the glacial till soils at the site is anticipated to reduce the maximum penetration depth to about 8 to 10 feet. For this reason, a second transducer (100 Mhz) will be available for use at the site if deeper radar profiling is required.

Field adjustment and initial background profiling will be performed in the same area used for background measurements for the EM survey. Field adjustments will consist of setting the instruments range; setting the low and high pass filters; and adjusting the upper, middle and lower gain controls to achieve the best resolution of subsurface data. The graphical output will be checked by the system operator throughout the GPR survey and system adjustments will be made, if necessary, to provide the best possible
resolution of subsurface anomalies. All work will be performed in accordance with the manufacturer's operation manual for the SIR System 3.

A.8 SOIL GAS SURVEY

A.8.1 OBJECTIVES

A soil gas survey will be performed to evaluate and delineate specific anomalies in the area of the proposed geophysical survey. The geophysical area to be evaluated is shown on Figure 4.2.2. The soil gas survey will allow a better delineation of the source areas, which may be contributing to groundwater contamination. The exact number of sampling locations will be determined based on the results of the geophysical survey and modified as the soil gas results are obtained during the fieldwork. MAIN expects to obtain between 50 to 100 soil gas samples, depending upon the difficulty in probe insertion and extraction and the number of geophysical anomalies.

A.8.2 EXPLANATION OF METHOD

The method involves extracting a small representative sample of soil gas through a hollow steel probe driven a few feet into the ground and analyzing the gas for the presence of expected volatile contaminants. The presence of contaminants in the soil gas provides a strong indication that there is a source of volatile organics either in the soil near the probe or in the groundwater below the probe. The soil gas analysis is performed in the field with a portable gas chromatograph so that sample loss does not occur due to shipment off-site. The analytical results are available immediately and can be used to help direct the investigation.

Soil gas analysis is used as a screening tool for rapidly identifying contaminant source soils and, in some cases, delineating groundwater contamination plumes. In soils above groundwater contamination plumes, the expected soil gas concentrations will be much less than those concentrations which would be expected for source soils. The soil gas program described in this workplan will identify areas where volatile organics range in concentration between 0.5 to 100 ppm. These concentrations will indicate the presence of source materials (i.e., soils saturated with solvents). These soils constitute a continual sink for groundwater impacts.

The soil gas evaluation program involves three essential elements. These are:

- 1. Soil Gas Sampling
- 2. Analytical Support
- Data Interpretation

A.8.3 SOIL GAS SAMPLING

Soil gas samples will be collected through a hollow steel drilling rod which will be driven approximately 5 feet into the vadose zone using a drilling rig. Soil gas sampling will be conducted at locations which have been identified by geophysical techniques as anomalies. The intent of the soil gas program is to obtain information confirming the presence of volatile organic compounds in the areas of geophysical anomalies. Concentrations of elevated soil gas are a prime indicator of source areas responsible for groundwater contamination. MAIN estimates between 50 to 100 soil gas sampling points will be sampled. The soil gas sampling will continue until the entire anomalies gas concentrations have been delineated. The gas sampling details are illustrated in Figure A-7. A detailed explanation of the sampling procedure is as follows:

- In general, the survey will be conducted in the areas of the proposed geophysical survey. Sampling locations are selected based on the results of the geophysical survey, although they may be modified in the field as the results of the real-time soil gas survey are accumulated. The location is marked on a site map and a wooden stake with the sample number indicated on the stake is driven into the ground at this location. These points will be surveyed and plotted on a site map by the land surveyor.
- A 1.75 inch, outer diameter, steam-cleaned, hardened hollow carbon steel drilling rod (BW) is driven approximately five feet below the ground surface using a drilling rig equipped with standard carbon equipment. The steel drilling rod is fitted with a penetrometer point on the tip.
- 3. Once the desired depth of penetration is reached, the drilling rod is withdrawn slightly, approximately 6 inches, allowing the penetrometer point to dislodge from the rod, creating a void space through which soil gas can be extracted. A metal rod is inserted into the hollow drilling rod to ensure that the penetrometer point has been dislodged. If present, the point is knocked out with the metal rod.
- Bentonite is packed at the ground surface around the probe to prevent influx of atmospheric air into the sample probe.
- 5. The hollow drilling rod exposed above the land surface is fitted with a coupling containing both evacuation and sampling ports. Tetlon tape will be used on the threads connecting the coupling to the hollow drilling rod to prevent infiltration of surface gases into the sampling port.
- 6. The probe is purged by creating a slight negative pressure with an air sampling pump through a latex evacuation line for at least 5 minutes to ensure that the gases flowing through the hollow drilling rod are representative of soil gases. Samples of sol gas are collected prior to contact with any tubing or pumps.
- 7. The effluent gas from the air sampling pump will be monitored with a hand held vapor monitor, such as the HNU PI101. The gas sample will be collected

immediately if the effluent monitoring indicates an increase in the concentration of volatiles. Gas samples will be collected in order to coincide, as much as possible, with the highest concentration of gas found to be present. If no increase in the concentration of soil gas is determined by the effluent monitoring then purging will be performed for a minimum of 5 minutes. After 5 minutes of purging a soil gas sample is collected through a septum port using a gas-tight gas sampling syringe.

8. The sample is then injected into the portable gas chromatograph for analysis.

9. The drilling rod is removed from the ground using drilling rig and the probe hole is backfilled with bentonite to prevent infiltration of surface water. Drilling rods will be steam cleaned after each use. Other sampling equipment (e.g., drill couplings, sampling syringes, tubing, etc.). will be decontaminated after each use according to the decontamination procedures outlined in Section 4.6.2 of the Quality Assurance Project Plan. All syringes will be decontaminated prior to field use.

A.8.4 ANALYTICAL SUPPORT

Soil samples are analyzed in the field using a portable gas chromatograph to facilitate real time data acquisition. A simplified explanation of the analytical procedure is provided in the following paragraphs.

The gas chromatograph instrument separates compounds in a chromatographic column (selected on a site-specific basis) and detects and quantifies the compounds using a detector. After a sample is introduced to the chromatograph, it is carried by a carrier gas through the column. Different compounds pass through the column at different rates, resulting in a characteristic "retention time" for each compound. By comparison with standards, this retention time can be used to identify compounds. The detector

responds to the presence of compounds by producing an electric current. The magnitude of this current can be used, when compared to standards, to determine concentrations of compounds present in the sample.

The analytical system to be utilized for this program is the portable Photovac 10S50 gas chromatograph. This instrument is equipped with a heated capillary column and an onboard peak integrator. The detector for this instrument is the Photoionization Detector (PID). The PID is ideal for detecting volatile organic compounds which contain aromatic rings and unsaturated double bonds. Both groundwater and previous soil gas sampling have indicated the presence of TRCLE, 12 DCLE, C2H3CL, CHCL3 and a substance similar in retention time to Toluene.

Quantitative analysis of soil gas requires quantitative gas standards. Gas standards will be prepared by a gas standard vendor such as Scott Specialty Gas. The gas standard mixture will include TRCLE, 12 DCLE, Benzene, Toluene, and Xylene, each at concentrations of approximately 100 pnunv. This standard mixture will be certified by the standard manufacturer and a certificate of analysis will accompany the gas standard. All field calibration standards will be prepared from this certified gas standard. Dilutions will be made from this standard by injecting a known volume of calibration gas into a clean glass sampling bulb of known volume.

Since the intent of the soil gas program is to indicate the presence of elevated concentrations of volatile organic compounds, soil gas results will be expressed as total volatile organic compounds as TRCLE. If retention time matches between the soil gas sample and the calibrated gas standard are within \pm 1 sec. then individual compounds detected in the soil gas will be reported. However, since the soil gas program is a screening program determination of individual organic compounds is not critical to the detection and delineation of likely source areas.

A detailed description of the analytical procedures is as follows:

Calibration Procedures and Frequency

The analytical instrument will be calibrated each day prior to the analysis of a sample.

Gas Standards

Gas standards will be prepared from certified pre-calibrated compressed gas cylinders. Compressed gas standards offer advantages in time savings and ease of use. However, they are limited to only those compounds within the cylinder.

These cylinders were purchased from Scott Specialty Gas Corp. and are certified by Scott, to be traceable to National Bureau of Standards (NBS) standards.

The calibration procedure is as follows:

- 1) A two stage pressure regulator is attached to the cylinder for gas removal.
- A clean, labeled, glass gas sampling bulb (approx. 125 ml), with a teflon connection is placed over the second stage effluent port. The teflon stopcocks at both ends are opened.
- The diaphragm of the regulator is turned counterclockwise until the pressure in the diaphragm is unnoticeable by the hand.
- The cylinder valve is opened. The first stage pressure will indicate the current cylinder pressure.

- The second stage pressure is increased to 2 psig by turning the regulator valve clockwise.
- 6) Gas should be heard passing through the bulb as the second stage pressure is increased. The bulb is allowed to purge for approximately 10 seconds. The teflon stopcock furthest from the regulator is closed, then, the stopcock closest to the regulator is closed. The gas is now captured within the glass bulb at the delivery pressure of the regulator.
- 7) Using a gas-tight, designated syringe, an appropriate volume of captured gas will be removed for the bulb through the silicone septum and injected into the clean sampling bulb.
- 8) The Response Factor (RF) for each analyte is obtained as the ratio of the gas concentration injected and the area under the peak produced by that injection. This integration is performed electronically by the on-board electronic integrator.
- 9) Response factors will e obtained for each analyte listed in the gas standard.
- 10) For constant volume injections, the RF represents the concentration of analyte per unit area of instrument response. It is obtained by injecting a known concentration of analyte into the instrument and dividing the concentration by the area of the peak observed on the chromatogram. The analyte concentration in an unknown soil gas sample is determined by injecting an equal volume of gas into the gas chromatograph. The peak area obtained from the unknown sample is multiplied by the RF to determine the actual concentration of the analyte injected.

The RF allows conversion of peak areas into concentrations for the contaminants of interest. The RF used is changed if the standard response varies 50%. If the standard injections vary by more than 50% the standard injections are repeated. If the mean of the two standard injections represents greater then 50% difference than a third standard is injected and a new RF is calculated from the three

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standard injections. A new data sheet is started with the new RF's and calibration data:

% Difference = <u>A area - B area</u> A area

Where A = mean peak area of standard injection from first calibration
B = peak area of subsequent standard injection
The low peak standards will be made fresh daily.

A two point calibration curve will be performed daily, one point will be approximately 0.5 ppmv and the second point will be at approximately 5 ppmv. Dilutions of the calibrated gas standard will be performed using gas-tight syringes and injecting appropriate volumes into clean gas-tight gas sampling bulbs of known volume.

- 11) Syringe blanks will be performed for each syringe to be used prior to analysis. Syringes will be cleaned with Alconox or equivalent detergent and brush daily. They will be baked out in an oven at a minimum temperature of 60°C. for a minimum of 1 hour prior to use.
- 12) System blanks are ambient air drawn through the probe and complete sampling apparatus and analyses by the same procedure as a soil gas sample. The probe is above the ground. One system blank will be run at the start of each day from the batch of probes to be used.
- A duplicate field sample will be taken after every 20 sample locations or at a minimum of one per day.
- 14) Field notebooks will be kept detailing the sample identification and amount of sample injected.

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The following system parameters will also be noted:

a) Gas flows for the ultra pure air

b) Tank pressures for the ultra pure air

1. Column temperatures

c) Integrator parameters

1. Gain and baseline offset

d) Column

1. type

2. length and diameter

3. packing material

e) operator

f) date

If any system parameters change the chromatograms are stamped and changes noted.

15) Sample Documentation - The field notebooks will allow for full traceability of results. The response factors used and how they were calculated are noted. The sample number, time, amount injected and the peak are noted.

The actual chromatogram can be traced from this information. The sample concentration noted is calculated using the RF, amount injected and peak area for the component of interest.

A.8.5 DATA INTERPRETATION

Data interpretation is an important element of the soil gas analysis. The acquired vapor phase concentrations are evaluated to determine the relationship between soil gas and source soils. When examining chromatograhs and comparing peak heights, several factors must be considered. Retention times (used to identify compounds) will vary with operating temperature and carrier gas flow rate. The detector responds to mass, not necessarily the concentration of the gas. Consequently, the sample volume injected into the chromatograph is important when interpreting output. "Gain", the degree of electronic amplification of the signal from the detector, must also be considered. If concentrations and volumes of two samples are equal, peak height will be higher in the one analyzed using a higher gain. Typically, large sample volumes and, if necessary, high gains are used to detect very low concentrations.

The instrument is calibrated using prepared standards. The identification and quantification of contaminants is accomplished through the use of appropriate gas standards. Gas standards will be obtained from compressed gas cylinders. The compressed gas cylinders are obtained from an independent vendor and are traceable to the National Bureau of Standards. Typically, the soil gas survey is used to provide screening data, identifying areas where compounds are present and the total volatile organic concentration. This is primarily accomplished by expressing the concentrations of compounds as the TRCLE equivalents. Various volumes and concentrations of TRCLE gas reference standards are injected under similar operating conditions as those for the unknown samples. Quantification of VOCs in the samples is accomplished by comparing the area of the compound peaks on the sample chromatogram with the area of the TRCLE reference standard peak. This is most often accomplished by the instrument integrator, however, it can be accomplished manually.

The soil gas data will be tabulated by relating each location to a specific concentration of total volatile organic compound, expressed as TRCLE equivalents. Additionally, individual volatile organic peaks will be quantified, such as TRCLE, providing a reasonable retention time match can be obtained, ± 1 sec. This data will also be

presented on a site map with each sampling location assigned a specific soil gas concentration. Soil gas isocontours will then be interpreted from the obtained data, thereby identifying approximate boundaries for likely source areas.



4.2.2 SOIL INVESTIGATION

The primary data gap associated with the soils in the landfill area is the absence of specific source definition. The soil investigation will include the following:

- 1. Geophysical survey,
- 2. Soil gas survey, and
- 3. Soil boring sampling and analysis.

A general description of the SOW for each of the individual tasks is presented in the following subsections. Unidentifiable anomalies will be investigated using test pits for visual inspection as needed. If an obvious point contributor is encountered while the test pit is dug, analytical sampling will be performed for confirmation. Soil from the test pit will be returned to the excavation. The RI contractor will provide the criteria necessary for test pit excavations. Specific procedures for completing test pits operations are provided in the Field Sampling and Analysis Plan (Appendix A).

4.2.2.1 Geophysical Survey

The-results of the geophysical surveys conducted by ICF (1989) and Hunter/ESE (1989) have been described in Section 2.4.5. These surveys delineated additional possible source areas of contamination.

The proposed geophysical survey area, including the areas north of the completed surveys and at the former construction debris landfill, is presented in Figure 4.2-2. The survey will first be performed using EM-induction techniques. The EM survey will be completed with the Geonics EM 31 Terrain Conductivity Meter. Field measurements will be taken along a survey grid having 100 ft centers. Specific anomalies detected during the EM survey will then be investigated using GPR-to characterize these areas further.-

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In addition, the health-based criteria for carcinogens and systemic toxicants is available in Volume I of the RCRA Facility Investigation (RFI) Guidance Manual (EPA 530/SW-89-031) (EPA, 1989d). The criteria in this manual specify the environmental concentrations for soils and can be used as target levels for the cleanup of releases from regulated waste management units under RCRA.

3.3.2 LOCATION-SPECIFIC ARARs

3.3.2.1 Historic Sites and Archaeological Findings

There are no registered historical buildings, nor have there been any significant archeological findings within the SEAD area.

In order to determine if the National Historic Preservation Act should be considered a location specific ARAR, <u>An Archeological Overview and Management Plan for Seneca</u> <u>Army Depot</u> (September 1986) was obtained and reviewed. According to this document, four prehistoric archeological sites are known to exist at SEAD and 231 potential historic archeological sites were identified based on documentary sources. According to the report, no specific historic sites are recorded at SEAD and, according to an earlier report, <u>Historical Report on Seneca Army Depot</u>, 1972 Heraldic Section, DARCOM there are no sites worthy of inclusion on the National Register.

Four prehistoric archeological sites are known to exist at Seneca Army Depot, however, none are located on the ash landfill area. The four sites are located approximately 6,000 feet southeast and 10,000 feet northwest of the ash landfill area.

There are also 231 potential historic archeological sites noted from documentary sources.

None of the potential historic archeological sites are located within the ash landfill area. The closest potential sites include locations of former farmsteads, Circa 1850, west of the ash landfill area.

3.3.2.2 Rare, Threatened, or Endangered Species

No endangered or threatened species are known to inhabit the SEAD area. However, additional characterization of SEAD and adjacent offpost areas is required, particularly since the area is covered with grasses and brush thickets and is situated adjacent to Seneca Lake.

The Installation Assessment of the Seneca Army Depot (January 1980) did not indicate that any endangered species were present at SEAD, but did indicate that the following endangered species are known to exist in the area: the indiana Bat (Myots Sodalis) and the American osprey (Pandion halaietus carolinensis). The report also stated that since no large or deep permanent streams exist, protected aquatic species have not been considered and that the state-protected bog turtle (Clemmys muhlenbergi) dwells in marshy areas which are numerous in the area.

The U.S. Fish and Wildlife Service has indicated that there are no critical habitats or endangered or threatened species in the SEAD area, although some transient species may occur and that there are Bald Eagles (Haliaeetus Leucocephalus) nesting at the Montezuma National Wildlife Regure (personal communication: Paul Nickerson and Mark Clough, U.S. Fish and Wildlife Service). According to the National Heritage Program of NYSDEC, there are no state listed endangered or threatened species in the general area of SEAD (personal communication: Burrel Buffington, Information Officer, National Heritage Program). A habitat-based assessment will be performed during the RI. This assessment will be used to evaluate the existing ecological values of the site and adjacent areas. The NYSDEC, Division of Fish and Wildlife, Technical and Administrative Guidance Memorandum (TAGM), Habitat-Based Assessment, Steps 1 and 3 will be followed during the assessment.

In addition, since the site is near offpost farmland areas, the requirements of the Farmland Protection Policy Act of 1981 (addressed in TCFR 658) should be examined.

A "fish and Wildlife Management Plan" was prepared for the Seneca Army Depot in July 1988. The regulatory controls and coordination resulting from the plan are as follows:

- o The management of wild animal populations is performed as a function of Wildlife Management at Seneca Army Depot. Management of all species is performed in accordance with the NYSDEC.
- o Fish management is not required at this time, since overpopulation is not a problem. The fish management program is in the early stages. It is planned to use a fishing derby (Section III, E) for data gathering purposes to enhance the development of this program.
- Predator control is not necessary at this time. (See Section III, F). Annual hunting and trapping currently keeps these populations in control.
- Management of mammals involves muskrats, woodchucks, and deer. Detrimental muskrat activities involve burrowing into pond dikes, while woodchucks cause problems from burrowing into earth-covered structures. Trapping is encouraged and is performed by in-house personnel in removing woodchucks from a restricted area. Many fence areas have fences extending into the ground, which restricts the movements of rodents.

- Management of the deer herd is necessary and important aspect of wildlife management at SEAD (See II, A). This is performed through an Annual Deer Harvest. A nominal fee is charged to encourage hunting. The harvest is performed with technical advice from the NYSDEC and in accordance with NYS regulations. Special "deer-of-either-sex" permits are annually obtained from NYS to allow the taking of more female deer (a doe may be taken instead of a buck). This has a strong impact upon the effectiveness of the Deer Harvest; much coordination between SEAD and NYS is performed annually to obtain these permits.
- The deer herd is maintained at a level that will insure a healthy stock for the resources that are available. Data gathered by SEAD personnel during the deer harvest on sex and age distribution becomes a valuable tool in the management of the herd. The data will indicate the degree of annual replenishment of young stock as well as the decline or increase of certain age classes.

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A major concern in decontamination of sampling equipment has been the choice of solvent. The standard decontamination solvent will be pesticide-grade isopropanol. Disposal of solvent rinses must be performed in an approved manner (evaporated onsite or containerized for disposal through a disposal contract, depending on the volume). The following sampling equipment

decontamination procedures are for sampling equipment that contacts sample matrices.

4.6.2 DECONTAMINATION PROCEDURES

The required decontamination procedures for all sampling equipment are:

- 1. Clean with Liquinox[®] and tap water (a higher grade of water always may be substituted for tap water) using a brush, if necessary, to remove particulate matter and surface films.
- 2. Rinse thoroughly with tap water.
- 3. Rinse thoroughly with 10-percent nitric acid (HNO_3) ultrapure. For carbonsteel split spoons, this rinse is to be reduced to 1 percent HNO_3 . If metals samples are not being collected, the 10 percent HNO_3 rinse may be omitted.
- 4. Rinse thoroughly with tap water.
- 5. Rinse with acetone only, or a methanol rinse followed by a hexane rinse (solvents must be pesticide grade or better).
- 6. Rinse thoroughly with **DI**-water. deionized, demonstrated analyte free water.
- 7. Allow to air-dry.
- 8. For overnight storage or transport, wrap in new aluminum foil to prevent contamination.

General Corrections

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Comment 25 (EPA)

4.6.3 MONTHLY REPORTS

When field work, associated with response activities, is being conducted at the Site, the Army shall submit a monthly Field Activity Report to EPA and NYSDEC, not later than the 10th day of the month addressing the following:

- A summary of work completed in the field, i.e., sampling events or well installation. Upon request, copies of trip reports and/or field logs shall be provided;
- Anticipated or actual delay of a schedule field activity, to include basis and any effect on subsequent events or scheduled activities;
- Discovery or indication of significant additional contamination or any new family of hazardous substances at an AOC other than that previously recognized or expected for the AOC location;
- Quantum increase in concentration of hazardous substances of any media beyond that previously recognized or expected for that AOC location;
- Determination of any specific or potential increase of danger to the public, the environment, or to individuals assigned to work at the site. Such a determination shall be reported to the EPA and NYSDEC as soon as discovered; and
- 6. Copies of all Quality Assurance Data and sampling and test results and all other laboratory deliverables received by the Army during the month, if any.

4.6.34 RI REPORT

A draft RI report will be prepared at completion of the site investigation and data evaluation. The report will summarize the results of the field investigation and records searches and present the data and conclusions in a clear and concise record. The RI report will also present the results of the data evaluation and RA. This task is complete upon review, comment, and revision of the draft RI report document, as governed by the IAG.

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5 working days prior to sending samples. The protocol is contained in Appendix D.

4.2.9 WASTE CONTAINERIZATION

All drill cuttings, well development water, and rinsate will be contained in approved 55-gal drums. RI-generated waste disposal will be conducted in accordance with all applicable RCRA requirements. **RI-generated waste materials are not classified and they will be characterized as hazardous waste by using TCLP**. All drums shall be labeled as to contents and origins. At the end of each phase of drilling, documentation (based on results of the required chemical analyses, evaluation of site conditions, and knowledge of regulatory requirements) will be provided that recommends the disposition for each drum. For each drum considered to contain contaminated material, the RI contractor will recommend a specific, optimum method and price of disposal. Actual disposal will be the responsibility of the RI contractor.

4.3 SAMPLE ANALYSIS AND VALIDATION

A summary of the number and type of samples to be collected, along with parameters for analysis, is presented in Table 4.3-1. All laboratory analysis will be performed in accordance with the methodology presented in the QAPP (Appendix C).

Contractor QA personnel will validate data received from the contractor's laboratory in accordance with the Region II SOPs for evaluating organic and inorganic analysis. Factors to be considered include sample holding times, instrument time and performance, instrument calibration, blanks, surrogate recoveries, matrix spike/duplicates, and other quality control (QC) parameters.

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Development operations shall be performed until the following conditions are met:

- 1. The turbidity of the well water is below 50 nephelometric turbidity units (NTUs). This will be a goal of the development operations.
- 2. The sediment thickness remaining in the well is less than 5 percent of the screen length.
- 3. At least five well volumes (including the saturated filter material in the annulus) have been removed from the well.
- 4. The temperature, specific conductivity, and pH of the well water have stabilized (two consecutive readings are within 10 percent of each other).
- 5. The cap and all internal components of the well casing above the water table are rinsed with well water to remove all traces of soil/sediment/cuttings. This washing will be conducted before and/or during development.

Because the wells may be slow to recharge due to the low permeability of the formation, surging and overpumping may need to be performed numerous times on each well, with complete recharge between each episode. Every attempt will be made to remove excessive turbidity from the wells, because high turbidity is believed to be responsible for elevated metal concentrations detected in the groundwater at the site during previous sampling events. The shallow wells will be developed using a decontaminated stainless steel drop pipe attached to a centrifugal pump or a decontaminated Teflon® bailer. The deep wells will be developed using a decontaminated stainless steel pump or a decontaminated Teflon® bailer. Any proposed changes to the approved drilling methods and well installation plan will be submitted to USACE for approval.

A.2.3 GROUNDWATER SAMPLING

The nine new monitor wells, existing monitor wells, and privately owned wells as determined from the well inventory will be sampled during this investigation. Groundwater samples will be analyzed for TCL organic compounds (volatiles, semivolatiles, pesticides/PCBs), TAL metals, and herbicides. Ten percent of the site

wells (at the discretion of the RI contractors) will be analyzed for the following parameters: alkalinity, chloride, sulfate, TOC, hardness, residual (total), residual (dissolved), and residual (suspended). Additionally, all wells will be analyzed for BOD₅ and COD. These parameters will aid in evaluating potential remediation alternatives at the site.

A maximum of three rounds of sampling will be conducted in the groundwater wells. All wells will be sampled initially and the wells which show "hits" will be sampled a second time for confirmation. If there is a discrepancy between the initial sampling round and the second confirmation round, a third round will be performed. Tentativelyidentified-compounds (TICs) identified during round one will also be confirmed by subsequent analyses.

Prior to groundwater sample collection, water levels in all monitor wells will be measured relative to the top of the well casing. Measurement will obtained using the U.S. Geological Survey (USGS) wetted-tape method (using a decontaminated steel tape).

A plastic ground cloth will be placed beneath all sampling equipment-during well purging and sampling to prevent contamination. Well purging will consist of pumping or bailing three to five submerged well volumes and will continue until the pH, temperature, and specific conductivity are observed to vary less than 5 percent over 2 successive readings. Evacuation of at least 3 to 5 well volumes is required for high yielding wells; however, in wells with low recoveries, this may not be practical. In this case, the well will be purged to near dryness (not completely dry) once and allowed to recharge sufficiently (about 75 percent of its static level) for samples to be collected. Purging may be accomplished by manual bailing, drop pipe and centrifugal pump, or a submersible pump. The well will be sampled within 3 hours of purging, if it has recovered sufficiently to yield a sample. If a well is allowed to sit longer than 3 hours after evacuation, it will be re purged because the water in the casing may no longer be representative of the aquifer conditions. Low yield wells will be sampled for each parameter as soon as water is available for that parameter. All purge water will be containerized in DOT approved 55 gal drums. Each drum of material will be labeled as hazardous materials until the RI contractor has completed analyses and provided documentation to USACE, as well as submitted recommendations for disposal based on chemical analyses, evaluation of site conditions, and appropriate regulations.

Whenever feasible, wells expected to be uncontaminated or least contaminated will be sampled first and followed by wells with increasing levels of contamination. In order to obtain a representative sample of groundwater, the water that has stagnated in the well casing will be purged prior to sampling. Evacuating the well allows for fresh formation groundwater to enter the well. Water will be purged from the top of the water column resulting in upward movement of water within the well casing and the removal of all stagnant water within the well.

Purge water will be screened for VOAs [using a photoionization detector (PID) or FID] and pH, temperature, and specific conductance will be measured. When indicator parameters such as pH, temperature, and specific conductance are observed to vary less than 5 percent over two successive readings, the well is presumed to be adequately flushed for representative sampling. Evacuation of at least 3 to 5 well volumes is required for high yielding wells; however, in wells with very low recoveries this may not be practical. In this case, the well will be purged to near dryness (not completely dry) once and allowed to recharge sufficiently (about 75 percent of its static level) for samples to be collected. Purging may be accomplished by: manual bailing, use of a drop pipe and centrifugal pump, or a submersible pump. The well will be sampled within 3 hours of purging, if it has recovered sufficiently to yield a sample. If a well is allowed to sit longer than 3 hours after evacuation, it will be re-purged since the water contained in the casing may no longer be representative of the aquifer conditions. Lowyield wells will be sampled for each parameter as soon as water is available for that parameter. All purge water will be containerized in DOT-approved 55-gallon drums. Each drum of material will be labeled as hazardous materials until the contractor has completed analyses and provided documentation to USACE, as well as submitted recommendations for disposal based on chemical analyses, evaluation of site conditions, and appropriate regulations.

After purging the well, the sampling team will change to new PVC gloves for sample collection. Samples will be obtained using a decontaminated Teflon® bailer. Groundwater samples collected for volatile analyses will be obtained in a manner that will minimize the loss of volatile compounds. Well samples will be collected with the required quality assurance/quality control (QA/QC) samples being transmitted to the laboratory for chemical analysis in accordance with the QAPP.

Groundwater samples collected for VOC analysis will be the first fractions collected at each well. The VOC samples will be placed in 40-mL glass bottles with Teflon® septum caps. Each vial will be filled carefully until a positive water meniscus is achieved, and then each vial will be capped. Each vial will then be checked for air bubbles. If a bubble is discovered, the cap should be removed and the sample discarded. The sample must then be retaken and new preservatives added. Then, the sample is resealed, and the bubble must not be evident.

Samples will be preserved and packed in ice for shipment to the laboratory. Field groundwater sampling logs (Figure A-5) will include onsite measurements of water quality (pH, specific conductance, and temperature), volume purged, method of purging, static water level, sample time and date, and fraction sampled. Chain-of-custody records will be maintained.

A.3 SURFACE/SPRING WATER AND SEDIMENT SAMPLING

A.3.1 OBJECTIVES

As described in the WP, surface/spring water and sediment sampling at the site will be performed to determine the nature and areal extent of contamination in the site area drainage system, seeps, and springs.

Samples will be collected using the procedures described in the following subsections. Data generated in the field during the surface/spring water and sediment sampling will be recorded both in the site logbook and on the sample data sheets (Figure A-6).

A.3.2 TECHNIQUES

Surface/spring water and sediment sampling equipment will be decontaminated prior to use in accordance with the procedures outlined in the QAPP. Volatile organic monitoring equipment will be calibrated prior to each day's activities in accordance with the manufacturer's recommended procedures. Instrument calibration data will be recorded on the appropriate log sheets. Surface/spring

| Matrix | Sampling Device | Analysis | Sample Container | Sample Preservation | Holding Time from Collection | Analytical Method |
|--|--------------------------------------|---|--|--|--|--|
| Groundwater/ surface water/ blanks | Stainless steel or Teflon® bailer | TCL VOCs | 3 40-mL glass vials with Teflon® septum | HCl to pH<2 Cool to 4 C | 14 days analyze | SW8240 NYSDEC CLP |
| | Stainless steel or Teflon® bailer | TCL BNAs, pesticides, PCBs, and herbicides | 4 1-L amber glass, Teflon®-lined cap | Cool to 4 C | 7 days extract 40 days analyze | SW8270, 8080 NYSDEC CLP SW8150 |
| | Stainless steel or Teflon® bailer | TAL metals | 1 1-L polyethylene | HNO_3 to $pH<2$ Cool to 4 C | 6 months (Hg - 28 days) | NYSDEC CLP SW6010, 7060, 7420, 7740 SW7471 |
| | Stainless steel or Teflon® bailer | Cyanide | 1 1-L polyethylene | NaOH to pH>12 Cool to 4°C | 14 days analyze | SW9010 NYSDEC CLP |
| | Stainless steel or Teflon® bailer | Alkalinity COD | 1 1-L polyethylene 1 1-L polyethylene | Cool, 4 C Cool, 4 C H ₂ SO ₄ to pH<2 | 14 days 28 days | EPA 310.1 HACH 8000 |
| | | BOD Chloride Sulfate TOC | 1 1-L polyethylene 1 1-L polyethylene 1 1-L polyethylene 1 1-L polyethylene | Cool, 4 C none required Cool, 4 C Cool, 4 C HCL <2 | 48 days 28 days 28 days 28 days | EPA 405.1 EPA 325.3 EPA 375.4 EPA 9060 |
| | | Hardness Residue (total, dissolved, | 1 1-L polyethylene 1 1-L polyethylene | HNO ₃ to pH<2 Cool, 4 C | 6 months 7 days | EPA 130.2 EPA (160.3, 160.1, 160.2) |

Table A-1. Summary of Analytical Methods, Preservation, and Holding Times

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| Matrix | Sampling Device | Analysis | Sample Container | Sample Preservation | Holding Time from Collection | Analytical Method |
|----------|----------------------------|---|---|------------------------|------------------------------------|---|
| Soil | Split-spoon | TCL VOCs | 2 40-mL glass vial with Teflon®-lined cap | Cool to 4 C | 10 days analyze | SW8240 NYSDEC CLP |
| | Split-spoon | TCL BNAs, pesticides, PCBs, and herbicides | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 7 days extract 40 days analyze | SW8270, 8080 NYSDEC CLP SW8150 |
| | Split-spoon | TAL metals | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 6 months | NYSDEC CLP SW6010, 7060,- 7420, 7740 |
| | | Mercury | 1 8-oz glass with Teflon®-lined cap | Cool to 4°C | 28 days | SW7471 NYSDEC CLP |
| | Split-spoon | Cyanide | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 14 days analyze | SW9010 NYSDEC CLP |
| Sediment | Stainless steel spatula | TCL VOCs | 2 40-mL glass vial with Teflon®-lined cap | Cool to 4 C | 14 days analyze | SW8240 NYSDEC CLP |
| | Stainless steel scoop | TCL BNAs, pesticides, PCBs, and herbicides | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 14 days extract 40 days analyze | SW8270, 8080 NYSDEC CLP |
| | Stainless steel scoop | TCL metals | 1 8-oz glass with Teflon®-lined cap | Cool to 4 C | 6 months | NYSDEC CLP SW6010, 7060, 7420, 7740 |

Table A-1. Summary of Analytical Methods, Preservation, and Holding Times (Continued, Page 2 of 3)
| Matrix | Sampling Device | Analysis | Sample Container | Sample Preservation | Holding Time from Collection | Analytical Method | |
|---|--------------------------|--|---|--|---------------------------------|----------------------|--|
| Sediment (Continued) | Stainless steel scoop | Mercury | 1 8-oz glass with Teflon®-lined cap | Cool to 4°C | 28 days | SW7471 NYSDEC CLP | |
| | Stainless steel scoop | Cyanide 1 8-oz glass with Teflon®-lined cap | | Cool to 4 C | 14 days analyze | SW9010 NYSDEC CLP | |
| Note: $BNA = base/neutral/acid.$ C = degrees Celsius. g = gram. HCl = hydrochloric acid. $HNO_2 = nitric acid.$ | | Hg mL NaOH oz PCB | mercury. milliliter. sodium hydroxide. ounce. polychlorinated biphenyl. | RCRA = Resource Conservation and Recovery Act. TAL = target analyte list. TCL = target compound list. | | | |

Table A-1. Summary of Analytical Methods, Preservation, and Holding Times (Continued, Page 3 of 3)

Source: ESE.

C-SEADRIFS.5/QAPP-H.11

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| Table 2.2.2 | Current or | r. of Drocision | and | A | | Matrin C | nileo | Compos | ndc and | Surrogator | for | Organia | Analysis |
|--------------|------------|-----------------|-----|----------|-----|----------|-------|--------|---------|------------|-----|-----------|-----------|
| Table 5.5-2. | Summar | y of Precision | anu | Accuracy | 101 | Matrix 5 | pike | Compou | mus anu | Surrogates | 101 | Organic . | Allalysis |

| | | | Aque | ous Matrix | Soli | d Matrix |
|--|--------------------------------|-------|-----------------|--------------|-----------|-------------------------|
| | | Spike | Precision | Accuracy | Precision | Accuracy |
| Method* | Parameter | Туре | (Max RPD) | (% Recovery) | (Max RPD) | (% Recovery) |
| SW8240 | 1,1-Dichloroethene | SC | 25114 | 61 to 145 | 22 | 59 to 172 |
| NYSDEC | Trichloroethene | SC | 2214 | 71 to 120 | 24 | 62 to 137 |
| CLP | Benzene | SC | 3311 | 76 to 127 | 21 | 66 to 142 |
| 1999-1999-1999-1999-1999-1999-1999-199 | Toluene | SC | 2813 | 76 to 125 | 21 | 59 to 139 |
| | Chlorobenzene | SC | 3213 | 75 to 130 | 21 | 60 to 133 |
| | Toluene-do | S | 00100000000 | 88 to 110 | | 81 to 117 |
| | 4-Bromofluorobenzene | S | | 86 to 115 | | 74 to 121 |
| | 1,2-Dichloroethane-d4 | S | | 76 to 114 | | 70 to 121 |
| SW8270 | Phenol** | SC | 42 | 12 to 89 | 35 | 26 to 190 90 |
| NYSDEC | 2-Chlorophenol** | SC | 40 | 27 to 123 | 50 | 25 to 102 |
| CLP | 1,4-Dichlorobenzene | SC | 28 | 36 to 97 | 27 | 28 to 104 |
| 0000000000 | N-Nitroso-di-n- propylamine | SC | 38 | 41 to 116 | 38 | 41 to 126 |
| | 1,2,4-Trichloro- benzene | SC | 28 | 39 to 98 | 23 | 38 to 107 |
| | 4-Chloro-3-methyl-** phenol | SC | 42 | 23 to 97 | 33 | 26 to 103 |
| | Acenaphthene | SC | 31 | 46 to 118 | 19 | 31 to 137 |
| | 4-Nitrophenol** | SC | 50 | 10 to 80 | 50 | 11 to 114 |
| | 2.4-Dinitrotoluene | SC | 38 | 24 to 96 | 47 | 28 to 89 |
| | Pentachlorophenol** | SC | 50 | 9 to 103 | 47 | 17 to 109 |
| | Pyrene | SC | 31 | 26 to 127 | 36 | 35 to 142 |
| | Nitrobenzene-d ₅ | S | | 35 to 114 | | 23 to 120 |
| | 2-Fluorobiphenyl | S | | 43 to 116 | | 30 to 115 |
| | A | | | | | |

C-SEADRIFS.5/QAPP-H.3

| | | | Aque | ous Matrix | Solid Matrix | | |
|-------------------|--------------------------|-----------------|------------------------------|---|--------------------------|--|--|
| Method* | Parameter | Spike Туре | Precision (Max RPD) | Accuracy (% Recovery) | Precision (Max RPD) | Accuracy (% Recovery) | |
| SW8270 | p-Terphenyl-d | S | | 33 to 141 | | 18 to 137 | |
| NYSDEC | Phenol- $d_{e^{\pm\pm}}$ | Š | *** | 10 to 94 | | 24 to 113 | |
| CLP | 2-Fluorophenol** | S | | 21 to 100 | | 25 to 121 | |
| | 2,4,6-Tribromophenol** | S | | 10 to 123 | | 19 to 122 | |
| SW8080 | Lindane | SC | 51 <u>++</u> 15 | 43 to 145++56-123 | 42 ⁺⁺ 50 | 45 to 129++ | |
| NYSDEC | Heptachlor | SC | 38 <u>++</u> 20 | 48 to 124++40-131 | 59<u>++</u>31 | $\frac{46-127}{30 \text{ to } 148^{++}}$ | |
| CLP | Aldrin | SC | 45 <u>++</u> 22 | 37 to 127⁺⁺40-120 | 40 ++ 43 | $\frac{33-150}{53 \text{ to } 133 + +}$ | |
| | Dieldrin | SC | 43 <u>++</u> 18 | 56 to 142 ⁺⁺ 52-126 | 47 <u>++</u> 38 | $\frac{34+152}{46 \text{ to } 140++}$ | |
| | Endrin | SC | 60 <u>++</u> 21 | 35 to 155<u>++</u>56-121 | 37 <u>++</u> 45 | $\frac{51-134}{52 \text{ to } 126++}$ | |
| | 4,4-DDT | SC | 53⁺⁺27 | 46 to 152++38-127 | 59++ 50 | $\frac{42-139}{37 \text{ to } 155 + +}$ | |
| | Dibutylchlorendate | 8C 2 | | 46 to 146 ⁺⁺ 24-254 | | $\frac{23-134}{32 \text{ to } 156^{++}}$ | |
| SW 8150 | 2.4-D* | SC | 30 | 63 to 87 | 50 | 63 to 87 | |
| | 2.4-DB | SC | 30 | 84 to 102 | 50 | 84 to 102 | |
| | 2.4.5-T | SC | 30 | 67 to 103 | 50 | 67 to 103 | |
| | 2,4,5-TP/Silvex+der.* | SC | 30 | 73 to 103 | 50 | 73 to 103 | |
| | Dicamba(banvel)* | SC | 30 | 58 to 100 | 50 | 58 to 100 | |
| | Dalapon | SC | 30 | 42 to 90 | 50 | 42 to 90 | |
| | Dichlorprop | SC | 30 | 91 to 103 | 50 | 91 to 103 | |
| | Dinoseb | SC | 30 | 74 to 100 | 50 | 74 to 100 | |
| | MCPA | SC | 30 | 86 to 110 | 50 | 86 to 110 | |
| | МСРР | SC | 30 | 82 to 106 | 50 | 82 to 106 | |

Table 3.3-2. Summary of Precision and Accuracy for Matrix Spike Compounds and Surrogates for Organic Analysis (Continued, Page 2 of 3)

Table 3.3-2. Summary of Precision and Accuracy for Matrix Spike Compounds and Surrogates for Organic Analysis (Continued, Page 3 of 3)

Note: -- = not applicable.

S = surrogate.

SC = spike compound. This represents a spike into a sample matrix, its duplicate, and into standard (blank) water.

*The methods cited are from NYSDEC CLP Analytical Services Protocol, September 1989, Statement of Work for Organics and Inorganic Analyses and Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (EPA, 1986).

Precision: Contractor QC criteria meets or exceeds the RPD criteria that can be calculated from the spiking and recovery information presented in the method.

+Matrix spike and QC check sample compound.

**Not applicable to BNEs (only) by SW8270.

++These precision and accuracy data are based on Contractor's laboratory historical data.

Source: ESE.

| | | | Aqueo | us Matrix | Sol | id Matrix |
|-------------------|--------------------|---------------|-------------------------------------|---------------------------------------|------------------------|---------------------------------------|
| Method* | Parameter | Spike Type | Precision (Max RPD) ⁺ | Accuracy (% Recovery) ⁺ | Precision (Max RPD) | Accuracy (% Recovery) ⁺ |
| ASTM 2216 | Moisture | | | | 23+ | |
| SW6010 | Antimony | SC | 15 | 79 to 109 | 15 | 79 to 109 |
| NYSDEC | Barium | SC | 10 | 86 to 106 | 10 | 86 to 106 |
| CLP | Beryllium | SC | 15 | 78 to 108 | 15 | 78 to 108 |
| 2002000000 | Cadmium | SC | 14 | 80 to 108 | 14 | 80 to 108 |
| | Chromium | SC | 15 | 79 to 109 | 15 | 79 to 109 |
| | Copper | SC | 12 | 84 to 108 | 12 | 84 to 108 |
| | Lead | SC | | | 15 | 79 to 109 |
| | Nickel | SC | 14 | 78 to 106 | 14 | 78 to 106 |
| | Silver | SC | 17 | 73 to 107 | 17 | 73 to 107 |
| | Thallium | SC | 25 | 75 to 125 | 25 | 75 to 125 |
| | Zinc | SC | 18 | 76 to 112 | 18 | 76 to 112 |
| SW7060 | Arsenic | SC | 24 | 72 to 120 | 24 | 72 to 120 |
| SW7420 | Lead | SC | 27 | 71 to 125 | | |
| SW7471 | Mercury | SC | 21 | 83 to 125 | 21 | 83 to 125 |
| SW7740 | Selenium | SC | 29 | 71 to 129 | 29 | 71 to 129 |
| SW9010 | Cyanide | SC | 18 | 81 to 117 | 18 | 81 to 117 |
| | Alkalinity, total | EPA 310.1 | 11 | 87 to 109 | | |
| | COD | HACH 8000 | 15 | 85 to 115 | | |
| | BOD ₅ | EPA 405.1 | | | | |
| | Chloride | EPA 325.3 | 5 | 95 to 105 | | |
| | Sulfate | EPA 375.4 | 5 | 92 to 108 | | |
| | Carbon (TOC) | EPA 9060 | 15 | 85 to 115 | | |
| | Hardness | EPA 130.2 | 25 | 85 to 115 | | |
| | Residue, total | EPA 160.3 | 23 | | | |
| | Residue, dissolved | EPA 160.1 | 20 | | | |
| | Residue, suspended | EPA 160.2 | 20 | | | |

Table 3.3-1. Summary of Precision and Accuracy for Metals, Inorganics, and Radiation

Table 3.3-1. Summary of Precision and Accuracy for Metals, Inorganics, and Radiation (Continued, Page 2 of 2)

Note: mg/kg = milligrams per kilogram.
 mg/L = milligrams per liter.
 RPD = relative percent difference.
 SC = spike compound. This represents a spike into a sample matrix, its duplicate, and into standard (blank) water.
 SSC = standard spike compound. This represents a spike into standard water/soil and its duplicate.
 -- = not applicable.

*The methods cited are from the following sources:

A = Standard Method for the Examination of Water and Wastewater, 16th Edition, 1985.

E = Methods for Chemical Analysis of Water and Wastes, EPA Manual, 600/4-79-020 (EPA, 1983 with additions).

SW = Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW 846, 3rd Edition (EPA, 1986).

NYSCED CLP = NYSDEC CLP Analytical Services Protocol, Statement of Work for Organics and Inorganic Analyses (September 1989).

⁺The precision and accuracy criteria are based on contractor's laboratory historical data.

Source: ESE.

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| | | | Number of Field Samples | Num Analyz | ber of QC San zed by RI Con | mples atractor | Number of QA Samples Analyzed by USACE | | | |
|-----------------------|------------------------------------|------------------------------------|-------------------------------|-----------------------------------|---------------------------------|--|---|---------------------------------|--|--|
| Analyte | Analytical Method | Number of Background Samples | | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks ⁺ | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks ⁺ | |
| Groundwater | | | | | | | | | | |
| Volatile Organio | cs SW8240 NYSDEC CLP | 2 | 32 | 3 | * | 2 | 3 | * | 2 | |
| Mercury, Total | SW7471 NYSDEC CLP | 2 | 32 | 3 | * | 0 | 3 | * | 0 | |
| Arsenic, Total | SW7060 NYSDEC CLP | 2 | 32 | 3 | * | 0 | 3 | * | 0 | |
| Selenium, Total | SW7740 NYSDEC CLP | 2 | 32 | 3 | * | 0 | 3 | * | 0 | |
| ICAP: Metals. | | | | | | | | | | |
| Total | SW6010 NVSDEC CLP | 2 | 32 | 3 | * | 0 | 3 | * | 0 | |
| Semivolatiles | SW8270 | 2 | 32 | 3 | * | 0 | 3 | * | 0 | |
| Harbicides | SW8150 | 2 | 32 | 2 | * | 0 | 2 | * | 0 | |
| Pesticides/PCRs | SW8150 | 2 | 32 | 3 | * | 0 | 3 | * | 0 | |
| Testiendes/Tebs | NYSDEC CI P | 2 | 52 | 5 | | 0 | 5 | | 0 | |
| Alkalinity | EPA 310.1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| COD | HACH 8000 | 0 | 3 | 0 | 0 | 0 | 0 | Ő | Ő | |
| BOD | EPA 405.1 | 0 | 3 | 0 | 0 | 0 | Ő | Ő | 0 0 | |
| Chloride | EPA 325.3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Sulfate | EPA 375.4 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| TOC | EPA 9060 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Hardness | EPA 130.2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Residue, Total | EPA 160.3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Residue, Dissolved | EPA 160.1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Residue, Suspended | EPA 160.2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | |

Table 4.7-1. Sample Matrix and Analytical Requirements for SEAD Burning Pits/Incinerator Ash Landfill

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| | | | Number of Field Samples | Num Analyz | ber of QC Same and by RI Com | mples stractor | Number of QA Samples Analyzed by USACE | | | |
|-------------------|--------------------------------|------------------------------------|-------------------------------|-----------------------------------|---------------------------------|------------------------------|---|---------------------------------|------------------------------|--|
| Analyte | Analytical Method | Number of Background Samples | | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | |
| Surface/Spring Wa | iter | | | | | | | | | |
| Volatile Organics | SW8240 NYSDEC CL | 1 P | 9 | 1 | * | 1 | 1 | * | 1 | |
| Mercury, Total | SW7471 NYSDEC CL | 1 P | 9 | 1 | * | 0 | 1 | * | 0 | |
| Arsenic, Total | SW7060 NYSDEC CL | 1 P | 9 | 1 | * | 0 | 1 | * | 0 | |
| Selenium, Total | SW7740 NYSDEC CL | 1 .P | 9 | 1 | * | 0 | 1 | * | 0 | |
| ICAP: Metals, | SW6010 NYSDEC CL | P | | | | | | | | |
| Total | | 1 | 9 | 1 | * | 0 | 1 | * | 0 | |
| Semivolatiles | SW8270 NYSDEC CL | 1 P | 9 | 1 | * | 0 | 1 | * | 0 | |
| Herbicides | SW8150 | 1 | 9 | 1 | * | 0 | 1 | * | 0 | |
| Pesticides/PCBs | SW8080 NYSDEC CL | 1 P | 9 | 1 | * | 0 | 1 | * | 0 | |
| Sediments | | | | | | | | | | |
| Volatile Organics | SW8240 NYSDEC CL | 1 P | 9 | 1 | * | 0 | 1 | * | 0 | |
| Mercury, Total | SW7471 NYSDEC CI | 1 P | 9 | 1 | * | 0 | 1 | * | 0 | |
| Arsenic, Total | SW7060 NYSDEC CL | 1 P | 9 | 1 | * | 0 | 1 | * | 0 | |
| Selenium, Total | SW7740 NYSDEC CL | 1 P | 9 | 1 | * | 0 | 1 | * | 0 | |
| ICAP: Metals, | SW6010 NYSDEC CL | Р | | | | | | | | |
| Total | | 1 | 9 | 1 | * | 0 | 1 | * | 0 | |

Table 4.7-1. Sample Matrix and Analytical Requirements for SEAD Burning Pits/Incinerator Ash Landfill (Continued, Page 2 of 4)

.

| | Analytical Method | Number of Background Samples | Number of Field Samples | Num Analyz | ber of QC Sat zed by RI Con | mples atractor | Number of QA Samples Analyzed by USACE | | | |
|---------------------------------------|---|------------------------------------|-------------------------------|--|---------------------------------|------------------------------|---|---------------------------------|------------------------------|--|
| Analyte | | | | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | |
| Sediments (Contin | ued) | | | ······································ | | | | | | |
| Semivolatiles | SW8270 NYSDEC CLI | 1 | 9 | 1 | * | 0 | 1 | * | 0 | |
| Herbicides Pesticides/PCBs | SW8150 SW8080 NYSDEC CLI | 1 1 P | 9 9 | 1 1 | * | 0 0 | 1 1 | * | 0 0 | |
| Soils Borings | | | | | | | | | | |
| 1) Surficial and In mediate Sample | iter- cs | | | | | | | | | |
| Volatile Organics | SW82 40 NYSDEC C | 4 SLP | 56 | 5 | * | 0 | 5 | * | 0 | |
| ICAP: Metals, Total | SW6010 | 4 | 56 | 5 | * | 0 | 5 | * | 0 | |
| Semivolatiles | SW8270 NYSDEC C | 4 3LP | 56 | 5 | * | 0 | 5 | * | 0 | |
| Herbicides | SW8150 | 4 | 56 | 5 | * | 0 | 5 | * | 0 | |
| Pesticides/PCBs | SW8080 | 4 | 56 | 5 | * | 0 | 5 | * | 0 | |
| Mercury | SW7471 | 4 | 56 | 5 | * | 0 | 5 | * | 0 | |
| Arsenic | SW7060 | 4 | 56 | 5 | * | 0 | 5 | * | 0 | |
| Selenium | NYSDEC C | 4 LP | 56 | 5 | * | 0 | 5 | * | 0 | |

Table 4.7-1. Sample Matrix and Analytical Requirements for SEAD Burning Pits/Incinerator Ash Landfill (Continued, Page 3 of 4)

.

| Analyte | | | Number of Field Samples | Num Analyz | ber of QC San zed by RI Con | mples atractor | Number of QA Samples Analyzed by USACE | | |
|--|------------------------------------|------------------------------------|-------------------------------|-----------------------------------|---------------------------------|------------------------------|---|---------------------------------|------------------------------|
| | Analytical Method | Number of Background Samples | | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ |
| Soils Borings (C | Continued) | | | | | | | | |
| 2) Above Water and Deep Sa | Table mples | | | | | | | | |
| Volatile Organics | SW8240 NYSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| ICAP: Metal Total | s, SW6010 | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Semivolatiles | SW8270 | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Pesticides/PC | Bs SW8080 NYSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Herbicides | SW8150 | 4 | 56 56 | 5 | * | 0 | 5 | * | 0 |
| Arsenic | NYSDEC CLP SW7060 | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| Selenium | NYSDEC CLP SW7740 NYSDEC CLP | 4 | 56 | 5 | * | 0 | 5 | * | 0 |
| 3) Diesel Underground Storage Tanl | l c | | | | | | | | |
| TRPH | SW9071 SW846 | 0 | 4 | 1 | * | 0 | 1 | * | 0 |

Table 4.7-1. Sample Matrix and Analytical Requirements for SEAD Burning Pits/Incinerator Ash Landfill (Continued, Page 4 of 4)

| | Analytical Method | Number of Background Samples | Number of Field Samples | Num Analyz | ber of QC San ed by RI Con | mples tractor | Number of QA Samples Analyzed by USACE | | | |
|-----------------|---------------------------------|------------------------------------|-------------------------------|-----------------------------------|---------------------------------|------------------------------|---|---------------------------------|------------------------------|--|
| Analyte | | | | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | Number of Replicate Samples | Number of Rinsate Samples | Number of Trip Blanks+ | |
| Dust/Wipe | | | | | | | | | | |
| Semivolatiles | SW8270 NYSDEC CLP | 0 | 2 | 0 | * | 0 | 0 | * | 0 | |
| Pesticides/PCBs | SW8080 NYSDEC CLP | 0 | 2 | 0 | * | 0 | 0 | * | 0 | |

Table 4.7-1. Sample Matrix and Analytical Requirements for SEAD Burning Pits/Incinerator Ash Landfill (Continued, Page 4 of 4)

*One rinsate sample will be collected per decontamination event, not to exceed one sample per day. +The actual number of field QC blanks shipped will depend on the duration of field activity.

Source: ESE.

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8.0 DATA REDUCTION, VALIDATION, AND REPORTING

8.1 DATA REDUCTION AND REPORTING

Data transfer and reduction are essential functions in summarizing information to support conclusions. It is essential that these processes are performed accurately and, in the case of data reduction, accepted statistical techniques are used. The contractor will use its in-house-developed computer system for data management.

Example calculations will be included with the analytical method, where appropriate, to facilitate review. The entry of input data and calculations should be checked and the signature/initials of the data technician and reviewer(s) should accompany all data transfers with and without reduction.

All QA/QC procedures recommended in the SW846 NYSDEC CLP Statement of Work analytical method used will be mandatory. The data flow scheme is presented in Figure 8.1-1. Reporting will be in the form of contract laboratory program (CLP) deliverables. The deliverable forms are provided in Attachment A.

For routine analyses performed at the laboratory, sample response data information will be entered into the computer system by the analyst or other designated individual(s). The computer calculates the following:

- 1. Linear or quadratic regression line for standards,
- 2. Coefficients of variation for replicates,
- 3. Spiked recoveries,

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compared with quantitative statements of health risk criteria. Therefore, a high level of data certainty is necessary. RA data are generated through the sampling and analysis of biological and environmental media, particularly where the potential for human exposure is judged to be significant.

Based on the information presented in Table 3.2-1 of the work plan, the Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs) will be incorporated as the preliminary DQOs for the RI groundwater and surface water sampling. The analytical requirements and quantitation limits proposed for the RI will be based on the SW-846 **NYSDEC CLP** analytical methods identified in Table 3.3-1 of the work plan. Subsequent confirmation rounds will use methods determined to be appropriate after the first round. Soil sampling will be analyzed by the same analytical methods used for water samples.

1.12 DATA GAPS

In general, the data gaps include quantification of contaminant source strength and migration extent in several media. The specific data gaps, by media, are as follows:

- 1. Groundwater
 - a. Determination of nature and extent of contamination within the shallow and lower aquifers,
 - b. Determination of background concentrations, and
 - c. Identification of potable wells within 1-mile radius of the site.
- 2. Surface Water

PT-16), and MW-35D will be installed southwest of the ash landfill area. In addition to nested wells PT-22 and MW-38D, proposed shallow well MW-36 will be installed adjacent to proposed deep well MW-35D, downgradient of the ash landfill area. These two pairs of nested wells will aid in determining the potential existence of a hydraulic connection between the surficial and lower aquifers.

Information from split-spoon samples, standard penetration testing, observations regarding the moisture content of recovered soil samples, and direct measurement with a water-level tape of the water table in each boring will be used to screen the shallow wells from the top of the bedrock to greater than 3 ft above the water table. Bedrock wells will be screened from approximately 3 ft above the lower water table to 17 ft below the lower water table.

4.2.1.3 Well Sampling and Analysis

Upon completion of monitor well installation and development, groundwater samples will be collected from the nine new wells and all of the previously installed wells at the ash landfill area, including PT-26. All wells, including private wells downgradient of the ash landfill area as determined from the well inventory, will be sampled in accordance with the methodology presented in Appendix A. The New York State Department of Health (NYSDOH) and Seneca County Health Department (SCHD) staff will collect samples from the private wells of houses downgradient of the site at the same time that the RI contractor conducts the well sampling and analysis. DOH and SCHD will require a 2-week notice prior to groundwater sample collection. All samples will be analyzed for TCL organic compounds (volatiles, semivolatiles, pesticides/PCBs), TAL metals, and herbicides.

All samples will be analyzed for the following parameters:

1. Target Compound List (TCL) for Volatile Organic Analytes (VOA).

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- Target Compound List (TLC) Acid, Base/Neutral, Polychlorinated Biphenyls (AB/Ns, Pesticides and PCBs).
- 3. Target Analyte List (TAL)(Metals).
- 4. Method 8150 (Herbicides)

A maximum of three rounds of sampling will be conducted in the groundwater wells. All wells will be sampled initially and the wells which show "hits" will be sampled a second time for confirmation. If there is a discrepancy between the initial sampling round and the second confirmation round, a third round will be performed. Tentativelyidentified-compounds (TICs) identified during round one will also be confirmed by subsequent analyses. RI will be based on the SW-846 NYSDEC CLP analytical methods identified in Table 3.3-1. Subsequent confirmation rounds will use methods determined to be appropriate after the first round. Soil sampling will be analyzed by the same analytical methods used for water samples.

3.5 DATA GAPS

In general, the data gaps include quantification of contaminant source strength and migration extent in several media. The specific data gaps, by media, are as follows:

- 1. Groundwater
 - a. Determination of nature and extent of contamination within the shallow and lower aquifers,
 - b. Determination of background concentrations, and
 - c. Identification of potable wells within 1-mile radius of the site.
- 2. Surface Water
 - a. Determination of nature and extent of contamination within onsite and offsite surface waters, including drainage ditches, identifiable wetland areas, and Kendaia Creek;
 - b. Determination of background concentrations; and
 - c. Identification of springs within a 1-mile radius of the site.
- 3. Soils
 - a. Determination of nature and extent of contamination within the landfill area,
 - b. Evaluation of potential source areas adjacent to the landfill/incinerator area, and
 - c. Determination of background concentrations.
- 4. Sediments

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3.3.2.3 Wetlands

USACE defines wetlands as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances support, a prevalence of vegetation typically adapted for existence in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The landfill area at SEAD is known to contain several groundwater seep areas that may be considered wetlands by definition. Therefore, the following location-specific ARARs may apply:

- 1. Executive Order (EO) 11990 (40 CFR 6)--Protection of Wetlands;
- 2. Clean Water Act, Section 404 (40 CFR 230)--Prohibition of Wetland Filling;
- 3. EO 11988 (40 CFR 6)--Flood Plains Management;
- 4. RCRA (4 USC 6901)--Waste Facility Management Rules; and
- New York State Environmental Conservation Law Article 24--Freshwater Wetland Act.

The Flood Insurance Rate Map (FIRM) of the Federal Emergency Management Agency (FEMA) places the Seneca Army Depot ash landfill grounds within Panel 1, Town of Romulus, New York, Seneca County (Community Panel Number 360755 0001 B). The southern portion of the Depot is not subject to flooding and is located within "areas determined to be outside the 500-year flood plain" (Zone C).

3.3.2.4 Significant Agricultural Lands

Historically, Seneca County has been developed as an agricultural center supporting a rural population with scattered settlements providing durable goods and required services. Prior to the establishment of the depot land use consisted primarily of the cultivation of market garden crops in the early part of the nineteenth century and later

cultivation of grain and fodder crops. Orchards, dairy farms, and vineyards were also present in the earlier years. The Seneca Army Depot was initially constructed in 1941-1943. Since this time the land has been used by the Army. The Depot consists of a main storage area of igloo-type magazines, aboveground magazines, a headquarters area, operative, maintenance and service facilities, a housing area, retail facilities and an airport.

Deep and moderately deep somewhat poorly drained soils that have a silty loam to heavy loam subsoil are present on the ash landfill site according to a Seneca County soil survey (April 1972).

According to the New York State Land Use and National Resource Inventory overlay maps, the SEAD is identified as all categories of public lands and land in the vicinity of the ash landfill consist of inactive agricultural land, active cropland/cropland pasture, forest land and outdoor recreation (along Seneca lake). There are no significant agricultural lands on the ash landfill site based on a review of the overlays.

3.3.3 ACTION-SPECIFIC ARARs

Action-specific requirements set performance, design, or other controls or activities related to hazardous waste management. These requirements are triggered by specific remedial actions selected for a particular remedy. Shallow groundwater contamination is known to exist at SEAD. However, the extent, if any, of contamination of the deeper groundwater remains to be established. Insufficient data are available to characterize the discharge of contaminated groundwater to surface water bodies or to evaluate the extent of runoff of contaminated surface water.

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4.2.2.2 Soil Gas Survey

Information obtained by the proposed geophysical survey will be used to identify possible source areas of subsurface contamination. A soil gas/soil headspace survey will be performed to further evaluate specific anomalies inferred in the area of the proposed geophysical survey. The soil gas/soil headspace survey will allow a better delineation of the groundwater quality as it migrates downgradient from these source areas. The lateral extent of the soil gas survey will be expanded, if necessary, to delineate any "hot spots" which are identified. The exact number of sampling locations will be determined based on the results of the geophysical survey. Sample point locations having groundwater near the surface will be sampled using soil headspace methods, as these conditions are not conducive to soil gas methods. The RI contractor will provide soil gas procedures. Detailed soil gas survey procedures are provided in the Field Sampling and Analysis Plan.

4.2.2.3 Soil Boring Sampling and Analysis

The drilling, logging, and sampling of 30 soil borings will be performed: (1) within the potential source areas of the landfill area as previously identified in Figure 1.1-2, and (2) at potential source areas identified during the proposed geophysical and soil gas surveys. The soil borings will be performed to determine the nature and concentrations of contaminants in the overburden materials (soil and fill).

The ICF (1989) report indicates that significant sources of groundwater contamination may exist below the water table at several locations. The soil borings will be drilled with a truck-mounted rig equipped with hollow-stem augers and will be advanced to the top of bedrock, which is anticipated to be

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shoulders to the top of the head. Specific criteria for upgrading personal protection based on TOV is presented in Table 4-1. Attachment E contains a sample logsheet for recording TOV measurements. If TOV levels exceed background, gas chromatograph analysis may be made of the air in the breathing zone. In the <u>absence</u> of documented evidence that TRCLE, 12DCLE, C2H3CL, and CHCL3 <u>are not</u> present in the breathing zone, work will be performed in Level B personal protective equipment. Further airmonitoring information is given in the Air Monitoring section of the WP.

During field activities at the site, real-time monitoring for volatile organic compounds (VOC's) and particulates will be conducted at the downwind Ash landfill site boundary. Particulate monitoring will be performed using a Model PDM-3 MINIRAM miniature real-time aerosol monitor. If the level of VOCs at the downwind Ash landfill site boundary exceeds 5 ppm above background levels measured upwind from the work area, then all activities must be stopped and corrective measures implemented to control the source of the release. If the level of airborne particles at the downwind site boundary exceeds the action level of 150 ug/m³, all work activities must be stopped and corrective measures implemented to control the source of the release.

A radioactive survey using a Geiger counter will be conducted during drilling and sampling operations. If any radioactive material is detected, the site will be evacuated and the RI/FS will be re-scoped to handle this issue.

4.3 WORK LIMITATIONS

Work will be limited to daylight hours and during normal weather conditions. If work is to be performed at times of reduced illumination, such as late evening hours, artificial flood lighting will be provided. Extremes in temperature and weather conditions (i.e., wind and lightning) will restrict working hours. All work onsite will be suspended when lightning occurs in the vicinity. for Occupational Safety and Health (NIOSH) Method 1003] uses a coconut shell charcoal tube [100 milligrams (mg)/50 mg] for maximum air volume of 15 liters (L) at a sampling rate of 0.03 liter per minute (L/min) for an 8-hour time-weighted average (TWA) sample. The collection tubes will be submitted to an American Industrial Hygiene Association (AIHA)-accredited laboratory for analysis.

During field activities at the site, real-time monitoring for volatile organic compounds (VOC's) and particulates will be conducted at the downwind Ash landfill site boundary. Details of the VOC and particulate monitoring are provided in Section 4.2 Appendix B.

4.2.6 SURVEYING

The location and elevation of each new monitor well, soil boring, and surface water/sediment sample will be surveyed by a New York State Registered Land Surveyor. The coordinates will be to the closest 1 ft and referenced to the state planar coordinate system. Elevations will be to the closest 0.01 ft and referenced to the National Geodetic Vertical Datum (NGVD) survey of 1929. The results of this survey will be used to develop an additional cross section of the area west of the ash landfill by using geologic logs created during the soil boring and monitor well installation programs.

In addition, three permanent concrete monuments will be established on the site. The monuments will be located within the study area boundaries and set 50 ft from the edge of any existing roads and a minimum of 1,000 ft apart. Horizontal control (1:10,000) and vertical control (1:5,000) of third order or better will be maintained. Each monument will be labeled with a 3.25-inch domed brass or aluminum alloy survey marker (cap). Each cap will be marked in a consecutively numbered sequence as follows:

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(F93) (E64) (HEHH) LI (AHZH) EI

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The analyst's supervisor or a designated reviewer will check analyst calcualtions and transcriptions for errors. The analyst's supervisor or a designated reviewer also reviews the analytical batch and any explanations or corrective actions provided by the analyst. If the supervisor or designee is not satisfied with the explanations or corrective actions, an additional explanation or corrective action is provided in the batch. The supervisor or designee signs the analytical batch when satisfied with the data.

The laboratory coordinator reviews analytical data batches that have explanations and corrective actions and signs the analytical batch when satisfied with the data. The laboratory coordinator also reviews all final data reports for inconsistencies and completeness prior to releasing the reports to the client; qualification of data and/or QA/QC summaries are provided as appropriate.

All outliers will be handled as per the EPA validation SOPs (Attachment B).

8.4 DATA REVIEW BY PROJECT QA OFFICER

The project QA officer will review the data according to the guidelines provided in Region II SOPs. The goal is to ensure that the analytical data meet the general QA/QC criteria recommended in SW846 NYSDEC CLP. The QA supervisor will also review the explanation of any data qualification statements. The CLP inorganic and organic results forms will be used (see Attachment A). This will enable the data to be validated by the Region II SOP (see Attachment B).

All field information must be recorded in sequentially numbered bound notebooks and be made using noneraseable, waterproof ink. The notebook pages must themselves be sequentially numbered from one through to the end.

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6.0 PLANS AND MANAGEMENT

The purpose of this WP is to present the activities that will be required for the development of the RI/FS. The following subsections describe the project staffing, future schedule, health and safety, quality management, and engineering QC developed for this WP.

6.1 STAFFING

This section lists WP project staff and describes the functional relationships of the organizational structure and responsibilities of the support functions (see Figure 6.1-1). The ESE MAIN personnel who will served in a supervisory role are indicated by the boxes connected by solid lines of authority. These personnel will provided overview and guidance to the project team and will assisted the project manager in the resolution of any technical difficulties.

The project director, Mr. Gary R. Horwitch, P.E., Mr. James P. Chaplick was is responsible for appointing the project manager and providing overall direction, coordination, and corporate support as needed over the project duration.

The project manager, Mr. Jose Morales, P.E., Mr. Michael Duchesneau, P.E., was is responsible for the effective day-to-day management of the project staff; direct communication and liaison with the client; technical approach and review of deliverables, management of resources, schedules, and budgets; and coordination among the general and technical support functions.



The engineering QC reviewer (Mr. Gary R. Horwitch, P.E.) was responsible for senior technical review of all deliverables based on his previous experience with the site and/or with similar projects.

The general support functions include the QA supervisor and safety manager. The QA supervisor was is responsible for developing the QC procedures identified in the QAPP. The project safety manager was is responsible for assisting the project manager in preparation of the SHERP for required site activities.

6.2 SEAD MANAGEMENT STRUCTURE AND EPA CONTACTS

The geotechnical engineer at ACE, Mr. Kevin Healy, is responsible for QA review of all geotechnical concerns.

The chemical engineer at SEAD, Mr. Randall Battaglia, is responsible for the day to day oversight of project scheduling and performance and he also coordinates with EPA and NYSDEC.

The EPA contacts are Carla Struble (EPA Project Manager), Amelia Jackson (Chemist), Steven Petrucelli (Environmental Engineer).

6.23 PROJECT SCHEDULE

The proposed implementation schedule for the SEAD RI/FS is shown in Table 6.2-1. This schedule will be updated as required during the field effort to indicate any delays and potential impacts on future deliverables.

6.34 <u>SHERP</u>

To provide an Occupational Safety and Health Administration (OSHA)-compliant working environment for the RI field team members and subcontractor personnel performing the fieldwork, the SHERP has been prepared and is presented in Appendix B.

6.45 <u>QAPP</u>

To achieve the data quality goals of the fieldwork at the SEAD site, the QAPP has been prepared and is presented in Appendix C.

6.56 ENGINEERING QC

The engineering QC provided a process for senior technical review of all deliverables based on the reviewers' technical expertise and previous experience with similar projects. Technical review comments were incorporated into the deliverables before submission of the review drafts to USACE, EPA, and NYSDEC. Any deviations to the approved Plan(s) must be approved by Kevin Healy (ACE Project Manager), Randall Battaglia (Seneca Project Manager) and Carla Struble (EPA Project Manager).