PARSONS ENGINEERING SCIENCE, INC.

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December 17, 2001

00852

Commander
U.S. Army Corps of Engineers
Engineering and Support Center, Huntsville
Attn: CEHNC-OE-DC (Major David Sheets)
4820 University Square
Huntsville, Alabama 35816-1822

SUBJECT: **Seneca Army Depot Activity – Romulus, New York Response to Comments on the Draft Action Memorandum for Removal Actions at SWMUs SEAD-59 and SEAD-71**

Dear Major Sheets:

Parsons is pleased to submit the Response to Comments on the Draft Action Memorandum for Removal Actions at SEAD-59 and SEAD-71 at the Seneca Army Depot Activity located in Romulus, New York. This work was performed in accordance with the Scope of Work (SOW) for Delivery Order 00017 to the Parsons ES Contract DACA87-95-D-0031. This submittal has also been provided under separate cover to Mr. Julio Vasquez at the USEPA and Ms. Alicia Thorne at NYSDEC.

These Response to Comments are being issued prior to submittal of the subject documents for review by EPA and NYSDEC. In accordance with Section 17.7(e) of the FFA, we are requesting a consultation with the EPA and NSYDEC to discuss the development of the TAGM-based cleanup goals presented in these responses. We would like to propose a meeting during the week of January 7, 2002 in Albany.

Parsons appreciates the opportunity to work with the USACE on this project and looks forward to a continued relationship on this and other projects. Please feel free to call me at (781) 401-2361 if you have any questions or comments.

Sincerely,

PARSONS

Eliza D. Schacht, P.E.
Task Order Manager

cc: S. Absolom, SEDA
J. Fallo
K. Healy
K. Hoddinott, USACHPPM
C. Kim, USAEC
B. Wright, USAIOC
M. Brock, USACOE, New England

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PARSONS

**Response to Comments from New York State Department of Environmental Conservation
Division of Environmental Remediation**

Subject: Draft Action Memorandum Fill Area West of Building 135 (SEAD-59)
and the Alleged Paint Disposal Area (SEAD-71)
Seneca Army Depot, Site ID No. 850006

Comments Dated: July 31, 2001

Date of Comment Response: December 17, 2001

General Comments:

This is in reference to the above stated document dated June 2001 that was received on July 27, 2001. You have not responded to the Department's April 19, 2001 letter which outlines several concerns that have not been addressed in this draft.

As requested in the Department's April 19, 2001 letter the NYSDEC has yet to receive a response to state comments made on October 2, 1998 on the Draft Phase 1 Remedial Investigation. Without a satisfactory response to these comments, NYSDEC cannot be in agreement that this time critical removal action proposal is appropriate. While the Army's desire to remove environmental threats from this site is laudable, we suggest that a response to outstanding concerns will facilitate agreement between the agencies on the work proposed.

The Army appears to confuse the purpose of a removal action with those of a remedial response. A removal action is taken to eliminate a substantial, imminent threat at a site while a more complete and thorough study and analysis (i.e. RI/FS) is taken to complete the entire remedial response at a site. The statement "this removal action is intended to be the final remedy for both sites," that was made in your April 11, 2001 letter is again repeated in this draft after the Department stated in our April 19, 2001 that the statement is premature. Regardless of a removal action, only a completed remedial investigation/feasibility study shall determine whether further remediation is necessary. Therefore, the statement should be removed from the text.

As stipulated in the Department's April 19, 2001 letter, "your proposal for developing site cleanup goals based on the reasonable maximum exposure (RME) is unacceptable for it would not recognize any synergistic effects." The cleanup goals presented in this document on Table 5.3-1 are based on RME and are therefore unacceptable. As stated in our letter, the proposed cleanup goals should be developed based on TAGM 4046. The Department finds it a quandary that the Army uses TAGM 4046 as a means to justify the declaration of a Time Critical Removal Action however the draft never recognizes TAGM 4046 as a Chemical -Specific ARAR in Section 5.2.1 or a To Be Considered (TBC). Reconciliation is necessary. Again, we point out that the Army's intent to develop site cleanup goals based solely upon human health risk calculations is in conflict with state regulation 6 NYCRR Part 375.

In Section 1.2, purpose, Scope and Objectives, the Army states that this "time critical removal action, which will be completed as a result or this Action Memorandum, is intended to incorporate the necessary measure for removal site closeout." Presented later in the document, the Army proposes to install four additional monitoring wells at SEAD 59 and an unspecified amount of monitoring wells at SEAD 71 with site groundwater monitoring on a semi-annual basis, which is to be reviewed after five years. In addition, the Army proposes to apply deed restrictions to ensure that the future land use remains as Planned Industrial Development. As discussed above, the Army appears to confuse the purpose of a removal action with those of a remedial response. The need and extent of items such as additional monitoring wells, groundwater monitoring plans, and deed restrictions will be developed through completion of the RI/FS process. It appears inappropriate to propose these actions as a removal action, and much more so in a proposed "time critical removal action."

Response:

NYSDEC has expressed several concerns regarding unresolved comments, the use of a removal action as a final remedy at SEADs-59 and 71 and cleanup goals developed outside of TAGM 4046.

Outstanding Comments:

Regarding outstanding responses to comments, the Army has recently submitted responses to comments from NYSDEC dated October 2, 1998 on the Draft Phase I RI. These responses were submitted on November 7, 2001.

Removal Action as Final Remedy

Several changes have been made to this Action Memorandum and Decision Document to address NYSDEC's concerns regarding the role of this removal action in the overall remediation of the site as well as cleanup goals established for the site. The Army recognizes that the removal action may not be the final remedy for the site. However, the Army does believe that if the removal action is properly completed, additional debris and soil excavation may not be required. The Army wants the removal action to result in removing all contaminated debris and soils, and lead to agreement between the regulatory agencies and Army that further excavation will not be required.

Following the removal action, the Army will assess remaining contaminant concentrations in both soil and groundwater to determine if additional action is required. The Army recognizes that the CERCLA process will need to be completed prior to implementation of the final remedy. The Army's intent in performing a removal action is not to circumvent the RI/FS process. Please note that a Phase I RI has already been completed and an evaluation of additional required remedial measures, if any, will be completed once the removal action is complete. After submission and approval of this evaluation, the Army intends on submitting a PRAP and ROD. A no further action ROD may be proposed if NYSDEC and the Army agree that no additional action is required based on soil and groundwater data evaluated after the removal action.

The statement "this removal action is intended to be the final remedy for both sites" will be changed to read "this removal action is intended to remove the source of potential risks to human health, the environment and groundwater quality". The revised text will state that further actions to address contaminated groundwater, if any, will be evaluated.

Cleanup Goals

The Army acknowledges NYSDEC's rejection of cleanup goals that are based solely on human health risk calculations. The Army has reviewed NYSDEC's Technical and Administrative Guidance Memorandum #4046 – Determination of Soil Cleanup Objectives and Cleanup Levels (January 24, 1994). Based on this review and conversations with NYSDEC, the Army has a better understanding of this guidance document and its requirements in determining cleanup goals. It is our understanding that this document should be used in developing soil cleanup objectives. TAGM #4046 develops general soil cleanup goals based on contaminant concentrations that are protective of human health under a residential scenario and groundwater quality.

The TAGM 4046 memorandum establishes the soil cleanup objectives for organics based on the lower of the following two values:

1. soil concentrations protective of human health considering a residential scenario; or
2. soil concentrations protective of groundwater/drinking water quality at the site.

The Action Memorandum and Decision Document have been revised to recognize TAGM 4046 as the basis in developing cleanup goals. Our approach to developing cleanup goals at SEAD-59/71 is to revise those values listed in Tables 1, 2, and 3 of TAGM 4046 using site-specific information and the TAGM procedures outlined in Sections 2 and 3 of TAGM 4046. Two basic assumptions were made in modifying the recommended cleanup objectives in TAGM 4046. These assumptions are:

1. the future receptor at SEAD-59/71 is an industrial or construction worker, not a resident; and
2. groundwater use will be restricted at the site and the nearest potential user of the groundwater is several hundred feet from the site.

Using these assumptions, preliminary cleanup objectives for the removal action have been derived. The derived values and the calculations and assumptions are provided in Attachment A of this response to comment letter. The Army recognizes that these goals are based on the future industrial land use proposed for SEADs-59 and 71 and assumptions that groundwater use will be restricted at SEADs-59 and 71. Land use controls may be necessary to ensure that these future conditions are met. In addition, the Army recognizes that NYSDEC feels it is premature to incorporate a discussion of land use controls in the Action Memorandum and Decision Documents. Therefore, although preliminary cleanup objectives have been developed with the use of land use controls in mind, the actual role of land use controls (at SEADs-59 and 71) will be presented in future documents. The controls the Army has in mind are the types of controls discussed on November 20 of this year when we met with the State and with the Restoration Advisory Board.

Specific Comments on Draft Action Memorandum:

Comment 1. Page TOC-8. List of Acronyms: TAGM is an acronym for Technical and Administrative Guidance Memorandum not "Chemical and Administrative Guidance Memorandum."

Response: Agreed. The text has been revised.

Comment 2. Page 1-4. Section 1.4. Site Contacts: The NYSDEC project manager's address has changed. Please replace with the following:

New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Eastern Remedial Action
11 th Floor, 625 Broadway
Albany. NY 12233-7015

Response: Agreed. The text has been revised.

Comment 3. Page 3-5 Section 3.4, Additional Justification for Removal Action: It states that "the uncertainty of the contents of the buried items that may remain in the disposal area and at geophysical anomalies and contamination in soils and groundwater are considered justification for performing a removal action at both sites." Two sentences later it states that "goals for allowable concentrations will be developed, based upon existing conditions, and will be used as the basis for returning soil, segregated from the buried items, to the fill area and areas south of the road." Please clarify how the Army plans on developing cleanup goals based on existing conditions when the contents of the drums are unknown.

Response: The cleanup goals are developed based on site investigations performed to date. If during the removal action, additional contaminants appear to be sources of potential groundwater contamination, additional cleanup goals may be developed. Additional information regarding the removal process will be provided in the site-specific removal action work plan.

Comment 4. Pages 5-1-2, Section 5.1.2, Proposed Action Description: The excavated soils should be piled so that surface soils and bottom soils are kept separate. The statement that "it is assumed that NYCRR Part 360 will no longer apply because the fill area is being removed" is false. If the Army desires to backfill the "soils with concentrations of metals, pesticides, and SVOCs below the cleanup goals" that were developed based on human health risk calculations yet exhibit residual contamination, then NYCRR Part 360 may be applicable as the contaminated soil may be considered a solid waste. Please note that no backfilling should occur without the prior written approval from the NYSDEC.

Response: The process for determining the suitability of soils for use as backfill will be presented in the removal action work plan. In general, only those soils which pose no risk to human health or groundwater quality based on site-specific exposures will be used as backfill.

Comment 5. Page 5-3, Section 5.1.3, Contribution to Remedial Performance: The statement "this work should eliminate the potential for future remedial actions" should be removed from the text. See General Comments.

Response: Agreed. See General Response.

Specific Comments on Draft Decision Document:

Comment 6. The Draft Decision Document, which supports the Draft Action Memorandum repeats much of what is stated in the Draft Action Memorandum, section for section. Therefore the above said comments are applicable here.

Response: Agreed. The responses will be applied to both documents.

Comment 7. Page TOC-8, Abbreviations and Acronyms: Please correct each for micrograms per kilogram and micrograms per liter.

Response: Agreed. The text has been revised.

Comment 8. Page E-2, Assumptions: The first bulleted item states that "clearing and grubbing is necessary to perform soil capping. soil excavation, sediment excavation, and stockpiling." Nowhere in the document does it reference sediments, however the description of SEAD 59 includes drainage swales (that are not depicted in any of the site figures). Please reconcile.

Response: Agreed. The statement was incorrect. The first bulleted item will be revised to state that "clearing and grubbing is necessary to perform soil capping, soil excavation, and stockpiling".

Comment 9. Page E-3, Assumptions: In the second to last bulleted item, it states that "based on the soil data from SEAD 59, it was assumed that 11% of the excavated soil will have PAH, Aroclor-1254, or metals concentrations above Risk Based Clean up Goals." Nowhere in the document does it indicate that PCBs were detected at elevated concentrations nor does it state that soils with PCBs above the cleanup goals will be disposed off-site. Please reconcile.

Response: Agreed. First, the percentage of soils excavated soils that exceed the site-specific cleanup goals have been revised based on the new TAGM-derived cleanup goals. Secondly, the sentence will be revised to not include Aroclor-1254 since PCBs are not present at the site at elevated concentrations.

General Comment: Although your letter of April 11, 2001 states that a public meeting will be scheduled when the agency comments are received on the above said document, the Department suggests that the Army contact the regulatory agencies to discuss the proposal and its appropriateness.

Response: Agreed. The Army will contact the regulatory agencies to discuss the referenced proposal.

RESPONSE TO COMMENTS
from
State of New York State Department of Health

Draft Action Memorandum
Fill Area West of Building 135 (SEAD-59) and the Alleged Paint Disposal Area (SEAD-71)
Seneca Army Depot, Site ID No. 850006

Comments Dated August 1, 2001
Comments by Daniel Geraghty

Date of Comment Response: December 17, 2001

Comment by NYSDOH: I have reviewed the draft Action Memorandum for Removal Actions at SWMUs SEAD-59 and SEAD- 71 of the Seneca Army Depot located in Romulus, Seneca County.

In letters to your agency dated September 4, 1998 and March 23, 1999, the New York State Department of Health expressed the opinion that the full extent of contamination at these sites had not been defined. In the March 23, 1999 letter I suggest that a non-time critical removal action be delayed until the question of extent has been answered. However, with the increasing presence of people on the base due to reuse activities I feel it is appropriate at this time to proceed with removal of the known contamination. As always, the NYSDOH supports efforts to reduce or eliminate exposure to environmental contaminants.

However, the final remedy for the site will be selected after completion of the interim remedial measure (IRM) and an evaluation of the remaining contamination. Upon completion of the IRM a final remedy will be selected after a feasibility study that takes into consideration factors such as technical practicality, cost, permanence, community acceptance and effectiveness of the remedy against potential future uses of the site and compliance to New York State standards, criteria, and guidelines.

Since the stated focus of this interim remedial measure is the removal of grossly contaminated material such as drums, paint cans, and other containers we consider the soil chemical concentrations listed in Table 4.3-1 not to be relevant for this action.

Due to the volume of soils to be excavated and the proximity to working areas of the depot it will be necessary to closely follow the guidance found in the enclosed community air monitoring plan (CAMP). Please have the Army forward a copy of the interim remedial project health and safety plan including the CAMP for my review.

Response: As stated in the Action Memorandum/Decision Document, the purpose of this removal action is to reduce any non-carcinogenic and carcinogenic risks to acceptable levels considered protective of human health and the environment. While the removal of drums, paint cans, and debris is the focus of the removal actions, the potential for contamination to be present in the soils that surround these items will also be addressed. The Army recognizes that the removal action may not be the final remedy. However, the Army believes that if the removal action is properly completed, additional debris and soil excavation may not be required. The Army wants the removal action to result in removing all contaminated debris and soils, and lead to an agreement between the regulatory agencies and the Army that further remedial actions will not be required. To achieve agreement, the Army has proposed for this removal action TAGM-based cleanup goals that are protective of groundwater and human health in an industrial scenario. These goals are based on the future industrial land use proposed for SEAD-59 and 71 and assumptions that groundwater use will be restricted at the sites, if the applicable groundwater standards are not met. The derivation of site specific TAGM-based cleanup goals is outlined in Attachment A of the responses to NYSDEC's comments.

Following the removal action, the Army will assess remaining contaminant concentrations in both soil and groundwater to determine if any additional remedial action is required. After submission and approval of this evaluation, the Army intends on submitting a PRAP and ROD. A no further action ROD may be proposed if the agencies and the Army agree that no additional action is required based on soil and groundwater data evaluated after the removal action.

The attached CAMP will be included in the Removal Action Work Plan.

Response to Comments From
United States Environmental Protection Agency (US EPA)

Subject: Draft Action Memorandum for Removal Actions at SEAD-59 and SEAD-71
Seneca Army Depot Activity, Romulus, NY

Comments Dated: August 3, 2001

Date of Comment Response: December 17, 2001

General Comments:

Comment 1: The proposed time-critical removal action is intended by the Army to be the final action for SEAD-59 and 71. However, a time-critical removal action is usually an interim measure not intended to be the final action at a site. To perform this action as a final action for these sites, a more conservative approach, like using TAGMs as cleanup goals, is indicated. As you know, the establishment of cleanup goals based on back calculations of human health risks is a controversial subject that will require a more careful review and discussion from the regulatory agencies, resulting on potential delays that may adversely affect the nature of your proposal. Please note that these sites will still require a proposed remedial action plan (PRAP) and a record of decision (ROD) even after the action is taken at these sites.

Response: Changes have been made to this Action Memorandum and Decision Document to address concerns regarding the role of this removal action in the overall remediation of the site as well as cleanup goals established for the sites. The Army recognizes that the removal action may not be the final remedy for the sites. However, the Army does believe that if the removal action is properly completed, additional debris and soil excavation may not be required. The Army's intent is that the removal action will result in removing all contaminated debris and soils with concentrations above the revised TAGM-based cleanup goals. The Army believes that excavation to these revised cleanup goals will lead to agreement between the regulatory agencies and Army that further excavation will not be required. The revised TAGM-based cleanup goals are discussed later in this response to comments.

Following the removal action, the Army will assess remaining contaminant concentrations in both soil and groundwater to determine if additional action is required. The Army recognizes that the CERCLA process will need to be completed prior to implementation of the final remedy. The Army's intent in performing a removal action is not to circumvent the RI/FS process. An evaluation of additional required remedial measures, if any, will be completed once the removal action is complete. After submission and approval of this evaluation, the Army intends on submitting a PRAP and ROD. A no further action ROD may be proposed if the agencies and the Army agree that no additional action is required based on soil and groundwater data evaluated after the removal action.

The statement in the Decision Document and Action Memorandum "this removal action is intended to be the final remedy for both sites" will be changed to read "this removal action is intended to remove the source of potential risks to human health, the environment and groundwater quality". The revised text will state that further actions to address contaminated groundwater, if any, will be evaluated.

The Army acknowledges that establishment of cleanup goals based on back calculations of human health risk is controversial. The Army has reviewed NYSDEC's Technical and Administrative Guidance Memorandum #4046 – Determination of Soil Cleanup Objectives and Cleanup Levels (January 24, 1994). Based on this review and conversations with NYSDEC, the Army has a better understanding of this guidance document and its requirements in determining cleanup goals. The Action Memorandum and Decision Document have been revised to recognize TAGM 4046 as the basis in developing cleanup goals. The approach to developing the site-specific cleanup goals is described below in the Response to Comment 2.

Comment 2. Site-specific clean-up goals for SEAD-59 and SEAD-71 were developed based on the human health risk assessment using a target noncarcinogenic hazard index of 1 and a cancer risk of 1 E-04. EPA guidance (EPA, 1991a) requires a more conservative basis for the development of site-specific clean-up goals using a target noncarcinogenic hazard index of 1 and a target cancer risk of 1 E-06, even for commercial/industrial land uses. Site-specific cleanup goals should be re-calculated using a target cancer risk of 1 E-O6 in order to be adequately protective of human health.

Response: As stated in the Response above, cleanup goals have been revised based on TAGM 4046, which develops general soil cleanup goals based on contaminant concentrations that are protective of human health and groundwater quality.

The TAGM 4046 memorandum establishes the soil cleanup objectives for organics based on the lower of the following two values:

1. soil concentrations protective of human health considering a residential scenario; or
2. soil concentrations protective of groundwater/drinking water quality at the site.

The approach to developing cleanup goals at SEAD-59/71 is to revise those values listed in Tables 1, 2, and 3 of TAGM 4046 using site-specific information and the TAGM procedures outlined in Sections 2 and 3 of TAGM 4046. Two basic assumptions were made in modifying the recommended cleanup objectives in TAGM 4046. These assumptions are:

1. the future receptor at SEAD-59/71 is an industrial or construction worker, not a resident; and
2. groundwater use will be restricted at the site and the nearest potential user of the groundwater is several hundred feet from the site.

Using these assumptions and assuming a target cancer risk of 1E-06 and the target noncarcinogenic hazard index of 1, preliminary cleanup objectives for the removal action have been derived. The derived values and the calculations and assumptions are provided in Attachment A. The Army recognizes that these goals are based on the future industrial land use proposed for SEADs-59 and 71 and assumptions that groundwater use may be restricted at SEADs-59 and 71, if necessary. Land use controls may be necessary to ensure that these future conditions are met.

Comment 3. The selection of Chemicals of Potential Concern (COPCs) for the human health risk assessment was done solely on the basis of a comparison of average site concentrations to two times the average background concentration for inorganics. Organics were retained if they were detected. EPA guidance (EPA, 1989) recommends screening against risk-based levels to focus the risk assessment on the constituents most likely to cause unacceptable risks. Much unnecessary effort was expended determining the risks to such constituents as essential nutrients. It is recommended that this risk-based screening process be utilized in future risk assessments.

Response: Further reduction in the number of chemicals (beyond background comparison) is optional as recommended by USEPA (1989). EPA stated in its Risk Assessment Guidance (1989) that further reduction in the number of chemicals may be needed only in rare instances because the time required to implement the procedures stated in the Guidance (including examining historical information on the site, considering concentration and toxicity of the chemicals, examining the mobility, persistence, and bioaccumulation potential of the chemicals, considering special exposure routes, etc.) may exceed the time needed to simply carry all the chemicals of potential concern through the risk assessment. Carrying all chemicals of potential concern through the risk assessment was not a difficult task for this risk assessment; therefore, risk-based screening process was not conducted. Risk-based screening process, if applicable, will be used in future risk assessment.

Comment 4. The procedures for evaluating lead in the human health risk assessment were not performed correctly. It appears that average concentrations were "screened" against EPA's recommended residential screening value of 400 ppm. However, it is not appropriate to screen using average site concentrations. The maximum site concentrations of lead exceed the screening value. Therefore, a child's exposure to lead should be evaluated by using the average lead in soil concentrations in the IEUBK lead model (EPA, 1994).

In addition, Page 3-55 cites EPA Risk-Based Remediation Goals (RBRGs) for occupational exposure that are apparently presented in the EPA Adult Lead Model Guidance (EPA, 1996). However, these values could not be verified using that reference. If they were calculated, these calculations should be presented. Similarly, Page 3-55 indicates that a site-specific RBRG of 1250 ppm has been selected for the Seneca Army Depot. Please provide rationale and supporting documentation for selection of RBRG.

Response: As stated in the Decision Document, only two of the 34 samples at SEAD-71 exceed the 400 mg/kg screening level at sampling locations S-71-16 and S-71-19 with lead concentrations 3,470 mg/kg and 572 mg/kg, respectively. Rather than evaluate the risk at this site using the IEUBK model, the cleanup goal for lead (1250 mg/kg) proposed at an adjacent site (SEAD-16/17) will be proposed for SEAD-71 as well. The basis for this lead cleanup goal is described below in response to the second portion of your comment.

USEPA's 1996 document "Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil" describes a methodology for assessing risk associated with non-residential adult exposures to lead in soil. The EPA Risk-Based Remediation Goals (RBRGs) quoted in Section 3.5.3 (750 ppm and 1750 ppm) were calculated using the default exposure variables presented in this report. Based on the discussions held at a BRAC Cleanup Team (BCT) meeting as well as several correspondences between the Army and NYSDEC/USEPA, the Army proposed adopting the midpoint of this range (1250 ppm) as the industrial cleanup goal for the Seneca Army Depot. The same RBRG - 1250 ppm has been proposed for SEAD-16 and SEAD-17 and the feasibility study report for SEAD-16 and SEAD-17 (Parsons, July 2001) presented the correspondences between the Army and NYSDEC/USEPA. The "Adult Occupational Exposure" section under Section 3.5.3 has been revised to clarify the rationale and reference for the RBRGs.

Comment 5. The dermal pathway was not evaluated for most compounds in the human health risk assessment with the exception of Aroclor 1254. Various EPA Regions have published guidance on using default absorption factors in these risk calculations. For example, EPA Region IV recommends default absorption factors of 1.0% for organics and 0.1% for inorganics. Please provide an explanation for failure to evaluate this pathway.

Response: Various EPA regions have published guidance on dermal risk assessment. USEPA Region II recommends that only dermal exposure for cadmium, arsenic, PCBs, dioxins/furans and pentachorophenol be quantified since credible values are not available for other chemicals of concern. The draft Action Memorandum conducted the dermal risk assessment in accordance with the USEPA Region II recommendations. However, the understanding of dermal risk assessment has been approved in the past several years. The report has been updated according to the USEPA's dermal risk assessment interim guidance for Superfund (1999). USEPA (1999) recommends dermal absorption fraction from soil for cadmium, arsenic, chlordane, DDT, Lindane, PAHs, PCBs, dioxins/furans, 2,4-Dichlorophenoxyacetic acid, and pentachorophenol. The USEPA 1999 guidance also provides a default dermal absorption factor for semivolatile organic compounds of 10% as a screening method for the majority of SVOCs without dermal absorption factors. Therefore, the risks via dermal contact have been updated by using the EPA recommended dermal absorption values for the specific compounds and the semivolatile organic compounds. Since there are no default dermal absorption values presented for volatile organic compounds or inorganic classes of compounds, risks associated with these compounds were not quantified. The uncertainty related to the dermal exposure route has been addressed in the uncertainty assessment section (Section 3.5.4).

Please note that the risk assessment model presented in the Decision Document will no longer be used to derive cleanup goals. Please refer to Attachment A for the basis of revised TAGM cleanup goals.

Comment 6: No toxicological profiles for the human health were provided for the chemicals of concern selected. Toxicological profiles must be provided for any toxicity values not readily available via IRIS or HEAST.

Response: Agreed. The profiles for chemicals: 2-methylnaphthalene, endrin aldehyde, endrin ketone, and cobalt have been added to Appendix F. All toxicological profiles that can be found either via IRIS or HEAST are not included in the report.

Comment 7. The future industrial worker should be evaluated for risks associated with ingestion of surface soil. Pages 3-18 and 3-19 indicate that this exposure pathway will be evaluated. Please provide an evaluation of this exposure route for this receptor and present the results within the Decision Document.

Response: Agreed. The risks associated with ingestion of surface soil for the future industrial worker at both sites have been added to the report.

Please note that the risk assessment model presented in the Decision Document will no longer be used to derive cleanup goals. Please refer to Attachment A for the basis of revised TAGM cleanup goals.

Comment 8: There are no conclusions presented for the Ecological Risk Assessment (ERA) section of the Decision Document (Section 3.6). In addition, there is no mention of the results of the ERA in the Recommendations section of the Decision Document (Section 4.0). Hazard quotient values were calculated that present the highest potential and significant potential for expected ecological effects using maximum and minimum concentrations, respectively. As the Decision Document is currently written, it is unclear how these areas of contamination, which clearly pose a high potential for adverse ecological effects, will be addressed. If they will be addressed in the removal action, this fact should be specifically stated in both the ERA and the Recommendations sections.

Response: Agreed. A conclusion section has been added to Section 3.6. This section covers an additional evaluation of the potential environmental effects. The results of the SLERA and the additional evaluation suggests that no potential adverse ecological effects are expected at SEAD-59. However, there is a potential for adverse ecological effects at SEAD-71, mainly caused by PAHs and heavy metals.

Comment 9. The document describes the procedure that will be followed for the SEAD-59 and SEAD- 71 excavations, but omits discussion of how the excavations will be terminated. For example, will excavations terminate based on visual staining or discoloration of soil? Will the termination depth be based on lack of the debris that is anticipated? Will excavation depth be based on Pill readings, or on the professional judgment of the field geologist or technician? The justification for termination of excavation depth must be provided in the text.

Response: Agreed. Generally the excavation limits will be determined based on the visual extent of contamination. Excavation will continue until all debris and visually impacted soils have been removed. The process for determining the termination of excavation depths will be presented in the Removal Action Work Plan. This document will be submitted separately at a later date.

Comment 10: A significant omission in this report is collection of confirmation samples from the excavated areas in both SEAD-59 and SEAD-71. Collection of these samples is required because even if the excavated materials are determined to comply with the cleanup goals, the boundaries (i.e., sides and bottom) of the excavation may not, and "clean" soil would be backfilled into a "dirty" hole. Provide the number of confirmation samples that will be collected from each excavation, including QA/QC samples, and the analytes and methods that will be requested for the samples. Also include procedures for maintaining the excavated soil piles and excavated pits on site while awaiting analytical results of the confirmation samples.

Response: The collection of confirmatory samples for the excavation areas will be required as stated in the text. The specific number of confirmatory samples that will be collected and the requirements for maintenance of the soil piles will be presented in the Removal Action Work Plan to be submitted.

Comment 11. Review of Figures 3-2 and 4-1 of the July 1998 Phase I RI completed for SEAD-59 and SEAD-71 shows that the locations of completed test pits at these two sites do not correspond well with locations of the anomalies that were delineated by the geophysics, allowing for the possibility that areas of waste and debris at both SEADs have not been evaluated. In addition" in previous excavations, when debris, such as drums, was detected in some of the test pits, excavation was halted and no further excavation was completed. Therefore, a larger volume of debris may be encountered at deeper intervals during the removal action than is anticipated in this Action Memorandum. While this document is not meant to serve as a work plan, a contingency plan should be added in the case that additional debris, or debris that does not fit the description of materials excavated to date (i.e., drums labeled as hazardous waste), is excavated. The contingency plan should also provide procedures to be followed if drums, similar to those already encountered in test trenches, are encountered.

Response: Agreed. Text has been added to state that a confirmatory plan will be developed as part of the Removal Action Work Plan. The contingency plan will provide details on procedures for handling and disposing of additional debris is encountered.

Comment 12. It would serve well for the document to undergo a general editing process, including a spell check. Numerous words, such as "scenario" and "trespasser" are misspelled throughout the entire document, but also, other grammatical and typographical errors were found. This is a recurrent problem with most of the Army's documents for the Seneca Army Depot.

Response: Agreed. The document will be spell checked and edited before being re-issued.

SPECIFIC COMMENTS

Comment 13. Section 2.1, 3rd ¶, Page 2-1: This paragraph seems outdated. SEDA is not currently used for the purposes stated within this paragraph.

Response: Agreed. The text has been revised.

Comment 14. Section 2.5, Page 2-6: The text in this section indicates that the analytical results of soil gas samples have been included in Appendix A of this document. Appendix A is in fact the June 2001 Decision Document, which contains the soil and groundwater analytical results, but not the soil gas analytical results. Because the results of the soil gas samples are in large part driving the boundaries of removal area at SEAD-59, include this data in the Final Action Memorandum.

Response: Agreed. Soil gas data has been added to the Appendix.

Comment 15. Section 2.5.4.1, Soil Data, Page 2-9 and 2-10: The text that summarizes the impacts to soil at SEAD-59 mentions polynuclear aromatic hydrocarbons (PAHs) and BTEX detections, but omits the fact that 16 metals and six other VOCs were also detected at concentrations exceeding the criteria, and that aldehyde was detected, for which no TAGM value exists. Include the above information in this paragraph.

Response: Agreed. The text has been revised.

Comment 16. Section 2.5.4.1, Groundwater Data, Page 2-10: The first paragraph omits mention of aluminum as a chemical of concern at the site. This compound was originally identified at concentrations exceeding applicable criteria at SEAD-59 in the Draft Final Project Scoping Plan (Parsons, February 1997). In addition, specify that the "one SVOC" that was reported above TAGM values was phenol.

Response: Agreed. The text has been revised as requested.

Comment 17. Section 5.1.2, SEAD-59, Page 5-2: The text indicates that excavated soils will be placed in piles of 150 cubic yards (each) and sampled prior to either backfilling and regrading, disposal in a Subtitle D landfill, or treatment and subsequent disposal. There are several issues associated with this statement:

- The text indicates that disposal soil samples will be analyzed for metals, pesticides, and semivolatile organic compounds (SVOCs). However, volatile organic compounds (VOCs) should also be included in this sampling, because, as noted in multiple background documents, several VOCs, including BTEX compounds, have been detected in samples from this site.

- The number of confirmation samples that will be collected per 150 cubic yard pile should be specified. Similarly, one TCLP sample is required per 150 cubic yard (as indicated in the Decision Document), and this should be added to this section.

- The Decision Document indicates that approximately 11% of the SEAD-59 soils are expected to exceed cleanup goals. Indicate this in Section 5.1.2, as well as the *possibility* that some soils will also exceed the TCLP limits, and include text similar to that in the SEAD- 71 section that outlines treatment and disposal plan for these hazardous wastes.

Response: Agreed. The following changes have been made to the text:

- disposal soil samples will also be analyzed for VOCs;
- one confirmatory sample will be collected per 150 cubic yard pile;
- one TCLP sample will be collected at a frequency of one sample every 150 cubic yards;
- the volume of soil exceeding the revised cleanup goals will be added to Section 5.1.2; and
- a statement that there is a possibility that some soils from SEAD-59 will also exceed the TCLP limits has been added.

A confirmatory sampling plan will be provided in the Removal Action Work Plan to be submitted at a later date.

Comment 18. Section 5.1.2, SEAD-59, Page 5-3: There is no information concerning trenching and shoring or dewatering activities which may be required for the removal action that will be carried out at SEAD-71. This information should be provided.

Response: This information will be provided in the Removal Action Work Plan.

Comment 19. Section 5.1.2, SEAD-71, Page 5-3: In addition to the applicable items in Specific Comment #5, there is a discrepancy in the estimated excavation volume for this SEAD. Figure 5-2 estimates the total excavated volume as 871 cubic yards. However, the text on Page 5-2 indicates that the excavated volume of soil is much larger than that. Based on Parson's assessment that 3% of the excavated soils from SEAD-71 would equal 275 cubic yards, the total excavated volume would be 9166 cubic yards. Please correct this discrepancy either in the text or on Figure 5-2, or both.

Response: The volume of excavated soils that exceed the site-specific cleanup goals at SEAD-71 will be revised based on the new TAGM-derived cleanup goals and will be updated in the document.

Comment 20. Section 5.1.7, Page 5-4: Please provide specific information regarding this off site treatment option. What kind of treatment technology would be used, duration of treatment, long-term effectiveness and permanence, residual toxicity, etc.?

Response: This information will be provided in the Removal Action Work Plan.

Comment 21. Section 5.2, Page 5-9: Please note that TAGMs are "To Be Considered" guidelines.

Response: Agreed. The text has been revised.

Comment 22. Section 5.2.3, Page 5-15: The reference for the OSHA standard for occupational noise exposure should be changed to 29 CFR 1910.95. It is incorrectly listed as 29 CFR 1910.50.

Response: Agreed. The text has been revised.

Comment 23. Figure 5-1: Revise the line types used on this figure to better distinguish the " Area to be Remediated" from soil gas concentrations of 20 ppm or greater. These two lines appear the same on a black-and-white copy.

Response: Agreed. The figure has been revised.

Comment 24 Figure 5-2: The location of test pit TP71 -1 has been omitted from this figure. Please include this item, as well as the estimated excavation depths of excavation Areas A through E.

Response: Agreed. The figure has been revised.

Comment 25. Section 5.4, Page 5-17: Please note that a public notice for time-critical removal is required within 60 days of the action start date.

Response: Agreed. The text has been revised.

Comment 26. Decision Document, Section 3.0 Page 3-1: This section contains a reference to Figure 1-2. There is no Figure 1-2 found in either the Action Memorandum section or the Decision Document section of this document. Please verify that the appropriate reference is provided.

Response: The text has been revised.

Comment 27. Decision Document, Section 3.2, Page 3-3: The data usability criteria are referenced in this section. Additional discussion pertaining to data usability was described as having been included in other reports which pertain to the Seneca Army Depot Activity. This document should contain information pertaining to specifics of data validation and usability which apply to SEAD-59 and SEAD-71.

Response: Information pertaining to data validation and usability will be provided.

Comment 28 Decision Document, Section 3.3.5.1, Page 3-18: The document (USEPA, 1993A) referenced in this section could not be located in order to verify the exposure parameters used for RME and CT evaluations. Please confirm the exact title and date for this document.

Response: Agreed. The title of the referred document is "Superfund's Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure". The correct reference will be provided.

Comment 29. Decision Document, Section 3.5.3, Page 3-54: The reference to the final lead contamination rule is cited as "40 CFR 475". The correct citation is "40 CFR 745". Please correct this error throughout the text.

Response: Agreed. The text has been revised.

Comment 30. Decision Document, Table 3.4-1, Toxicity Values: The following specific comments refer to the toxicity values listed in Table 3.4-1:

- The oral cancer slope factor listed for benzene could not be verified.

- The inhalation RFD listed for methyl chloride is "NA." However, there *is* an inhalation RFC for methyl chloride listed in IRIS. Please verify that the most current information was referenced for generation of the toxicity value table.

- There is no oral RFD listed for trichloroethene, yet the reference indicates that one was provided by EPA. Please verify that the most current information has been utilized for generation of the toxicity value table.

- The oral RFD values listed for 2-methylnaphthalene and naphthalene could not be verified.

Response:

1) Agreed. The oral cancer slope factor for benzene is 5.50 E-2 according to IRIS.
2) Agreed. An inhalation RfD for methyl chloride of 2.60E-2 has been used to revise the risk calculation. It was derived from a RfC value of 9E-2 mg/m3 from IRIS.
3) Agreed. Currently there is no toxicity value for trichloroethene listed in IRIS or HEAST. An oral RfD of 6E-3 mg/kg-day and an inhalation cancer slope factor of 6E-3 (mg/kg-day)-1, adopted by the EPA Region III RBC table, were used to evaluate risks from TCE exposure. In addition, an oral slope factor of 1.1E-2, which has been withdrawn from IRIS, was used in the risk assessment.
4) Agreed. An oral RfD of 2.0E-2, which is used by the EPA Region III RBC Table, has been used to evaluate risks associated with 2-methylnaphthalene. The oral RfD for naphthalene from IRIS – 2.0E-2 has been used to evaluate the human health risk.

Table 3.4-1 and the report has been revised to reflect the above changes.

Comment 31. Decision Document, Table 3.3-1: Please confirm that references provided in the footnotes to this table are correct. The Exposure Factors Handbook Update should be consistently referenced as an EPA, 1997 document. References found under the Future Day Care Center Worker, Child Trespasser and Site Worker list the document as a 1996 publication.

Response: Agreed. The most current Exposure Factors Handbook is 1997. All dates have been updated accordingly.

Comment 32. Decision Document, Table 3.3-1: The ingestion rate for the Future Day Care Center Worker is referenced to the EPA Dermal Exposure Assessment document. Please verify the appropriate reference for this exposure parameter.

Response: Agreed. The appropriate reference is USEPA, 1993.

Comment 33. Decision Document, Table 3.3-2: The average PMIO concentration from measurements that were used in the calculations of risk from inhalation of airborne particulate could not be verified. The measured PM 10 concentration of 17 micrograms per cubic meter of air used in Appendices A and B could not be verified.

Response: The average of the arithmetic mean PM10 concentrations is 16.4 ug/m3. In order to be conservative, the maximum PM10 from Site#1, 16.9 was rounded and used in the risk assessment. The text has been revised to state the source of the PM10 value used in the risk assessment.

Comment 34. Decision Document, Table 3.5-3: The residential lifetime cancer risk from dermal contact to groundwater should be 2E-05. Please verify that the appropriate number of significant figures is utilized.

Response: This comment is not understood. The residential lifetime cancer risk from dermal contact to groundwater currently entered in the table is correct. The values in this table match the values in the Appendix. We believe that the appropriate number of significant figures is utilized.

It should be noted that we have updated our risk assessment of the dermal exposure route according to the USEPA's Dermal Risk Assessment Interim Guidance (1999), which represents the current knowledge of the dermal risk assessment.

Comment 35. Decision Document, Table 3.5-4: The residential lifetime cancer risk under the CTC scenario should be 3E-04 for the ingestion of soil pathway. Please verify that the correct figures are utilized.

Response: This comment is not understood. The residential lifetime cancer risk from dermal contact to groundwater currently entered in the table is correct. The values in this table match the values in the Appendix. We believe that the appropriate number of significant figures is utilized.

Comment 36. Decision Document, Section 3.6.1, Page 3-60: This section presents the objectives and an overview of the ERA. The last sentence of this section discusses how HQ values between 1 and 10 are interpreted as having some potential for adverse effects, HQ values between 10 and 100 indicate a significant potential for adverse effects and HQ values greater than 100 indicate adverse effects can be expected. It should be stated in this section whether this is a general rule that was determined by the cleanup team, or whether this information was obtained from the literature.

Response: The section has been revised to reflect that chemicals with HQ>1 will be considered further for their potential ecological effects.

Comment 37. Decision Document, Section 3.6.2.1, Page 3-60: This section discusses the identification of ecological COPCs. The second sentence of this section states that screening analyses designed to reduce the list of COPCs were not performed for this ERA. It is unclear why a screening-level analysis was not performed. A screening-level ecological risk assessment can greatly reduce the list of COPCs that needs to be evaluated in a baseline risk assessment saving significant amounts of time and resources. Justification should be provided regarding why a screening-level analysis was not performed.

Response: The ecological risk assessment presented in this report is a screening-level ecological risk assessment (including Steps 1 and 2 as discussed in USEPA's Ecological Risk Assessment Guidance for Superfund, 1997) with an additional step of refining contaminants of potential concern (as part of Step 3). The sentence was meant to suggest that screening of COPCs against screening criteria (e.g., ARARs) was not conducted. This sentence has been deleted from the section. The ecological risk assessment section (Section 3.6) has been revised to reflect that the screening-level ecological risk assessment with an additional step of refining contaminants of potential concern was included in the report.

Comment 38. Decision Document, Section 3.6.2.4, Page 3-64: This section discusses ecological assessment endpoints. It is stated in the third full sentence on Page 3-64 that mechanisms of toxicity are evaluated conceptually in the analysis plan in Section 3.6.2.3.2. However, Section 3.6.2.3 .2 actually discusses fate and transport, not mechanisms of toxicity. This discrepancy should be addressed.

Response: Agreed. The text has been revised.

Comment 39. Decision Document, Section 3.6.2.6, Page 3-71: This section discusses the analysis plan for the ERA. It is stated in this section that the analysis plan includes measures of effect, measures of exposure, and measures of ecosystem and receptor characteristics. A citation should be provided for this information since this is not the approach taken in the *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA, 1997b).

Response: This section has been deleted from the report since the analysis plan for the ERA is not required for the screening-level ecological risk assessment (SLERA).

Comment 40. Decision Document, Section 3.6.4.1, Page 3-94: The table presented on page 3-94 provides all of the NOAEL HQ values greater than one for constituents in shallow soil at SEAD-59. It is unclear why pyrene is included in this table since none of the HQ values calculated for pyrene are greater than one. Data for pyrene should be removed from this table.

Response: Agreed. Pyrene has been removed from the table. It should be noted that this table has been named as Table 3.6-7.

Comment 41. Decision Document, Tables 3.6-6a and 3.6-6B and tables on Pages 3-94 and 3-97: All of these tables require legends, because the dashes or the bolded numbers signify are undefined. Please revise to include a legend.

Response: Agreed. Legends have been added to Tables 3.6-6a and 3.6-6B and the tables in Sections 3.6.4.1 and 3.6.4.2 to define the dashes and the bolds. It should be noted that the tables in Sections 3.6.4.1 and 3.6.4.2 have been numbered as Table 3.6-7 and Table 3.6-8, respectively.

Comment 42. Decision Document, Appendix E, Page E-2: This page is missing from the document.

Response: The page has been added.

Comment 43. Decision Document, Addendix E, Page E-3: The text indicates that some soil from SEAD-59 is expected to have Aroclor-1254 concentrations exceeding cleanup goals. The basis for this statement is not clear, because Aroclor-1254 was not detected in soil samples at concentrations exceeding the criteria. Please evaluate and modify, if required.

Response: Agreed. Aroclor-1254 has been removed from the text.

Comment 44. Decision Document, Operation and Maintenance, Page E-3: While the selection of the removal action for remediation of SEADs 59 and 71 should not entail major O&M costs, minor costs such as the maintenance of the vegetative cover at each SEAD should be included in this Cost Estimate.

Response: Agreed. O&M costs have been added for maintenance of the vegetative cover as necessary.

ATTACHMENT A – DEVELOPMENT OF CLEANUP GOALS FOR ORGANICS USING TAGM 4046

In order to calculate acceptable cleanup goals (CUGs) for organics for SEADs-59 and –71 (hereafter referred to as the "site"), the Army followed an approach adopted by the New York State Department of Environmental Conservation (NYSDEC). The "Technical and Administrative Guidance Memorandum #4046" (hereafter referred to as the "TAGM 4046") was published in 1994 by the NYSDEC to provide a basis and procedure to determine soil cleanup levels. The TAGM approach for organics is mainly based on: (1) human health based levels that correspond to a target non-cancer hazard quotient or excess lifetime cancer risk under the residential scenario; (2) environmental concentrations that are protective of groundwater/drinking water quality. Using the procedures presented in TAGM 4046, the NYSDEC proposed the recommended soil cleanup objectives listed in Tables 1, 2, 3 and 4 of TAGM 4046. This attachment presents the derived CUGs for the site using the site-specific conditions according to TAGM 4046 procedures. The major site-specific factors considered include:

(1) The future use receptor. The site is proposed for industrial use while the TAGM values are based on human health levels protective of a residential child receptor; therefore, the CUGs were modified to be protective of receptors under the industrial use scenario.
(2) Distance to the nearest potential groundwater user. Groundwater dispersion in the aquifer from the site boundary to the closest potential groundwater user has been considered while only dispersion within the site itself is incorporated into the recommended soil cleanup objective provided in Appendix A of TAGM 4046.

Site-specific CUGs were calculated using the following steps:

1) Identification of constituents of concern (COCs) based on exceedances of the TAGM,
2) Calculation of human health risk-based CUGs using site-specific receptors and exposure assessment, and
3) Estimation of soil CUGs to protect groundwater quality from the site at the Seneca perimeter.

The proposed CUGs for the Site are the lower value of either the human health risk-based CUGs or the CUGs aimed to protect the groundwater quality at the Seneca site border.

1.0 CONSTITUENTS OF CONCERN

COCs were determined based on the magnitude and frequency of the exceedances of the recommended cleanup objectives shown in Appendix A of TAGM 4046 (referred to as TAGMs). A summary table of the chemicals detected in site soils in exceedance of the TAGM is presented (**Table 1**). A total of 22 organic compounds have been detected exceeding the TAGM values for SEAD-59 and SEAD-71. Of all the chemicals with TAGM exceedances, 2-methylnaphthalene, benzo(g,h,i)perylene, dibenzofuran, fluorene, ethyl benzene, heptachlor epoxide and endrin are colocated with other COCs. On this basis, these chemicals were not selected as COCs. As a result, three VOCs (benzene, toluene, and total xylenes), and 12 PAHs were identified as COCs and were included in the following CUG calculation.

2.0 HUMAN HEALTH RISK-BASED CUGS

Risk-based CUGs represent chemical concentration thresholds at a defined level of risk. A risk-based CUG is calculated based on exposure to contaminated environmental media such as soil or groundwater, and the value of the CUG depends on the amount of chemical exposure. Activities that involve frequent chemical exposure give rise to lower (more stringent) CUGs; activities that involve infrequent chemical exposure will yield higher (less stringent) CUGs at an equivalent "acceptable" risk threshold. Because a CUG depends on the frequency of exposure, CUGs are developed based on a type of activity expected to occur at a site. As such, the CUGs have been derived as a function of the expected land use and exposure frequency for a site.

This section discusses the approach used to calculate the risk-based concentrations to be protective of all future potential receptors. This approach is in accordance with the NYSDEC TAGM 4046 approach (outlined in Section 2 of TAGM 4046) and the U.S. EPA risk assessment guidelines (U.S. EPA, 1991).

2.1 METHODOLOGY

The risk-based CUG values are derived essentially by reversing the risk calculations performed in a risk assessment. For example, if the risk equation is written as:

$$\text{Cancer Risk} = \text{Concentration (C)} \times \text{Chemical Toxicity Factor (CSF)} \times \text{Intake Factors (IF)}$$

then the CUG is estimated by choosing a target risk level, and solving the above equation for the concentration that yields this risk.

The CUG concentration for each risk driving chemical of concern was calculated according to the following general approach:

$$\textit{Cleanup Goal (CUG)} = \frac{\textit{Acceptable Risk}}{\textit{Chemical Toxicity Factor} \times \textit{Intake Factor}} \quad (1)$$

In addition to the CUGs corresponding to the target cancer risk endpoints, CUGs for non-cancer endpoints were calculated. The lowest of the non-cancer and cancer based CUGs were used as the limiting health-based CUGs. The TAGM approach considers only ingestion of chemicals in soils in assessing risk-based concentrations. Specific on-site receptors used to estimate CUGs included the construction worker, industrial worker, and trespasser child (6-11 yr). Three residential receptors (an adult, a child ages 1-6 years, and a child and adult) were included for comparison purposes only, since the future site use is proposed to be industrial. A child and adult receptor was used to quantify chronic exposure for an exposure duration of 30 years based on a combination of exposure for a residential receptor, ages 1-6 years and 7-31 years.

The specific equations used to calculate the CUGs for cancer and non-cancer endpoints are summarized below.

CUG for Cancer Endpoints

$$CUG_{cancer}\left(\frac{mg}{kg}\right) = \frac{TCR}{SF_{oral}\left(\frac{mg}{kg \cdot day}\right)^{-1} \times IF_{oral}\left(\frac{1}{day}\right)} \qquad (2)$$

where:

TCR = target cancer risk (10^{-6})

SF_{oral} = oral cancer slope factor $(mg/kg\text{-}day)^{-1}$

IF_{oral} = oral intake factor (1/day)

$$IF_{oral}\left(\frac{1}{day}\right) = \frac{IR_{soil}\left(\frac{mg}{day}\right) \times FS \times EF\left(\frac{days}{yr}\right) \times ED(yr) \times 10^{-6}\ \frac{kg}{mg}}{BW(kg) \times AT(days)} \qquad (3)$$

where:

IR_{soil} = the soil ingestion rate (mg/day),

FS = the fraction of contaminated soil from the site (unitless),

EF = the exposure frequency (days/year),

ED = the exposure duration (years),

BW = the body weight (kg), and

AT = the averaging time (days).

For the residential child and adult receptor:

$$IF_{oral}\left(\frac{1}{day}\right)=\frac{IF_{soil\ adj}\left(\frac{mg\cdot yr}{kg\cdot day}\right)\times FS\times EF\left(\frac{days}{yr}\right)\times 10^{-6}\frac{kg}{mg}}{AT(days)} \quad (4)$$

where:

$IF_{soil/adj}$ = the age-adjusted soil ingestion factor (mg-yr/kg-day)

CUG for Noncancer Endpoints:

$$CUG_{nocancer}\left(\frac{mg}{kg}\right)=\frac{THQ\times RfD\left(\frac{mg}{kg\cdot day}\right)}{IF_{oral}\left(\frac{1}{day}\right)} \quad (5)$$

where:

THQ = target hazard quotient (1)

RfD = oral reference dose (mg/kg-day)

IF_{oral} = oral intake factor (1/day)

2.2 EXPOSURE AND TOXICITY FACTORS

The exposure factors used to calculate site-specific preliminary cleanup goals using the TAGM 4046 approach are based on the USEPA's Exposure Factors Handbook (1997), USEPA Region III RBC Table Technical Background Information, and professional judgment based on the site conditions. **Table 2** presents the exposure factors for the selected receptors.

The toxicity factors including the oral cancer slope factor and oral chronic reference dose were obtained from the USEPA's Integrated Risk Information System (IRIS) database, USEPA's Health Effects Assessment Summary Tables (HEAST), and USEPA Region III RBC Table. **Table 3** presents the toxicity factors for the COCs.

The NYSDEC TAGM 4046 adopted a target excess lifetime cancer risk of one in a million for Class A and B carcinogens and one in 100,000 for Class C carcinogens. In order to be conservative (i.e., protective of human health), a target excess lifetime cancer risk of one in a million and a target non-cancer hazard quotient of 1 were used to develop the human health risk based CUGs.

2.3 RESULTS AND DISCUSSIONS

Table 4 summarizes receptor-specific human health risk-based CUGs corresponding to the target cancer risk of 10^{-6}. The CUGs based on the exposure scenario for the industrial worker receptor are the most stringent CUGs for all the potential receptors under the industrial scenario.

Table 5 presents receptor-specific human health risk-based soil concentrations corresponding to the target hazard quotient of 1. The CUGs based on the exposure scenario for the construction worker receptor are the most stringent CUGs for all the potential receptors under the industrial scenario.

The most stringent CUGs for all the potential receptors under the industrial scenario were compared to the maximum soil cleanup objectives for SVOCs and VOCs defined by TAGM 4046, and the lower values were used as the final human health risk-based CUGs. For example, for benzene both cancer risk-based and noncancer risk-based CUGs were greater than the maximum soil cleanup objective for total VOCs of 10 mg/kg. Therefore, 10 mg/kg was adopted as the human health-based CUG. **Table 6a** and **Table 6b** present the final human health risk-based CUGs for SEAD-59 and SEAD-71, respectively.

The human health risk-based CUGs were calculated according to the TAGM approach and the USEPA Risk Assessment Guidelines. Conservative assumptions were made throughout the calculation to be protective of the potential receptors. For example, a trespasser child, ages 6-11 years was included as a potential receptor. However, it is highly unlikely that a child would trespass at a site designed for industrial use.

3.0 GROUNDWATER PROTECTION-BASED CUGS

Approach

Groundwater quality protection will be evaluated based on both actual groundwater monitoring data, and theoretical calculations that show that groundwater quality standards will not be exceeded at potential receptor areas. The location of potential receptors includes site areas where groundwater may be used for drinking water or at the site property lines. Groundwater use at SEAD-59 and 71 was not considered appropriate as a point of use for the following reasons:

(1) Groundwater in the unconfined groundwater zone is not a practical source for potable water for several reasons. First, the till/weathered shale aquifer has a low hydraulic conductivity and the yield would be low. Secondly, the saturated thickness in the till/weathered shale aquifer is extremely variable seasonally. Clearly, this variability and the ability of the

till/weathered shale aquifer to deliver a consistent source of water is not reliable or practical for domestic potable water use.

(2) Land use controls will be developed during the ROD process if it is found that concentrations of contaminants in the groundwater are unacceptable after the removal actions are completed.

The NYSDEC TAGM 4046 uses the water-soil equilibrium partition theory to develop soil cleanup goals that will be protective of groundwater quality at the source area. The soil cleanup objectives are calculated based on the following equation presented in Section 3 of TAGM 4046:

$$C_s = f \times K_{OC} \times C_w \times CF \qquad (6)$$

Where:

Cs	=	allowable soil concentration (µg/kg)
f	=	fraction of organic carbon of the natural soil medium (unitless)
Koc	=	partition coefficient (unitless)
Cw	=	applicable water quality criteria (ppb)
CF	=	correction factor = 100 (unitless)

The applicable water quality standard (Cw) is the New York State Water Quality Standard for Class GA groundwaters.

The Army understands the NYS Department of Environmental Conservation has as one of its mandates the protection of groundwater quality throughout the State. However, it is the Army's understanding that the State does take into account practicability and has agreed that, in general, groundwater remediation techniques cannot be effectively implemented to cleanup-impacted groundwater. Accordingly, the Army has used a simple dispersion analysis to develop cleanup goals for soil that will be protective of groundwater quality at the location of a potential receptor. The dispersion analysis substitutes the applicable water quality criteria with a theoretical water concentration at the source area that will disperse to concentrations below the Class GA standards at the nearest receptor. The theoretical water concentration is input into the water-soil partition equation, Equation 6, to develop a site-specific soil cleanup objective. It should be noted that institutional controls (particularly land use controls) would be implemented as part of the final remedy to ensure that the groundwater is not used where actual groundwater monitoring results show that concentrations exceed Class GA standards.

Dispersion Analysis

A revised soil cleanup goal for each of the site parameters was established by considering all of the water flowing between SEAD-59 or SEAD-71 and the closest potential receptor, assumed to be at the boundary of the area designated for housing. The position of SEAD 59 and 71 relative to the housing area boundaries is shown on **Figure 1**. Although the Housing area is upgradient of SEAD-59 and SEAD-71, this boundary was selected as a conservative measure in assessing the dispersion of groundwater contaminants, since it is physically the closest location where residential receptors are present.

The water included in this analysis consists of groundwater flowing through the aquifer from an upgradient source and water from precipitation that has infiltrated into the aquifer, as shown in **Figure 2**. This model is described by the mass balance and the continuity equations, (Equations 7 and 8), respectively. The mass balance equation, Equation 7, confines the mass of COCs entering the area between the operable unit and the receptor (including rainwater and contaminated groundwater) to be equal to the mass of COCs reaching the receptor.

$$C_{out}Q_{out} = C_{in}Q_{in} + C_pQ_p \qquad (7)$$

$$Q_{out} = Q_{in} + Q_p \qquad (8)$$

Where:

C_{out} = concentration of chemical in groundwater at the location of the receptor (ppb),

C_{in} = concentration of chemical in groundwater at SEAD-59/71 (ppb),

C_p = concentration of chemical in water from precipitation (ppb),

Q_{out} = flowrate of groundwater at the location of the receptor (CF/yr),

Q_{in} = flowrate of groundwater at SEAD-59/71 (CF/yr),

Q_p = flowrate of water from precipitation into the aquifer (CF/yr).

Substituting the continuity equation, Equation 8, into the mass balance and rearranging, the expression for the allowable concentration in the groundwater at SEAD-59/71 becomes:

$$C_{in} = \frac{C_{out}\left(Q_{in} + Q_p\right)}{Q_{in}} \qquad (9)$$

To solve this equation, the C_w value from TOGS 1.1.1 (Division of Water Technical and Operational Guidance Series) is used for C_{out}. The flow rates are determined from site-specific information. Equation 10 defines the groundwater flow rate through the aquifer.

$$Q_{in} = A_{in} \times q \qquad (10)$$

Where:

A_{in} = cross sectional area of the aquifer (SF), (width of SEAD-59/71) x (depth of water),

q = Darcy velocity (ft/yr) = k_h x i, where k_h (ft/day) is hydraulic conductivity and i (ft/ft) is the hydraulic gradient . The hydraulic conductivity and the hydraulic gradient are known quantities that have been measured at the Ash Landfill at SEDA.

Equation 11 expresses the flow rate of infiltration that enters the aquifer.

$$Q_p = A_p \times I \qquad (11)$$

Where:

A_p = infiltration area (SF), (width of SEAD-59/71) x (distance between SEAD-59/71 and the receptor)

I = infiltration rate (inches/yr), which is a measured value from SEDA and referenced in the SEAD-12 RI, Appendix E, November 2001.

Once Equation 9 is solved, C_{in} is considered to be C_w. In order to convert this groundwater concentration to the allowable concentration of the chemical in the soil, the C_w value is plugged into Equation 6. To establish a CUG value, the TAGM applies a correction factor, CF, of 100 to the concentration C_s. The correction factor accounts for mechanisms that may occur during transport that prevent soil contaminants from impacting the immediate site groundwater.

The revised soil cleanup objectives to be protective of groundwater are presented in **Tables 7a** and **7b** for SEAD-59 and SEAD-71, respectively. The revised CUGs are based on conservative estimates. The distance used for the derivation of the new CUGs was the shortest distance from SEAD 59/71 to a potential receptor, the area designated for housing, which is upgradient of the site. In reality, the flow moves downgradient, which places the receptor at a much greater distance from SEAD-59/71. Similar calculations were performed using the distance between SEAD-59/71 and the western border of SEDA (downgradient direction), as well as the distance between SEAD-59/71 and the eastern border of SEDA (upgradient direction), which lies beyond the housing area. The cleanup goals that were derived using the distance to the downgradient receptor, the more realistic model, exceed the proposed new cleanup goals (based on the distance to the housing area) by a factor of 10. This analysis also does not consider other factors that would reduce concentrations in the aquifer such as retardation, biodegradation and adsorption in the dispersion area, among others.

It should be noted that site the groundwater will be evaluated in the future by monitoring groundwater quality to show that exceedances of Class GA groundwater standards for the COCs, if shown to exist at all, are limited to very short distances from the source areas, if at all. Additionally, groundwater quality will improve after source removal.

4.0 PROPOSED CUGS

The proposed CUGs for the Site are presented in **Tables 6a** and **6b** for SEAD-59 and SEAD-71, respectively. As shown on **Tables 6a** and **6b**, the proposed soil cleanup goal for PAHs is in compliance with the TAGM 4046 requirement of total SVOCs not exceeding 500 mg/kg. Additionally, please note that the sum of the cleanup goals for carcinogenic PAHs is approximately 10 mg/kg. As for VOCs, total VOCs shall not exceed 10 mg/kg (as specified in TAGM 4046) in addition to meeting the CUG for the individual chemicals.

Overall, the proposed CUGs were calculated following the NYSDEC TAGM approach for the potential site receptors under the industrial scenario. In addition, groundwater dispersion in the aquifer from the site boundary to the closest potential residential well has been considered to calculate the CUGs aimed to protect groundwater. The human health based CUGs were also in compliance with the EPA Guidelines (1991).

REFERENCES

Hubbard, J.; Smith, R.L. 1999. EPA Region III Risk-based Concentration Table: Technical Background Information. On-line document. http://www.epa.gov/reg3hwmd/risk/tech99.pdf.

New York State Department of Environmental Conservation. 1994. Technical and Administrative Guidance Memorandum #4046.

Parsons, 1996. Final Groundwater Modeling Report at the Ash Landfill Site. June 1996.

Parsons, 2001. Draft Action Memorandum for Removal Actions at SWMU SEAD-59 and SEAD-71. June 2001.

Parsons, 2001. Final Remedial Investigation Report for SEAD-12, Appendix E. November 2001.

U.S. Environmental Protection Agency (USEPA). 1991. Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual – Part B, Development of Risk-based Preliminary Remediation Goals. Office of Emergency and Remedial Response, Washington, DC. December 1991.

U.S. Environmental Protection Agency (USEPA). 1996. Soil Screening Guidance: Technical Background Document. Office of Solid Waste and Emergency Response, Washington, DC. May 1996.

U.S. Environmental Protection Agency (U.S. EPA). 1997a. Exposure factors handbook. Volumes I-III: Activity Factors. EPA/600/P-95/002Fc. Office of Research and Development. Washington, DC.

U.S. Environmental Protection Agency (USEPA). 1997b. Health Effects Assessment Summary Tables. FY-1995 Annual. EPA/540/R-95/036. Office of Solid Waste and Emergency Response. Washington, D.C. May. PB95-921199.

U.S. Environmental Protection Agency (U.S. EPA). 2001. Integrated Risk Information System (IRIS) Online database. Office of Health and Environmental Assessment, Cincinnati, OH.

U.S. Environmental Protection Agency (USEPA) Region III. 2001. EPA Region III RBC Table. On-line database. http://www.epa.gov/reg3hwmd/risk/riskmenu.htm.

TABLE 1
Summary of Organic Compounds with TAGM Exceedances at SEAD-59 and SEAD-71
Seneca Army Depot Activity

COMPOUND	UNIT	NUMBER OF ANALYSES	NUMBER OF DETECTIONS	MAXIMUM VALUE	NUMBER ABOVE TAGM	TAGM 4046
SEAD-59						
VOLATILE ORGANICS						
Benzene	UG/KG	56	3	5,900	2	60
Ethyl benzene	UG/KG	56	4	260,000	1	5,500
Toluene	UG/KG	56	9	830,000	1	1,500
Total Xylenes	UG/KG	56	6	1,000,000	1	1,200
SEMIVOLATILE ORGANICS						
2-Methylnaphthalene	UG/KG	56	37	67,000	2	36,400
Benzo[a]anthracene	UG/KG	56	44	67,000	31	224
Benzo[a]pyrene	UG/KG	56	43	70,000	33	61
Benzo[b]fluoranthene	UG/KG	56	46	58,000	13	1,100
Benzo[k]fluoranthene	UG/KG	56	41	48,000	12	1,100
Chrysene	UG/KG	56	45	63,000	26	400
Dibenz[a,h]anthracene	UG/KG	56	34	17,000	29	14
Dibenzofuran	UG/KG	56	34	18,000	1	6,200
Fluoranthene	UG/KG	56	46	160,000	1	50,000
Indeno[1,2,3-cd]pyrene	UG/KG	56	42	34,000	4	3,200
Naphthalene	UG/KG	56	35	29,000	2	13,000
Phenanthrene	UG/KG	56	46	140,000	2	50,000
Pyrene	UG/KG	56	47	120,000	1	50,000
SEAD-71						
SEMIVOLATILE ORGANICS						
Anthracene	UG/KG	34	27	100,000	3	50,000
Benzo[a]anthracene	UG/KG	34	32	150,000	25	224
Benzo[a]pyrene	UG/KG	34	31	120,000	29	61
Benzo[b]fluoranthene	UG/KG	34	31	88,000	16	1,100
Benzo[ghi]perylene	UG/KG	34	30	62,000	1	50,000
Benzo[k]fluoranthene	UG/KG	34	24	130,000	13	1,100
Chrysene	UG/KG	34	32	150,000	23	400
Dibenz[a,h]anthracene	UG/KG	34	28	25,000	27	14
Dibenzofuran	UG/KG	34	22	38,000	5	6,200
Fluoranthene	UG/KG	34	33	440,000	7	50,000
Fluorene	UG/KG	34	25	62,000	1	50,000
Indeno[1,2,3-cd]pyrene	UG/KG	34	30	65,000	9	3,200
Naphthalene	UG/KG	34	15	46,000	2	13,000
Phenanthrene	UG/KG	34	32	290,000	6	50,000
Pyrene	UG/KG	34	33	280,000	7	50,000
PESTICIDES						
Endrin	UG/KG	34	11	120	1	100
Heptachlor epoxide	UG/KG	34	14	180	4	20

Table 2
Summary of Exposure Parameters
SEADs-59 and 71
Seneca Army Depot Activity

Exposure Pathway/Exposure Factor	Value	Reference/Comment
Industrial Worker		
Surface Soil Ingestion Rate (mg/day)	50	Central estimate of adult soil ingestion. USEPA, August 1997. Exposure Factors Handbook - Volume I. Table 4-23.
Fraction Surface Soil from Contaminated Source	1	Assumption
Surface Soil Ingestion Exposure Frequency (days/yr)	250	Exposure frequency for occupational scenario, EPA Risk Assessment Guidance for Superfund, Vol I, Part B, 1991; EPA Region III Risk-Based Concentration Table: Technical Background Information, 1999.
Surface Soil Ingestion Exposure Duration(yr)	25	Exposure duration for occupational scenario, EPA Risk Assessment Guidance for Superfund, Vol I, Part B, 1991; EPA Region III Risk-Based Concentration Table: Technical Background Information, 1999.
Conversion Factor (kg/mg)	0.000001	
Body Weight (kg)	71.8	USEPA. August 1997. Exposure Factors Handbook-Volume I. Table 7-11.
Averaging Time - Cancer (days)	27995.5	USEPA. August 1997. Exposure Factors Handbook - Volume I. Table 8-1. Lifespan = 76.7 years.
Averaging Time - Noncancer (days)	9125	25 year occupational exposure duration * 365 days/year.
Construction Worker		
Surface Soil Ingestion Rate (mg/day)	200	Assumption based on 20mg/hr ingestion rate (EPA 1997 Exposure Factors Handbook, Table 4-15) and 10 hr/day exposure duration.
Fraction Surface Soil from Contaminated Source	1	Assumption
Surface Soil Ingestion Exposure Frequency (days/yr)	250	Exposure frequency for occupational scenario, EPA Region III Risk-Based Concentration Table: Technical Background Information, 1999
Surface Soil Ingestion Exposure Duration(yr)	1	Assumes 1-yr construction project.
Conversion Factor (kg/mg)	0.000001	
Body Weight (kg)	71.8	USEPA. August 1997. Exposure Factors Handbook-Volume I. Table 7-11.
Averaging Time - Cancer (days)	27995.5	USEPA. August 1997. Exposure Factors Handbook - Volume I. Table 8-1. Lifespan = 76.7 years.
Averaging Time - Noncancer (days)	365	1 year exposure duration * 365 days/year.

Table 2
Summary of Exposure Parameters
SEADs-59 and 71
Seneca Army Depot Activity

Exposure Pathway/Exposure Factor	Value	Reference/Comment
Trespasser Child (6-11 yr.)		
Surface Soil Ingestion Rate (mg/day)	200	Recommended conservative estimate of the mean soil ingestion rates, USEPA,1997: Table 4-23; EPA Region III Risk-Based Concentration Table: Technical Background Information, 1999
Fraction Surface Soil from Contaminated Source	1	Assumption
Surface Soil Ingestion Exposure Frequency (days/yr)	52	Assumes 6 month exposure, 2 days per week
Surface Soil Ingestion Exposure Duration(yr)	6	Exposure duration for residential child (6-11yr), Assumption.
Conversion Factor (kg/mg)	0.000001	
Body Weight (kg)	30.8	Mean body weight for male and female children (6 to 11 yr), USEPA, 1997: Table 7-3
Averaging Time - Cancer (days)	27995.5	USEPA. August 1997. Exposure Factors Handbook - Volume I. Table 8-1. Lifespan = 76.7 years.
Averaging Time - Noncancer (days)	2190	6 year exposure duration * 365 days/year.
Resident (Adult)		
Surface Soil Ingestion Rate (mg/day)	100	Adult soil ingestion rate, EPA Region III Risk-Based Concentration Table: Technical Background Information, 1999
Fraction Surface Soil from Contaminated Source	1	Assumption
Surface Soil Ingestion Exposure Frequency (days/yr)	350	Exposure frequency for residential scenario, EPA Risk Assessment Guidance for Superfund, Vol I, Part B, 1991; EPA Region III Risk-Based Concentration Table: Technical Background Information, 1999
Surface Soil Ingestion Exposure Duration(yr)	24	95th percentile at same residence, USEPA, 1997: Table 15-176
Conversion Factor (kg/mg)	0.000001	
Body Weight (kg)	71.8	USEPA. August 1997. Exposure Factors Handbook-Volume I. Table 7-11.
Averaging Time - Cancer (days)	27995.5	USEPA. August 1997. Exposure Factors Handbook - Volume I. Table 8-1. Lifespan = 76.7 years.
Averaging Time - Noncancer (days)	8760	24 year occupational exposure duration * 365 days/year.

Table 2
Summary of Exposure Parameters
SEADs-59 and 71
Seneca Army Depot Activity

Exposure Pathway/Exposure Factor	Value	Reference/Comment
Resident (Child)		
Surface Soil Ingestion Rate (mg/day)	200	Recommended conservative estimate of the mean soil ingestion rates, USEPA,1997: Table 4-23; EPA Region III Risk-Based Concentration Table: Technical Background Information, 1999
Fraction Surface Soil from Contaminated Source	1	Assumption
Surface Soil Ingestion Exposure Frequency (days/yr)	350	Exposure frequency for residential scenario, EPA Risk Assessment Guidance for Superfund, Vol I, Part B, 1991; EPA Region III Risk-Based Concentration Table: Technical Background Information, 1999
Surface Soil Ingestion Exposure Duration(yr)	6	Exposure duration for residential child (1-6yr), EPA Region III Risk-Based Concentration Table: Technical Background Information, 1999
Conversion Factor (kg/mg)	0.000001	
Body Weight (kg)	15	50th Percentile body weight for male and female children (0 to 6 yr), USEPA, 1997: Tables 7-1, 7-6, 7-7
Averaging Time - Cancer (days)	27995.5	USEPA. August 1997. Exposure Factors Handbook - Volume I. Table 8-1. Lifespan = 76.7 years.
Averaging Time - Noncancer (days)	2190	6 year exposure duration * 365 days/year.
Resident (Child & Adult)		
Age-Adjusted Surface Soil Ingestion Rate (mg-yr/kg-day)	114	EPA Risk Assessment Guidance for Superfund, Vol. I, Part B, 1991, Appendix B, P.52
Fraction Surface Soil from Contaminated Source	1	Assumption
Surface Soil Ingestion Exposure Frequency (days/yr)	350	Exposure frequency for residential scenario, EPA Risk Assessment Guidance for Superfund, Vol. I, Part B, 1991, Appendix B, P.52; EPA Region III Risk-Based Concentration Table: Technical Background
Conversion Factor (kg/mg)	0.000001	
Averaging Time - Cancer (days)	27995.5	USEPA. August 1997. Exposure Factors Handbook - Volume I. Table 8-1. Lifespan = 76.7 years.
Averaging Time - Noncancer (days)	10950	30 year exposure duration * 365 days/year.

TABLE 3
TOXICITY VALUES
SEADs-59 and 71
Seneca Army Depot Activity

Analyte	Oral RfD (mg/kg-day)		Carc. Slope Oral (mg/kg-day)-1		Rank Wt. of Evidence
Volatile Organics					
Benzene	3.00E-003	i	5.5E-002	a	A
Toluene	2.00E-001	a	NA		D
Total Xylenes	2.00E+000	a	NA		D
Semivolatiles					
Anthracene	3.00E-001	a	NA		D
Benzo(a)anthracene	NA		7.30E-001	i	B2
Benzo(a)pyrene	NA		7.30E+000	a	B2
Benzo(b)fluoranthene	NA		7.30E-001	i	B2
Benzo(k)fluoranthene	NA		7.30E-002	i	B2
Chrysene	NA		7.30E-003	i	B2
Dibenz(a.h)anthracene	NA		7.30E+000	i	B2
Fluoranthene	4.00E-002	a	NA		D
Indeno(1,2,3-cd)pyrene	NA		7.30E-001	i	B2
Naphthalene	2.00E-002	a	NA		C
Phenanthrene	NA		NA		D
Pyrene	3.00E-002	a	NA		NA

a = Taken from the Integrated Risk Information System (IRIS) (Online November 2001)
i = EPA-NCEA provisional value, quoted by EPA Region III RBC Table, 2001
NA = Not Available

TABLE 4
Human Health Risk Based Soil Concentration Under Industrial Scenarios (Cancer Risk)
SEAD 59/71
Seneca Army Depot Activity

Equation for RBC (mg/kg) calculation[1]:

$$RBC = \frac{CancerR \times BW \times AT}{IR \times CF \times FI \times EF \times ED \times Cancer\_slope\_factor}$$

For the resident (child and adult), RBC[1] (mg/kg) $= \frac{CancerR \times AT}{CF \times EF \times IF_{soil/adj} \times cancer\_slope\_factor}$

Analyte	Cancer Oral Slope Factor (mg/kg-day)-1	Industrial Receptors			Residential Receptors[2]		
		Industrial Worker	Construction Worker	Trespasser Child	Resident (Adult)	Resident (Child)	Resident (Child and Adult)
Volatile Organics (mg/kg)							
Benzene	0.055	1.17E+02	7.31E+02	2.51E+02	4.35E+01	1.82E+01	1.28E+01
Toluene	NA						
Total Xylenes	NA						
Semivolatiles (mg/kg)							
Anthracene	NA						
Benzo(a)anthracene	0.73	8.81E+00	5.51E+01	1.89E+01	3.28E+00	1.37E+00	9.61E-01
Benzo(a)pyrene	7.3	8.81E-01	5.51E+00	1.89E+00	3.28E-01	1.37E-01	9.61E-02
Benzo(b)fluoranthene	0.73	8.81E+00	5.51E+01	1.89E+01	3.28E+00	1.37E+00	9.61E-01
Benzo(k)fluoranthene	0.073	8.81E+01	5.51E+02	1.89E+02	3.28E+01	1.37E+01	9.61E+00
Chrysene	0.0073	8.81E+02	5.51E+03	1.89E+03	3.28E+02	1.37E+02	9.61E+01
Dibenz(a,h)anthracene	7.3	8.81E-01	5.51E+00	1.89E+00	3.28E-01	1.37E-01	9.61E-02
Fluoranthene	NA						
Indeno(1,2,3-cd)pyrene	0.73	8.81E+00	5.51E+01	1.89E+01	3.28E+00	1.37E+00	9.61E-01
Naphthalene	NA						
Phenanthrene	NA						
Pyrene	NA						

Assumptions Target Cancer Risk (Cancer R): 1.00E-06		Industrial Worker	Construction Worker	Trespasser Child	Resident (Adult)	Resident (Child)	Resident (Child and Adult)
Body Weight (BW), [kg]=		71.8	71.8	30.8	71.8	15	
Averaging Time (AT), [days]=		27995.5	27995.5	27995.5	27995.5	27995.5	27995.5
Ingestion Rate (IR), [mg soil/day]=		50	200	200	100	200	
Conversion Factor (CF), [kg/mg]=		1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06
Fraction Ingestion (FI), [unitless]=		1	1	1	1	1	
Exposure Frequency (EF), [day/year]=		250	250	52	350	350	350
Exposure Duration (ED), [years]=		25	1	6	24	6	
Age Adjusted Ingestion Factor ($IF_{soil\ adj}$), [mg-yr/kg-day]=							114

Notes:

(1) RBCs corresponding to a target cancer risk of 10^{-6}. Only soil ingestion exposure was considered.

(2) Residential receptors were listed only for comparison purposes.

Cells in this table were intentionally left blank due to lack of toxicity data

TABLE 5
Human Health Risk Based Soil Concentration Under Industrial Scenarios (Noncancer Risk)
SEAD 59/71
Seneca Army Depot Activity

Equation for RBC calculation (mg/kg)[1]: $CUG = \dfrac{HQ \times BW \times AT \times RfD}{IR \times CF \times FI \times EF \times ED}$

Analyte	Ref Dose(RfD) (mg/kg/day)	Industrial Receptors: Industrial Worker	Industrial Receptors: Construction Worker	Industrial Receptors: Trespasser Child	Residential Receptors[2]: Resident (Adult)	Residential Receptors[2]: Resident (Child)
Volatile Organics (mg/kg)						
Benzene	3.00E-03	6.29E+03	1.57E+03	3.24E+03	2.25E+03	2.35E+02
Toluene	2.00E-01	4.19E+05	1.05E+05	2.16E+05	1.50E+05	1.56E+04
Total Xylenes	2.00E+00	4.19E+06	1.05E+06	2.16E+06	1.50E+06	1.56E+05
Semivolatiles (mg/kg)						
Anthracene	3.00E-01	6.29E+05	1.57E+05	3.24E+05	2.25E+05	2.35E+04
Benzo(a)anthracene	NA					
Benzo(a)pyrene	NA					
Benzo(b)fluoranthene	NA					
Benzo(k)fluoranthene	NA					
Chrysene	NA					
Dibenz(a,h)anthracene	NA					
Fluoranthene	4.00E-02	8.39E+04	2.10E+04	4.32E+04	3.00E+04	3.13E+03
Indeno(1,2,3-cd)pyrene	NA					
Naphthalene	2.00E-02	4.19E+04	1.05E+04	2.16E+04	1.50E+04	1.56E+03
Phenanthrene	NA					
Pyrene	3.00E-02	6.29E+04	1.57E+04	3.24E+04	2.25E+04	2.35E+03
Assumptions		Industrial Worker	Construction Worker	Trespasser Child	Resident (Adult)	Resident (Child)
Assuming HQ = 1						
Body Weight (BW), [kg] =		71.8	71.8	30.8	71.8	15
Averaging Time (AT) [days] =		9125	365	2190	8760	2190
Ingestion Rate (IR), [mg soil/day] =		50	200	200	100	200
Conversion Factor (CF), [kg/mg] =		1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06
Fraction Ingestion (FI), [unitless] =		1	1	1	1	1
Exposure Frequency (EF), [day/year] =		250	250	52	350	350
Exposure Duration (ED), [year] =		25	1	6	24	6
Age Adjusted Ingestion Factor ($IF_{soil\ adj}$), [mg-yr/kg-day]=						

Notes:

(1) RBCs correspond to a target noncancer HQ = 1. Only soil ingestion exposure was considered.

(2) Residential receptors were listed only for comparison purposes.

Cells in this table were intentionally left blank due to lack of toxicity data.

TABLE 6a
Soil Cleanup Goals for SEAD-59
SEAD 59/71
Seneca Army Depot Activity

Analyte	Human Health Based Clean Up Goals[1] (mg/kg)	Soil Concentration to be Protective of Groundwater [2] (mg/kg)	Proposed Soil Cleanup Goal (ug/kg)
Volatile Organics			
Benzene	10 [3]	1.0	1,000 [4]
Toluene	10 [3]	10 [3]	10,000 [3], [4]
Total Xylenes	10 [3]	10 [3]	10,000 [3], [4]
Semivolatiles			
Benzo(a)anthracene	8.8	49	8,800
Benzo(a)pyrene	0.88	50 [5]	880
Benzo(b)fluoranthene	8.8	19	8,800
Benzo(k)fluoranthene	50 [5]	19	19,000
Chrysene	50 [5]	7.1	7,100
Dibenz(a,h)anthracene	0.88	50 [5]	880
Fluoranthene	50 [5]	50 [5]	50,000 [5]
Indeno(1,2,3-cd)pyrene	8.8	50 [5]	8,800
Naphthalene	50 [5]	50 [5]	50,000 [5]
Phenanthrene	NA	50 [5]	50,000 [5]
Pyrene	50 [5]	50 [5]	50,000 [5]

Notes:

(1) The human health based cleanup goals were derived from the lower of the cancer RBCs and the non-cancer RBCs for all potential receptors under the industrial scenario; if the human health based CUG exceeds the maximum soil cleanup objective defined in TAGM 4046, the maximum value is selected. Refer to **Table 4** and **Table 5**.

(2) Soil concentrations to be protective of groundwater were calculated based on SEAD-59 site conditions. Refer to **Table 7a** and discussion section 3.0 in Attachment A.

(3) Maximum value for total VOCs of 10,000 µg/kg (TAGM 4046) applied since proposed value for the individual VOC wou exceed the maximum value for total VOCs.

(4) Total VOCs should not exceed the TAGM 4046 limit of 10,000 µg/kg.

(5) Maximum value for an individual semivolatile of 50,000 µg/kg (TAGM 4046) applied since the proposed value would exceed this maximum value provided in TAGM 4046.

NA - Toxicity data not available.

TABLE 6b
Soil Cleanup Goals for SEAD-71
SEAD 59/71
Seneca Army Depot Activity

Analyte	Human Health Based Clean Up Goals[1] (mg/kg)	Soil Concentration to be Protective of Groundwater [2] (mg/kg)	Proposed Soil Cleanup Goal (ug/kg)
Semivolatiles			
Anthracene	50 [3]	50 [3]	50,000 [3]
Benzo(a)anthracene	8.8	16	8,800
Benzo(a)pyrene	0.88	50 [3]	880
Benzo(b)fluoranthene	8.8	6.4	6,400
Benzo(k)fluoranthene	50 [3]	6.4	6,400
Chrysene	50 [3]	2.3	2,300
Dibenz(a,h)anthracene	0.88	50 [3]	880
Fluoranthene	50 [3]	50 [3]	50,000 [3]
Indeno(1,2,3-cd)pyrene	8.8	19	8,800
Naphthalene	50 [3]	50 [3]	50,000 [3]
Phenanthrene	NA	50 [3]	50,000 [3]
Pyrene	50 [3]	50 [3]	50,000 [3]

Notes:

(1) The human health based cleanup goals were derived from the lower of the cancer RBCs and the non-cancer RBCs for all potential receptors under the industrial scenario; if the human health based CUG exceeds the maximum soil cleanup objective defined in TAGM 4046, the maximum value is selected. Refer to **Table 4** and **Table 5**.

(2) Soil concentrations to be protective of groundwater were calculated based on SEAD-71 site conditions. Refer to **Table 7b** and discussion section 3.0 in Attachment A.

(3) Maximum value for an individual semivolatile of 50,000 mg/kg (TAGM 4046) applied since the proposed value would exceed this maximum value provided in TAGM 4046.

NA - Toxicity data not available.

TABLE 7a
Soil Cleanup Goals for SEAD-59 to be Protective of Groundwater
SEAD 59/71
Seneca Army Depot Activity

Assumptions:		Source:
Hydraulic conductivity (ft/day)	1.28	Final Groundwater Modeling Report at the Ash Landfill Site. June 1996. P 3-58.
Gradient (ft/ft)	1.95E-02	ibid.
Darcy velocity (ft/yr)	9.1	ibid.
Infiltration rate (in/yr)	7	SEAD-12 Final RI, Appendix E. November 2001.
Sat. Aquifer depth (ft)	5	Range given in SEAD-12 RI. November 2001.
f, fraction organic carbon	0.01	TAGM 4046
CF, correction factor	100	TAGM 4046

Cs = allowable soil concentration (ug/kg)
Cw = appropriate water quality value (ppb)
Koc = partition coefficient
$C_s = f * K_{oc} * C_w$

Ain = cross sectional area of aquifer (SF)
Qin = flowrate of groundwater at location of receptor (CF/yr)
Ap = infiltration area (SF)
Qp = flowrate of water from precipitation into the aquifer (CF/yr)

Site-Specific Information:

distance (ft) (1)	1300	Qin (CF/yr)	24,279
width of SEAD (N-S) (ft)(2)	533	Ap (sf)	692,900
Length of SEAD (E-W) (ft)(2)	514	Qp (CF/yr)	404,192
Ain (SF)	2,665	Qi/(Qi + Qp)	0.06

Chemical	K_{oc}	C_w (GA) (ppb)	$C_{w\ new}$ (ppb)(3)	C_s (mg/kg)	**Cleanup Goal = Cs x CF (ug/kg)**
SVOCs					
Benzo(a)anthracene	1,380,000	0.002	0.04	0.49	**48,707**
Benzo(a)pyrene	5,500,000	0.002	0.04	1.94	**194,124**
Benzo(b)fluoranthene	550,000	0.002	0.04	0.19	**19,412**
Benzo(k)fluoranthene	550,000	0.002	0.04	0.19	**19,412**
Chrysene	200,000	0.002	0.04	0.07	**7,059**
Dibenzo(a,h)anthracene	33,000,000	50	882	291186.07	**29,118,607,306**
Fluoranthene	38,000	50	882	335	**33,530,518**
Indeno(1,2,3-cd)pyrene	1,600,000	0.002	0.04	0.56	**56,472**
Naphthalene	1,300	10	176	2.3	**229,419**
Phenanthrene	4,365	50	882	39	**3,851,598**
Pyrene	13,295	50	882	117	**11,731,269**
VOCs					
Benzene	83	0.7	12	0.01	**1,025**
Toluene	300	5	88	0.26	**26,471**
Xylene	240	5	88	0.21	**21,177**

Notes:
(1) Distance is based on distance between the SEAD and the border of the area designated for housing. Refer to Figure 1 in Attachment A.
(2) SEAD width and length are based on Figure 5-1. Parsons, SEAD 59/71 Action Memorandum, June 2001.
(3) Refer to discussion Section 3.0 and Equation 9 in Attachment A. In Equation 9, Cin becomes Cw new.

TABLE 7b
Soil Cleanup Goals for SEAD-71 to be Protective of Groundwater
SEAD 59/71
Seneca Army Depot Activity

Assumptions:		Source:
Hydraulic conductivity (ft/day)	1.28	Final Groundwater Modeling Report at the Ash Landfill Site. June 1996. P 3-58.
Gradient (ft/ft)	1.95E-02	ibid.
Darcy velocity (ft/yr)	9.1	ibid.
Infiltration rate (in/yr)	7	SEAD-12 Final RI, Appendix E. November 2001.
Sat. Aquifer depth (ft)	5	Range given in SEAD-12 RI. November 2001.
f, fraction organic carbon	0.01	TAGM 4046
CF, correction factor	100	TAGM 4046

Cs = allowable soil concentration (ug/kg)
Cw = appropriate water quality value (ppb)
Koc = partition coefficient
$C_s = f * K_{oc} * C_w$

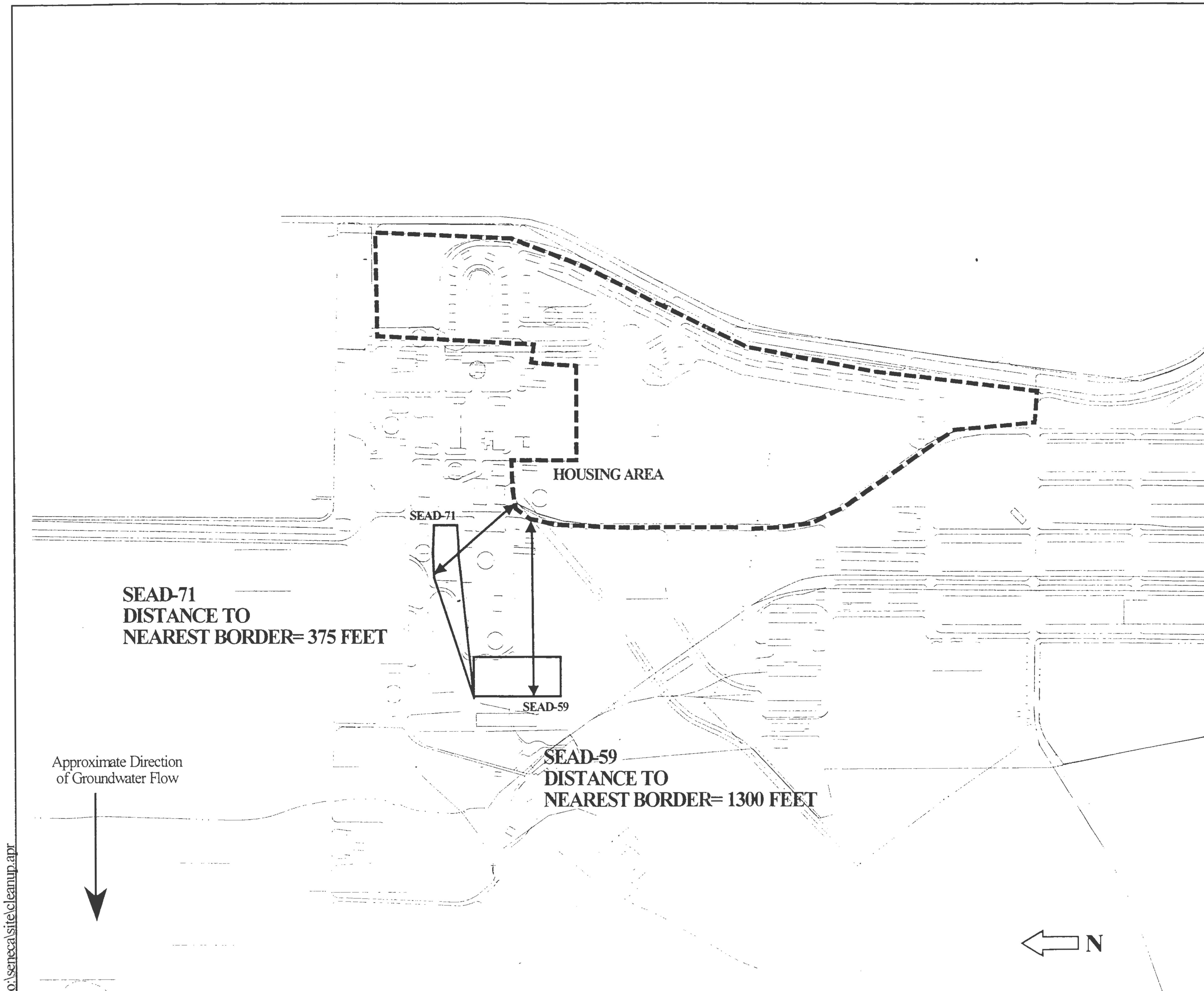
Ain = cross sectional area of aquifer (SF)
Qin = flowrate of groundwater at location of receptor (CF/yr)
Ap = infiltration area (SF)
Qp = flowrate of water from precipitation into the aquifer (CF/yr)

Site-Specific Information:

distance (ft) [1]	375	Qin (CF/yr)	31,886
width of SEAD (E-W) (ft)[2]	700	Ap (sf)	262,500
Length of SEAD (N-S) (ft)[2]	175	Qp (CF/yr)	153,125
Ain (SF)	3,500	Qi/(Qi + Qp)	0.17

Chemical	K_{oc}	C_w (GA) (ppb)	$C_{w\ new}$ (ppb)[3]	C_s (mg/kg)	**Cleanup Goal = Cs x CF (ug/kg)**
SVOCs					
Anthracene	14,000	50	290.11	40.62	**4,061,543**
Benzo(a)anthracene	1,380,000	0.002	0.01	0.16	**16,014**
Benzo(a)pyrene	5,500,000	0.002	0.01	0.64	**63,824**
Benzo(b)fluoranthene	550,000	0.002	0.01	0.06	**6,382**
Benzo(k)fluoranthene	550,000	0.002	0.01	0.06	**6,382**
Chrysene	200,000	0.002	0.01	0.02	**2,321**
Dibenzo(a,h)anthracene	33,000,000	50	290	95736.37	**9,573,636,723**
FLuoranthene	38,000	50	290	110	**11,024,188**
Indeno(1,2,3-cd)pyrene	1,600,000	0.002	0.01	0.19	**18,567**
Naphthalene	1,300	10	58	0.8	**75,429**
Phenanthrene	4,365	50	290	13	**1,266,331**
Pyrene	13,295	50	290	39	**3,857,015**

Notes:
(1) Distance is based on distance between the SEAD and the border of the area designated for housing. Refer to Figure 1 in Attachment A.
(2) SEAD width and length are based on Figure 5-2. Parsons, SEAD 59/71 Action Memorandum, June 2001.
(3) Refer to discussion Section 3.0 and Equation 9 in Attachment A. In Equation 9, Cin becomes Cw new.



LEGEND

- PAVED ROAD
- 680 GROUND CONTOUR AND ELEVATION
- CHAIN LINK FENCE
- UTILITY POLE
- APPROXIMATE LOCATION OF FIRE HYDRANT
- RAILROAD
- BORDER OF HOUSING AREA
- BORDER OF OPERABLE UNIT

NOTES:
- The distances to the nearest borders are estimated.

KEY PLAN

SEAD-59
SEAD-71

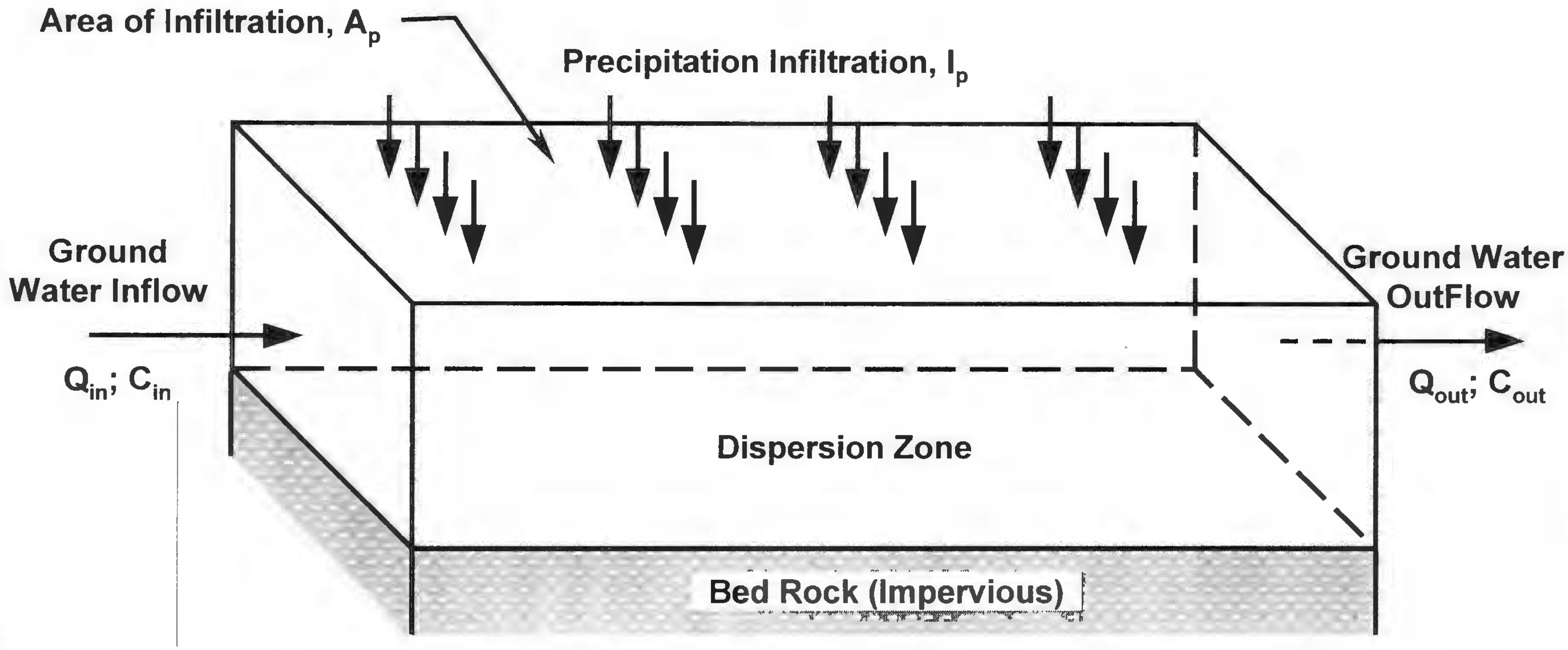
PARSONS
PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY
DECISION DOCUMENT
SEAD-59/71

FIGURE 1

DISTANCE TO
NEAREST BORDERS

JOB NUMBER: 734513-01000 | DATE: DEC 2001



$$C_{in} = C_{out} \frac{\left(Q_{in} + I_p * A_p\right)}{Q_{in}}$$

Figure 2. Conceptual model for groundwater contaminant dispersion.

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File

59/71

June 28, 2002

Commander
U.S. Army Corps of Engineers
Engineering and Support Center, Huntsville
Attn: CEHNC-FS-IS (Marshall Greene)
4820 University Square
Huntsville, Alabama 35816-1822

00851

SUBJECT: **Seneca Army Depot Activity – Romulus, New York**
Revised Final Action Memorandum for Removal Actions at SWMUs SEAD-59 and SEAD-71

Dear Mr. Greene:

Parsons Engineering Science, Inc. (Parsons) is pleased to submit response to NYSDEC comments and the inserts for the Revised Final Action Memorandum for Removal Actions at SEAD-59 and SEAD-71 at the Seneca Army Depot Activity located in Romulus, New York. This work was performed in accordance with the Scope of Work (SOW) for Delivery Order 00017 to the Parsons ES Contract DACA87-95-D-0031. This submittal has also been provided under separate cover to Mr. Julio Vasquez at the USEPA and Ms. Alicia Thorne at NYSDEC.

Parsons appreciates the opportunity to work with the USACE on this project and looks forward to a continued relationship on this and other projects. Please feel free to call me at (781) 401-2361 if you have any questions or comments.

Sincerely,

PARSONS

Eliza D. Schacht, P.E.
Task Order Manager

EDS/jjm

Enclosures

cc: S. Absolom, SEDA
J. Fallo
K. Healy
K. Hoddinott, USACHPPM
C. Kim, USAEC
B. Wright, USAIOC

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Response to Comments from the New York State Department of Environmental Conservation

Subject: Final Action Memorandum for Removal Actions at SWMUs SEAD-59 and SEAD-71
Seneca Army Depot
Romulus, New York

Comments Dated: May 30, 2002

Date of Comment Response: June 27, 2002

__Army's Response to Comments__:

The Army states that they "acknowledge that NYSDEC requires prior approval before backfilling," however the text was not revised to reflect this. Please revise accordingly.

Response: Agreed. The referenced statement has been added to the document.

__General Comments:__

Comment 1: It is unclear why this document is labeled a "Final" document since the State has not received a revised "Draft Final" prior to the submission of this document. However, regardless of this document being titled "Final", the document will require revision to address comments detailed below before the state can provide concurrence.

Response 1: Acknowledged. Revisions will be made to the document based on comments from NYSDEC. The revised document will be considered "Final".

Comment 2: The title of this document should denote that it is proposing time-critical removal actions, not simply removal actions.

Response 2: Agreed. The title of the document has been modified to incorporate the phrase "time-critical."

Comment 3: Public participation during the remedial process at inactive hazardous waste sites is valuable and necessary. Although it is understood that public participation in the form of public meetings is strictly not required prior to the initiation of field work for a Time-Critical Removal Action, it is questionable whether current circumstances at these sites warrant elimination of this important aspect of the remedial process prior to executing this planned effort. While a desire to remove environmental contamination on this property as rapidly as possible is laudable, it is not clear what information on the environmental condition of this property has been newly discovered which demands a course of action that does not allow for some degree of public participation at this point.

Because of our understanding that the data which is driving these actions is several years old, a delay of several additional weeks to allow for public participation in the process seems acceptable.

Response 3: The public was briefed of the proposed time-critical removal actions during a Restoration Advisory Board Meeting that was held on July 17, 2001. There has been no significant information identified pertinent to the environmental condition of the sites since the public briefing was held.

The Army needs to move forward expeditiously with the proposed actions to lessen, and hopefully eliminate, potential threats to the environment and surrounding populations from sources of contamination that have been identified and disclosed to all parties. Successful completion of the removal actions will also provide valuable data that may be used to complete the required remedial investigations at the sites.

Comment 4: To remain consistent with the NCP and the Army's declaration of a TCRA, the Army should follow NCP 300.415 (m)(2), which calls for the publishing of a notice of availability, which could note that this document will be discussed at the RAB meeting, a public comment period, and a written response to comments. A public presentation might be helpful as well (see General Comment #2). The Department requests a copy of the publishing notice of availability, when it is made available.

Response 4: See response to General Comment 3.

Comment 5: Perhaps it would be more expedient for the Army to perform Phase II of the RI (i.e., completion of the groundwater investigation and sediment and surface water sampling) while mobilized for the removal action.

Response 5: The Army plans to install three additional groundwater monitoring wells at the sites during the performance of the removal actions. Groundwater, sediment, and surface water sampling will be performed as a separate effort following the removal actions, as required. As stated in the previous response letters, the Army will assess the remaining contaminant concentrations following the removal actions to determine if additional action or investigation is required at the sites.

Specific Comments – Action Memorandum:

Comment 1: Page 2-1, Section 2.1, Base Description and History: Please revise the statement "Closure of the Depot was scheduled for September 30, 2001," to provide the actual closure date.

Response 1: Agreed. The text has been revised to state that termination of the military presence at the Depot was in July 2000.

Comment 2: Page 2-9, Section 2.5.4, Summary of Affected Media: For Groundwater Data, the document should indicate that the investigation is incomplete and therefore the groundwater data is limited. The current text indicates that the groundwater has been fully investigated and the statement that "(G)roundwater at SEAD-71 has not been significantly impacted," is not fully supported.

Response 2: Agreed. The text in the Action Memorandum and the Decision Document has been revised to state that one round of groundwater sampling was conducted at the sites during the ESI field program in 1994. The sampling procedure used at that time was not the EPA Region II low-flow groundwater sampling method and therefore the results may not be representative of the groundwater at the sites due to turbidity in the groundwater samples.

Please see the response to General Comment No. 5 for additional information on future groundwater investigation.

Comment 3: Page 2-11, Section 2.7, Potential for Continued State/Local Response: Clarification of the term "Response" is requested. The "Response" in the title is interpreted as meaning a comment but, in reading the paragraph, it is interpreted that the first sentence "response" means an action by the state/local government or persons. In the last sentence it seems to refer to comments, yet the sentence is contradictory to the first if the meanings of response are the same. Furthermore, is this section referring to *Section 2.6* and therefore is considered a "continued" state/local response?

Response 3: Agreed. The first sentence in the paragraph has been removed. The paragraph now discusses the opportunity for state and local parties to comment.

Comment 4: Page 3-2, Section 3.2, Statutory Authority: The statement that "(S)ince less than 6 months may pass before this removal action begins, this removal action is considered a voluntary, time critical removal action," is contrary to the 2 preceding sentences. A "voluntary, time critical removal action" is not defined in this document nor in the NCP. Please reconcile.

Response 4: Agreed. The final sentence has been revised to state, "Since the removal action should be conducted in less than 6 months, this removal action is considered a time-critical removal action.

Comment 5: Page 5-1, Section 5.1, Proposed Action: It is understood that excavation limits will be based on the visual extent of contamination of both debris and visually contaminated soils. However, it is not understood what "Cleanup verification sampling of soil" means, if the excavation is based on the visual extent. If the verification sampling of soil is to be compared to TAGM 4046 cleanup goals, then it should be stated as such with the parameters to be tested for listed in the document. In addition, the NYSDOH requests all post-excavation soil samples should be discrete samples and not composite samples.

Response 5: The Army has provided a general plan for the proposed confirmational sampling and analysis in the Action Memorandum (Section 5.1.1) and in the Decision Document (Section 3.3). The plan provides information about the frequency of the sampling, general location of the samples, and the proposed analyses.

In addition, the Army has prepared a Confirmatory Sampling Plan, which has been included in the Action Memorandum/Decision Document in Appendix **X**. This Plan provides more specific details of the proposed confirmational sampling and analysis. Confirmational soil samples will be collected as discrete samples as stated in the Confirmatory Sampling Plan.

Comment 6: Page 5-1, Section 5.1.1, Proposed Action Description: Prior to any backfilling, the Army should send results of confirmatory samples to the regulatory agencies for approval of this material as backfill.

Response 6: Agreed. The Army will provide the results of confirmatory samples to NYSDEC and the EPA for approval of this material as backfill.

Comment 7: Page 5-3, Section 5.1.6, Post-Removal Site Control Activities: The statement that "The Depot is fenced to limit access," is unclear. In Section 3.1, Threats to Public Health or Welfare or the Environment, it states that a TCRA is proposed at both these sites "because of the increased potential for exposure of workers and other re-users now present at the Depot." It is unclear how the Depot fence, which currently does not limit the access of on-site workers and re-users, would serve as a post-removal site control activity to these potentially threatened receptors. Please reconcile.

Response 7: Agreed. The sentence in Section 5.1.6 has been changed to state that there will be no post-removal site control activities.

Comment 8: The document states that "...soils which pose no risk to human health or groundwater quality are to be used as backfill." What criteria will be used to determine risk? Clarification is needed.

Response 8: Agreed. Excavated soil that is not found to contain concentrations of contaminants in excess of NYSDEC TAGM# 4046 criteria will be used as backfill. The text has been revised.

Specific Comments – Decision Document:

Comment 1: Please revise the statement on page 1-4 of the Decision Document regarding that there is unrestricted access to the sites. It is our understanding that this statement is not true due to heightened security measures recently instituted.

Response 1: Disagree. Although security guards are now posted at the entrance to the Depot, visitors and workers may access the Depot as necessary. Workers in those portions of the Depot that have been released to the public and private sectors for reuse under the BRAC process may have access to SEAD-59 and SEAD-71 because both sites are not fenced. The text has been revised to state that there are security guards at the Depot. However, access to the two sites by workers and visitors on site is unrestricted.

Comment 2: A majority of these comments are relevant for both SEAD-59 and SEAD-71, please ensure consistency of approaches taken for both SEADs in both the Action Memorandum and the Decision Document.

Response 2: Acknowledged.

Instructions for revising the Final Action Memorandum/Decision Document

1. Insert the revised cover.

Action Memorandum

1. Insert revised cover page.
2. Insert revised Sections 2, 3, and 5.

Decision Document

1. Insert revised cover page.
2. Insert revised page TOC-5 of the Table of Contents.
3. Insert revised Sections 2 and 3.

Appendices

1. Insert new Appendix F.

FINAL
ACTION MEMORANDUM
FOR
TIME – CRITICAL REMOVAL ACTIONS AT
SEAD-59 and SEAD-71
SENECA ARMY DEPOT ACTIVITY

Prepared for:

Seneca Army Depot Activity
Romulus, New York

and

US Army Corp of Engineers
Huntsville Center

Prepared by:

PARSONS
30 Dan Road
Canton, Massachusetts 02021

Contract No. DACA87-95-D-0031
Delivery Order 17
734516

Revised - June 2002

2 SITE CONDITIONS AND BACKGROUND

2.1 BASE DESCRIPTION AND HISTORY

This section provides a brief overview of SEDA and the conditions at the Fill Area West of Building 135 (SEAD-59) and the Alleged Paint Disposal Area (SEAD-71). The sites were evaluated in 1994 as part of an Army effort to determine the conditions at several solid waste management units (SWMUs) that were considered to potentially pose a threat to human health and the environment. A more detailed discussion can be found in the Draft Final *Project Scoping Plan for Performing a CERCLA Remedial Investigation / Feasibility Study (RI/FS) at the Fill Area West of Building 135 (SEAD-59), and the Alleged Paint Disposal Area (SEAD-71)*, February 1997, as well as the *Expanded Site Inspection - Seven Low Priority AOCs SEADs 60, 62, 63, 64 (A,B,C, and D), 67, 70, and 71*, April 1995, and *Expanded Site Inspection - Eight Moderately Low Priority AOCs SEADs 5, 9, 12 (A and B), 43, 56, 69, 44 (A and B), 50, 58, and 59*, December 1995, and *Draft Phase I Remedial Investigation (RI) at the Fill Area West of Building 135 (SEAD-59), and the Alleged Paint Disposal Area (SEAD-71)*, July 1998.

The Seneca Army Depot (Depot) is situated on the western flank of a topographic high between Cayuga and Seneca Lakes in the Finger Lakes region of central New York (**Figure 2-1**). The SEDA was constructed in 1941 and has been owned by the United States Government and operated by the Department of the Army since this time. The Depot generally consists of an elongated central area for storage of ammunitions and weaponry in Quonset-style buildings, an operations and administration area in the eastern portion, and an army barracks area at the north end of the Depot. The Depot was expanded to encompass a 1,524-meter airstrip, formerly the Sampson Air Force Base.

The primary historic mission of the SEDA was management of munitions. SEDA was used for the following purposes: (1) receiving, storing, and distributing ammunition and explosives; (2) providing receipt, storage, and distribution of items that support special weapons; and, (3) performing depot-level maintenance, demilitarization, and surveillance on conventional ammunition and special weapons. The Depot formerly employed approximately 1,000 civilian and military personnel.

The Depot's mission changed in early 1995 when the Department of Defense (DOD) recommended closure of the SEDA under the Base Realignment and Closure (BRAC) process. Congress approved this recommendation on September 28, 1995 and the Depot's mission closure date was set as September 30, 1999. Termination of the military presence at the Depot was in July 2000.

SEAD-59 (i.e., the Fill Area West of Building 135) is located in the east-central portion of SEDA. The site encompasses an area situated along both sides of an unnamed dirt road, which is the access road to Building 311 and runs perpendicular to the south side of Administration Avenue terminating at Building 311 (**Figures 2-2 and 2-3**). SEAD-59 is comprised of two areas, one area located north of the access road to Building 311 and one area located to the south of the road. Each area is characterized by different topography: the area to south of the road is relatively flat and slopes gently to the west, while the area to the north of the road contains a fill area that exhibits approximately 10 feet of relief.

The entire western border of the site is defined by a north-south trending drainage ditch. A drainage swale that flows east-to-west and parallels the railroad tracks forms the northern boundary of SEAD-59. At the northwestern corner of the site, the drainage swale turns to the north and flows under the railroad tracks. Drainage ditches are also located on each side of the access road to Building 311 and flow from east-to-west into the drainage ditch located in the western portion of the site.

SEAD-59 was used for the disposal of construction debris and oily sludges. SEDA personnel have indicated that there may be a large quantity of miscellaneous "roads and grounds" waste buried at the site. It is not known when the disposal took place.

SEAD-71 (i.e., the Alleged Paint Disposal Area) is located in the east-central portion of SEDA. The site is located approximately 200 feet west of 4th Avenue near Buildings 127 and 114 (**Figures 2-2 and 2-4**). The entire site is approximately 350 feet by 100 feet and bounded on the north and south by railroad tracks serving Buildings 114 and 127. A chain-link fence borders the east side of the site. The topography is relatively flat with a gentle slope to the southwest.

It is rumored that paints and/or solvents were disposed at SEAD-71 in burial pits. It is not known what other activities occurred here. No dates of disposal are available nor is there any information on the number of suspected disposal pits.

2.2 SITE-SPECIFIC GEOLOGY

2.2.1 SEAD-59

Based on the results of the drilling program conducted for the ESI at SEAD-59, fill material, till, weathered dark gray shale, and competent gray-black shale are the four major geologic units present on-site. At most of the boring locations, very little topsoil was present. Several of the borings were drilled on a gravel surface, and no topsoil was encountered at these locations.

Fill material was encountered in the borings located within the fill area north of the access road. The fill was characterized as being lithologically similar to the underlying till: it was characterized as silt containing minor components of sand and shale fragments, but was noted as being different from the till in color, which tended to be gray brown or tan, and due to the presence of gravel, asphalt, wood and other organic material. The fill was found to extend to a depth of 10.5 feet in select places.

The till was characterized as light brown in color and composed of silt, very fine sand, and clay, with minor components of gray-black shale fragments. Larger shale fragments (rip-up clasts) were observed at some locations at the top of the weathered shale. The thickness of the till ranged from 3.1 to 8.6 feet.

The weathered shale that forms the transition between till and competent shale was encountered at five of the nine boring locations. Competent gray-black shale was observed at two spots at 8.0 and 10.5 feet below grade, respectively. At the remaining boring locations, bedrock was inferred from the point of auger or spoon refusal at depths ranging from 9.5 to 20.5 feet below grade.

2.2.2 SEAD-71

Based on the results of the subsurface exploration conducted for the ESI at SEAD-71, till, calcareous weathered shale, and competent shale are the three major types of geologic materials present on-site. The till in the storage area was characterized as olive gray clay with little silt, very fine sand, and shale fragments (up to 1 inch in diameter) and ranged in thickness from 4.7 and 7.8 feet. In the southern section of the storage area, the till consisted of light brown silt with little clay and trace amounts of shale fragments (up to 1 inch in diameter). Large shale fragments (rip-up clasts) were observed at or near the till/weathered shale contact at all soil boring locations. In the western half of the site, the till consisted of olive gray silt and was found to be approximately 4 feet thick.

The weathered shale that forms the transition between the till and competent shale was encountered at all soil boring and test pit locations. The depth of the weathered shale ranged from 4.7 to 8.3 feet below ground surface. Competent, calcareous gray shale was encountered at depths between 5.2 and 9.4 feet below ground surface.

2.3 SITE-SPECIFIC HYDROLOGY AND HYDROGEOLOGY

2.3.1 SEAD-59

Surface water flow from precipitation events is controlled by the local topography. The area to the south of the access road slopes gently to the west. Surface water flow in this area is to the west and it is most likely captured by the north-south trending drainage swale located in the western portion of the site and by the drainage ditch which parallels the south side of the access road.

In the area north of the access road, a hill composed of fill material has approximately 10 feet of vertical relief. To the west, the hill slopes steeply to the north-south trending drainage swale, which flows north and eventually flows under the railroad tracks north of the site. To the north, the hill slopes to a sustained drainage ditch that is approximately two feet deep. This ditch originates east of the site near Building 128 and flows west, paralleling the railroad tracks and the northern boundary of SEAD-59. At the northwestern corner of the site, the drainage swale turns to the north and passes under the railroad tracks. To the east, the hill slopes downward to a graded gravel surface used for storage of large equipment. Surface water from this area also drains into the northern drainage swale, flowing along the northern boundary of the site, as described above. To the south, the hill slopes to the access road that runs through the site. Surface water from this southern portion of the hill drains into the drainage ditch that parallels the access road on the north side. Water captured by this drainage ditch flows west and intersects the north flowing drainage ditch in the western portion of SEAD-59.

Based on the data collected during the ESI, the groundwater flow direction is primarily southwest across SEAD-59.

2.3.2 SEAD-71

Surface water flow from precipitation events is controlled by the local topography, although there is little topographic relief on the site. There are no sustained surface water bodies on-site. In the fenced storage area located in the eastern half of the site, the area is covered with asphalt, which provides an impermeable surface resulting in an increased amount of surface water runoff from the site. Based on topographic relief, surface water flow is to the southwest towards the SEDA railroad tracks (to the south), which are topographically lower than the site.

Based on the data collected during the ESI, the groundwater flow direction in the till/weathered shale aquifer on the site is to the west-southwest.

2.4 LAND USE

The SEDA is situated between Seneca Lake and Cayuga Lake and encompasses portions of Romulus and Varick Townships. Land use in this region of New York is largely agricultural, with some forestry and public land (school, recreational and state parks). The most recent land use report is that issued by Cornell University (Cornell 1967). This report classifies land uses and environments of this region in further detail. Agricultural land use is categorized as inactive and active use. Inactive agricultural land consists of land committed to eventual forest regeneration, land waiting to be developed, or land presently under construction. Active agricultural land surrounding SEDA consists largely of cropland and cropland pasture.

Forest land adjacent to SEDA is primarily under regeneration with sporadic occurrence of mature forestry. Public and semi-public land use surrounding and within the vicinity of SEDA includes Sampson State Park, Willard Psychiatric Center, and Central School (at the Town of Romulus). Sampson State Park entails approximately 1,853 acres of land and includes a boat ramp on Seneca Lake. Historically, Varick and Romulus Townships within Seneca County developed as an agricultural center supporting a rural population. However, increased population occurred in 1941 due to the opening of SEDA. Population has progressed since then largely due to the increased emphasis on promoting tourism and recreation in this area.

The 10,587-acre SEDA facility was constructed in 1941 and has been owned by the United States Government and operated by the Department of the Army (DOA) since that date. From its inception in 1941 until 1995, SEDA's primary mission was the receipt, storage, maintenance, and supply of military items, including munitions and equipment. The Depot's mission changed in early 1995 when the Department of Defense (DOD) recommended closure of the SEDA under its Base Realignment and Closure (BRAC) process. This recommendation was approved by Congress on September 28, 1995 and the Depot was scheduled for closure by July 2001.

In accordance with the requirements of the BRAC process, the Seneca County Board of Supervisors established the Seneca Army Depot Local Redevelopment Authority (LRA) in October 1995. The primary responsibility assigned to the LRA was to plan and oversee the redevelopment of the Depot. The Reuse Plan and Implementation Strategy for Seneca Army Depot was adopted by the LRA and approved by the Seneca County Board of Supervisors on October 22, 1996. Under this plan and subsequent amendment, areas within the Depot were classified as to their most likely future use. These areas included: housing, institutional, industrial, an area for the existing navigational LORAN transmitter, recreational/conservation and an area designated for a future prison. The LRA has established that the area including SEAD-59 and SEAD-71 will be used for Planned Industrial Development. At the time when the SEDA facility is relinquished by the Army, the Army will ensure that both sites can be used for the intended purpose.

2.5 CONTAMINATION ASSESSMENT

Geophysical surveys and test pits were performed during the ESI and RI to identify burial sites at SEAD-59 and -71. Soil (surface, subsurface), soil gas, and groundwater were collected and analyzed as part of the investigations (**Appendix A of the Decision Document**). The results are presented in the *Draft Phase I Remedial Investigation (RI) SEAD-59 and SEAD-71* (Parsons, July 1998), *the ESI Report for Seven Low Priority AOCs - SEADs 60, 62, 63, 64 (A, B, C, and D), 67, 70, and 71* (Parsons, April 1995) and the *Expanded Site Inspection - Eight Moderately Low Priority AOCs SEADs 5, 9, 12*

(A and B), 43, 56, 69, 44 (A and B), 50, 58, and 59 (Parsons, December 1995). The following sections summarize the nature and extent of contamination identified at these sites.

2.5.1 Soil Gas Survey

2.5.1.1 SEAD-59

A total of 241 soil gas points were sampled and analyzed during the Phase I RI investigation at SEAD-59. This sampling effort revealed one large area and four smaller areas of elevated total volatile organic compounds (VOCs), as shown in **Figure 2-6**. The larger area of elevated soil gas encompasses most of SEAD-59, extending from north of the unnamed dirt road to the west of the 60,000 gallon oil storage tank, including the mounded fill area. The highest soil gas concentrations measured were within the boundaries of the fill area. Maximum total VOC concentrations of greater than 10 parts per million by volume (ppmv) were observed at three separate locations within the fill area. The four smaller areas of elevated soil gas concentrations were detected in an area southeast of the fill area, an area directly southwest of the fill area, another area south of the fill area, and an additional area northwest of the fill area.

2.5.1.2 SEAD-71

A soil gas survey was not performed at SEAD-71.

2.5.2 Geophysics

2.5.2.1 SEAD-59

Four seismic refraction profiles were performed, during the ESI, on 4 lines positioned along each boundary line of SEAD-59. The seismic refraction profiles detected 5 to 10 feet of unconsolidated overburden (1,050 to 1,730 ft/sec) overlying bedrock (10,500 to 15,500 ft/sec). Saturated overburden was not detected by the seismic survey due to limited thickness of the saturated overburden. The elevations of the bedrock surface indicated that the bedrock sloped to the west, generally following the surface topography. Based upon the results of the seismic survey, the groundwater flow direction was also expected to be to the west, following the slope of the bedrock surface.

Electromagnetic (EM-31, EM-61) surveys were performed during the ESI and the Phase I RI at SEAD-59 to delineate the limits of the landfill and to identify locations where metallic objects were buried. The ESI EM-31 survey detected eight anomalies of unknown origin, though no clearly defined boundaries of the large fill area in the northeastern portion of the EM grid could be determined based upon the geophysical results. The electromagnetic (EM-61) survey performed for the Phase I RI at SEAD-59 detected 39 localized anomalies which could not be attributed to surface features and are presumed to be associated with unknown buried sources.

Ground penetrating radar (GPR) data were acquired during the ESI at SEAD-59. A small disposal pit was detected in the southeastern portion of the area investigated. Twelve of the 17 suspected buried metallic object locations revealed by the GPR survey were situated within the suspected disposal area in the northeastern quadrant of SEAD-59. Ten of the GPR anomaly locations were either situated over a localized EM anomaly or within 15 feet of a localized EM anomaly.

GPR data were also acquired during the Phase I RI at SEAD-59 over each distinct EM-61 anomaly to provide better characterization of the suspected metallic sources. Test pit locations were selected based on GPR data indicating the strongest presence of disposal pits or debris.

2.5.2.2 SEAD-71

Four seismic refraction profiles were performed as part of the geophysical investigations conducted for the ESI on four lines positioned along each boundary line of the storage area in the eastern half of SEAD-71. The seismic refraction profiles detected 6 to 9 feet of unconsolidated overburden (1,125 to 1,500 ft/sec) overlying bedrock (12,800 to 16,200 ft/sec). Saturated overburden was not detected by the seismic survey due to limited thickness of the saturated overburden. The elevations of the bedrock surface indicated that the bedrock slopes to the west, generally following the surface topography. Based on the results of the seismic survey, the groundwater flow direction is also expected to be to the west, following the slope of the bedrock surface.

An EM-31 survey was performed during the ESI at SEAD-71 in the western half of the site to help locate the burial pits. Interferences from many cultural effects (e.g., chain link fence, railroad tracks, etc.) along the perimeter of the surveyed area complicated the interpretation of the data. A review of the EM-31 data from SEAD-71 revealed one area, in the south-central portion of the grid, where both the apparent conductivity and the in-phase response decreased noticeably. One other area of increased apparent ground conductivity measurements was detected along the west-central portion of the grid, however, an associated in-phase response was not observed.

GPR data was acquired during the ESI at SEAD-71. The data from these surveys revealed an underground utility line or conduit running northwest-southeast across the northeastern corner of the storage compound. One area of anomalous subsurface reflections, typical of reflections from metallic objects, was detected in the south-central portion of the storage compound. The GPR survey conducted in the area west of the storage compound revealed five localized anomalies and three zones with multiple anomalies. The source of these EM-31 and the GPR anomalies was identified during test pit excavations as construction debris composed of chain link fencing, sheet metal, asphalt, and a crushed, yellow, twenty-gallon drum. Weathered shale, encountered at a depth of 5.5 feet, limited any further advancement of the excavation. There were no readings above background levels (0 ppmv of organic vapors and 10-15 micro rems per hour of radiation) during the excavations.

GPR data were also acquired during the Phase I RI at SEAD-71. Test pit locations were selected based on GPR data indicating the strongest presence of disposal pits or debris.

2.5.3 Test Pitting Program

2.5.3.1 SEAD-59

Twenty-four (24) test pits were excavated at SEAD-59 to investigate the nature of the geophysical and soil gas anomalies and to collect chemical data to identify the presence of constituents of concern. The excavated debris consisted of concrete, asphalt, metal, wood, chain link fencing, 55-gallon drums, and paint cans. Areas of petroleum-hydrocarbon and paint-stained soils were also detected.

2.5.3.2 SEAD-71

Six test pits were excavated at SEAD-71 to characterize the source of the geophysical anomalies. One test pit revealed oil-stained soils. The excavated debris consisted of construction debris composed of chain link fencing, sheet metal, asphalt, stone slabs, bricks and piping. A crushed, yellow, twenty-gallon drum and railroad ties were also found.

2.5.4 Summary of Affected Media

2.5.4.1 SEAD-59

The ESI and Phase I RI conducted at SEAD-59 identified several areas which have been impacted by releases of volatile organic compounds, semivolatile organic compounds, total petroleum hydrocarbons, and to a lesser extent, heavy metals.

Soil Data

Sampling conducted in SEAD-59 indicates impacts to soils from volatile organic compounds, semivolatile organic compounds, total petroleum hydrocarbons, and to a lesser extent, metals exist (See data in Appendix A of the Decision Document). Twenty-four (24) soil samples were collected from soil borings and test pits as part of the ESI for SEAD-59. One hundred and five (105) samples were collected during the Phase I RI for field screening and 34 of those samples were sent to the laboratory for confirmatory analysis.

Six VOCs, acetone, methylene chloride, methyl ethyl ketone, methyl chloride, carbon disulfide, and trichloroethene, were detected in soil samples at concentrations that were below New York State Department of Environmental Conservation's (NYSDEC's) recommended soil cleanup objective levels (defined in NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) #4046 – Determination of Soil Cleanup Objective and Cleanup Levels, January 1994).

In the fill area, polyaromatic hydrocarbon (PAH) compounds were found in surface soil and subsurface soil samples at concentrations exceeding the TAGM criteria. Total petroleum hydrocarbons were detected in the majority of the soil samples collected from the fill area. In the area directly southwest of the fill area, there is both physical and chemical evidence of the presence of hydrocarbons. In the area south of the fill area, several paint cans containing paint were found. BTEX constituents were detected in the sample from this location at concentrations exceeding the associated TAGM criteria. **Figure 2-7** presents the distribution of benzo[a]pyrene, chosen as an indicator chemical for PAHs.

Endrin aldehyde was detected in 11 of the 55 soil samples in which it was analyzed for, at a maximum concentration of 15 ug/Kg. There is no NYSDEC recommended cleanup value for this compound.

Twenty-two (22) metals were detected in soil samples collected from SEAD-59. Fifteen (15) metals were detected in one or more samples at concentrations that exceeded their associated NYSDEC cleanup criteria values. Exceedances were reported in all but 11 of the soil samples collected. A variety of the metals were found at concentrations just slightly above their cleanup criteria values, and approximately half of these exceedances appear to reflect natural variations in site soils. The exceptions to this are the metals antimony, calcium, lead, mercury, silver, sodium, and zinc which were reported at concentrations that are at least two times their recommended cleanup criteria levels.

Groundwater Data

One round of groundwater sampling was conducted at SEAD-59 during the ESI field program in 1994. The sampling procedure used at that time was not the EPA Region II low-flow groundwater sampling method and therefore the results may not be representative of the groundwater at the site due to turbidity in the groundwater samples.

The results of the groundwater analyses (**Table A-2** in Appendix A of the Decision Document) indicate that the groundwater at SEAD-59 has been moderately impacted by total petroleum hydrocarbons and, to a lesser extent, by metals and semivolatile organic compounds. Total petroleum hydrocarbons were detected at low concentrations in both of the downgradient groundwater samples, but it was not detected in the upgradient groundwater sample. Aluminum was detected in all three wells at concentrations above its EPA secondary MCL of 50 ug/L; the highest concentration measured for aluminum in groundwater was found in the upgradient well. Iron and sodium were also detected at concentrations above their associated groundwater criteria in all three wells, and again the highest concentrations measured for these compounds were found in the upgradient well. Thallium was found in the upgradient and one downgradient groundwater sample at concentrations above its federal MCL. Manganese was found in one downgradient sample at a concentration above NYSDEC's GA groundwater criteria. One SVOC, phenol, was reported at estimated concentrations above its groundwater criteria level.

The results of the ESI and RI have identified significant releases of BTEX and PAH compounds in the materials comprising the fill area and disposal pits at SEAD-59. It is important to note that trace quantities of total petroleum hydrocarbons detected in the fill materials are presumably being leached into the groundwater beneath the site. Therefore, the data suggest that affected media at SEAD-59 may have the potential to impact the modeled receptors.

2.5.4.2 SEAD-71

Soil and groundwater were sampled as part of the ESI conducted at SEAD-71 in 1994. Soils were also sampled as part of the Phase I RI conducted in 1998. Sampling and analyses were based upon historical usage of the area for the disposal of paint and solvents. The results of these investigations were detailed in the ESI and Phase I RI reports (Parsons, April 1995, July 1998). To evaluate whether each media (soil and groundwater) is being impacted, the chemical analysis data were compared to available New York State and Federal standards, guidelines, and criteria. Only those state standards, guidelines or criteria that are more stringent than federal requirements were used as a basis of comparison.

Soil Data

Eight soil samples were collected from two test pits excavated during the ESI at SEAD-71, and each of these samples was sent to a laboratory for chemical analysis. Twenty-one (21) surface soil samples were obtained for chemical analysis as part of the Phase I RI for SEAD-71. Nine soil samples were collected from four test pits and screened for BTEX compounds using immunoassay field screening tests and five of these soil samples were sent to the laboratory for confirmatory chemical analysis.

The Phase I RI confirmed the findings of the ESI conducted at SEAD-71. No burial pit for paint and solvents was uncovered during either investigation, although the investigations did indicate the soils at SEAD-71 have been impacted by the waste materials which have been disposed in at least one disposal pit on site. At three test pit locations, PAHs were present at concentrations exceeding the criteria specified in the NYSDEC's TAGM #4046. Heavy metals concentrations above their associated NYSDEC criteria values were also present in these three test pits. There is clear evidence that surface soils at SEAD-71 have been impacted by waste materials disposed in the area. Both PAHs and heavy metals were detected above their associated NYSDEC criteria levels in every surface soil sample collected during the Phase I RI. **Figure 2-8** presents the benzo[a]pyrene concentrations detected at SEAD-71. Benzo[a]pyrene was selected as the indicator chemical for PAHs.

<u>**Groundwater Data**</u>

One round of groundwater sampling was conducted at SEAD-71 during the ESI field program in 1994. The sampling procedure used at that time was not the EPA Region II low-flow groundwater sampling method and therefore the results may not be representative of the groundwater at the site due to turbidity in the groundwater samples.

One Groundwater at SEAD-71 has not been significantly impacted. Metals were the only constituents detected, with 20 being found in the samples collected. Out of the 20 metals found, five (i.e., aluminum, iron, lead, manganese, and thallium) were detected at concentrations above the lowest associated state or federal criteria (**Appendix A of the Decision Document**).

2.6 STATE AND LOCAL ACTIONS TO DATE

There have been no state- or local-related actions completed to date at either SEAD-59 or -71. However, state and local authorities have been active in reviewing the ESI work plans and reports, and have provided oversight for the field work.

2.7 POTENTIAL FOR CONTINUED STATE/LOCAL RESPONSE

The removal action proposed in this Action Memorandum will be conducted by the Army. State authorities will continue to be given the opportunity to review and comment on site documents.

3 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The removal action program discussed in this Action Memorandum is proposed to address the potential threats discussed below.

3.1 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

A time-critical removal action at both SEAD-59 and SEAD-71 is proposed because of the increased potential for exposure of workers and other re-users now present at the Depot. The presence of drums and other containers and the uncertainty of their contents is also justification for a removal action at both sites.

Since the historic military mission of the Depot has been terminated, the Depot has officially been closed by the Department of the Defense (DoD) and the US Army. This time-critical removal action would eliminate contaminants that have been identified in the soil that represent a potential threat to the environment and neighboring populations. In accordance with provisions of the DoD's Base Realignment and Closure (BRAC) process, the land and the facilities of the former Depot have been surveyed and evaluated, and prospective beneficial uses of the facility have been identified. Portions of the Depot are now being released to the public and private sectors for reuse under the BRAC process. As portions of the former Depot are released for other beneficial uses, increased access is afforded to all portions of the former Depot. This may result in an increased potential for exposure of populations to any residual chemicals that are present at former SWMUs remaining at the Depot pending clean-up. Therefore, the goal of the proposed time-critical removal action at SEAD-59 and SEAD-71 is to remove debris and visually contaminated soil. This removal action would remove or at least lessen the magnitude of the potential threat that it represents to surrounding populations and the environment.

The results of the test pitting investigation have confirmed the presence of 55-gallon drums, paint cans, and other containers at SEADs 59 and 71. The presence of such buried objects is of concern since the nature of the contents is unknown. The uncertainty of the contents of the buried items that may remain in the disposal area and at geophysical anomalies and the contamination in soils and groundwater are considered justification for performing a removal action at both sites. While removal of drums and paint cans is the focus of the planned removal action, the potential for contamination to be present in the soil that surrounds these items will also be addressed by this action.

3.2 STATUTORY AUTHORITY

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) states that a removal action may be conducted at a site when there is a potential threat to public health, public welfare, or the environment. An appropriate removal action is undertaken to abate, minimize, stabilize, mitigate, or eliminate the release or the threat of release at a site. Section 300.415(b)(2) of the NCP outlines factors to be considered when determining the appropriateness of a removal action, such as high levels of hazardous substances, pollutants, or contaminants in soils, largely at or near the surface, that may migrate; or the threat of fire or explosion.

Once it is determined that a removal action is appropriate, the removal is designated an emergency, time-critical, or non-time-critical removal. Emergencies are those situations in which response actions must begin within hours or days after the completion of the site evaluation. Time-critical removals are those in which, based on a site evaluation, it is determined that less than six (6) months remains before response actions must begin. Non-time-critical removals are those in which it is determined that more than six (6) months may pass before response actions must begin. Since the removal action should be conducted in less than six (6) months, this removal action is considered a voluntary, time-critical removal action.

5 PROPOSED ACTION AND ESTIMATED COSTS

5.1 PROPOSED ACTION

5.1.1 Proposed Action Description

The proposed remedial action at SEAD-59 and SEAD-71 is to excavate debris and visually impacted soils, and to transport and dispose of the excavated material at an off-site, state-approved landfill. Once the work plans have been approved, site preparation and mobilization will begin. The contractor will bring all the necessary equipment to the site, arrange for all required utilities, and obtain all necessary permits. If necessary, pads will be constructed for the equipment, and run on and run off controls will be constructed.

SEAD-59

SEAD-59 consists of two areas that are located north and south of an access road that bisects the site from east to west. The area north of the road is a fill area and the area south of the road was used as a staging area for heavy equipment and construction materials.

As part of the removal action at SEAD-59, approximately 23,085 cubic yards (cy) of soil will be excavated (**Figure 5-1**). The fill area (Area 1) will be excavated. Geophysical anomalies located south of the road will be excavated. Drums, paint cans, and construction debris will be screened out and disposed off-site. The excavation limits will be determined based on the visual extent of contamination. Excavation will continue until all debris and visually impacted soils have been removed. Cleanup verification sampling of soil in the fill area will be collected from the bottom and sides of the excavations based on a 50 feet by 50 feet grid. For small excavations measuring less than 2,500 square feet, such as Areas 2, 3, and 4 at SEAD-59, five samples will be collected (one from the base and one from each sidewall) at each excavation site. Additional details of the proposed confirmational sampling and analysis plan are provided in **Appendix F** of this Action Memorandum/Decision Document.

Following excavation, soils will be placed in 150cy piles for testing to ensure that they comply with the cleanup goals established for the site. One confirmatory sample will be collected per 150 cy pile. Soils with concentration of VOCs, SVOCs, pesticides, and metals exceeding the cleanup goals will be disposed at an offsite facility. These soils will also be analyzed for the characteristic of toxicity via the Toxicity Characteristic Leaching Procedure (TCLP) (every 150 cy) which is required for landfill disposal. Soils excavated from SEAD-59 are not expected to exceed TCLP limits and will be disposed at an off-site, Subtitle D, solid waste industrial landfill once TCLP results are obtained and verified. Based on the soil data obtained from SEAD-59, it was assumed that 65% of the excavated soil will contain concentrations of compounds above the associated cleanup goals and will require off-site disposal. There is a possibility that some soils from SEAD-59 will also exceed the TCLP limits. These soils will be treated off site. Once treatment of necessary soils has occurred, these contaminated soils will be transported to an off-site, Subtitle D, solid waste industrial landfill for disposal.

Prior to backfilling, the Army will provide the results of the confirmatory sampling analyses to the NYSDEC and EPA for prior written approval of the excavated material as backfill. Excavated soil that is not found to contain concentrations of contaminants in excess of NYSDEC TAGM 4046 criteria will be used as backfill. The sites will be regraded. A two-foot thick vegetative cover will be placed over the former fill area. It is assumed that provisions of the New York Code of Rules and Regulations (NYCRR) Part 360 will no longer apply because the fill area is being removed. The remaining areas will be covered with crushed stone.

The excavations at SEAD-59 will be dewatered and the water will be collected and placed in holding tanks. Any groundwater collected will be treated and disposed in accordance with applicable state and federal regulations. During the excavation process, the sides of the excavation may be sloped to the levels required by OSHA. Shoring or bracing may also be used.

A contingency plan will be added to the Removal Action Work Plan in case additional debris, or debris that does not fit the description of materials excavated to date is found and excavated. The contingency plan will also provide procedures to be followed if drums, similar to those encountered in the test pits conducted during the Phase I RI, are encountered.

SEAD-71

At SEAD-71, geophysical anomalies and soils with concentrations of contaminants exceeding the soil cleanup goals for the site will be excavated (**Figure 5-2**). Paint cans and debris will be screened out and disposed off site. The excavation limits will be determined based on the visual extent of contamination. Excavation will continue until all debris and visually impacted soils have been removed. Cleanup verification sampling of soil will be collected from the bottom and sides of the excavations based on a 50 feet by 50 feet grid. For small excavations measuring less than 2,500 square feet, five samples will be collected (1 from the base and one from each sidewall) at each excavation site. Additional details of the proposed confirmational sampling and analysis plan are provided in **Appendix F** of this Action Memorandum/Decision Document.

Following excavation, soils will be placed in 150 cy piles for testing to ensure that they comply with the cleanup goals developed for the site. One confirmatory sample will be collected from each 150 cy pile of excavated soil. Soils with concentration of VOCs, SVOCs, and metals exceeding the cleanup goals will be disposed at an offsite facility. These soils will also be analyzed for the characteristic of toxicity via the Toxicity Characteristic Leaching Procedure (TCLP) (every 150 cy) which is required for landfill disposal. About 3% (26 cy) of SEAD-71 soils are expected to exceed TCLP limits due to elevated levels of lead. There is a possibility that more than 3% of the soil may exceed the TCLP limits. These soils will be treated off site. Once treatment of necessary soils has occurred, these contaminated soils will be transported to an off-site, Subtitle D, solid waste industrial landfill for disposal.

Prior to backfilling, the Army will provide the results of the confirmatory sampling analyses to the NYSDEC and EPA for prior written approval of the excavated material as backfill. Excavated soil that is not found to contain concentrations of contaminants in excess of NYSDEC TAGM 4046 criteria will be used as backfill. The area will be covered with crushed stone.

5.1.2 Contribution to Remedial Performance

The purpose of this action is to remove the source of volatile organic, semivolatile organic, pesticide, and metal compound contamination at the sites and thereby reduce the potential for further contamination of soils and groundwater. This work is intended to remove the source of potential risks to human health, the environment, and groundwater quality.

5.1.3 Description of Alternative Technologies

Because the impetus for the removal action at these sites is the presence of debris, and due to the uncertain nature of this debris, only one alternative, excavation and disposal, rather than any sort of in-situ treatment of these items is logical. For this reason, no alternative technologies were evaluated as part of this evaluation.

5.1.4 Engineering Evaluation/Cost Analysis

Because this removal action is considered time-critical, only one alternative, excavation and disposal, rather than any sort of in-situ treatment of these materials was considered. A Decision Document, which contains a brief summary of the site history, the results of previous investigations, and cost analysis, was prepared and is included as **Appendix A** of this report.

5.1.5 Off-Site Disposal Policy

It is anticipated that soil generated during the removal action at both sites may be classified as hazardous waste. These soils will be treated off site. Once treatment of necessary soils has occurred, these contaminated soils would be transported to an off-site, Subtitle D, solid waste industrial landfill for disposal. All non-hazardous waste (construction debris, soils) will be disposed in an approved non-hazardous waste landfill (if necessary).

5.1.6 Post-Removal Site Control Activities

There will be no post-removal site control activities.

5.1.7 QA/QC Plan

The remedial contractor will be required to develop a Quality Assurance/Quality Control (QA/QC) Plan that will be submitted for approval. This plan will address both detailed and broad QA/QC issues. Detailed requirements include sampling and analytical protocols. The broader aspects will address the procedures necessary to ensure that the excavation, sizing, stabilization procedures, and stabilization procedures are conducted for accordance with the specifications.

Additional QA/QC will be provided by a 3rd party oversite contractor. The oversight contractor will be responsible for monitoring the removal action activities, including taking confirmation soil samples. The QA/QC Plan will be provided as part of the Removal Action Work Plan.

5.2 ARARS STANDARDS, CRITERIA AND GUIDELINES (SCGS)

Pursuant to Section 300.415(i) of the NCP, the removal action for the site "shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws." Applicable or relevant and appropriate requirements (ARARs) are used to identify removal action objectives, formulate removal action alternatives, govern the implementation and operation of a selected removal action, and evaluate the appropriate extent of site cleanup.

In Title 40 Code of Federal Regulations (CFR) Part 300.5, EPA defines applicable requirements as those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. Relevant and appropriate requirements are defined as those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

Any standard, requirement, criterion, or limitation under any federal environmental or state environmental or facility siting law may be either applicable or relevant and appropriate to a specific action. The only state laws that may become ARARs are those promulgated such that they are legally enforceable and generally applicable and equivalent to or more stringent than federal laws. A determination of applicability is made for the requirements as a whole, whereas a determination of relevance and appropriateness may be made for only specific portions of a requirement. An action must comply with relevant and appropriate requirements to the same extent as an applicable requirement with regard to substantive conditions, but need not comply with the administrative conditions of the requirement.

Three categories of ARARs have been analyzed: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs address certain chemicals or a class of chemicals and relate to the level of contamination allowed for a specific pollutant in various environmental media (water, soil, air). Location-specific ARARs are based on the specific setting and nature of the site. Action-specific ARARs relate to specific actions proposed for implementation at a site.

5.2.1 Chemical-Specific ARARs

Chemical-specific ARARs are usually health or risk-based standards limiting the concentration of a chemical found in or discharged to the environment. They govern the extent of site remediation by providing actual cleanup levels, or the basis for calculating such levels for specific media. These requirements may apply to air emissions during the removal action. A number of federal and state regulations may be used for this site. These include the following:

Federal:

- Resource Conservation and Recovery Act (RCRA), Groundwater Protection Standards and Maximum Concentration Limits (40 CFR 264, Subpart F)
- Clean Water Act, Water Quality Criteria (Section 304) (May 1, 1987 - Gold Book)
- Safe Drinking Water Act, Maximum Contaminant Levels (MCLs) (40 CFR 141.11-.16)

New York State:

- New York State Codes, Rules and Regulations (NYCRR) Title 6, Chapter X
- New York Groundwater Quality Standards (6 NYCRR 703)
- New York Safe Drinking Water Act, Maximum Contaminant Levels (MCLs) (10 NYCRR 5)
- New York Surface Water Quality Standards (6 NYCRR 702)
- New York State Raw Water Quality Standards (10 NYCRR 170.4)
- New York RCRA Groundwater Protection Standards (6 NYCRR 373-2.6 (e))
- New York State Department of Environmental Conservation, Division of Water, Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values, November 15, 1990
- New York State Department of Environment Conservation, Division of Fish and Wildlife, Division of Marine Resources, Technical Guidance for Screening Contaminated Sediments, July 1994
- Surface Water and Groundwater Classifications and Standards (6 NYCRR 700-705)
- Declaration of Policy, Article 1 Environmental Conservation Law (ECL)

- General Functions, Powers, Duties and Jurisdiction, Article 3 Environmental Conservation Law, Department of Environmental Conservation
- ECL, Protection of Water, Article 15, Title 5
- Use and Protection of Waters, (6 NYCRR, Part 608)

Water Quality

There are a number of water quality standards which are potential ARARs for this removal action.

- 40 CFR Part 131 (applicable): Water Quality Standards. This part implements Section 101 of the Clean Water Act (CWA), which specifies the national goals of eliminating the discharge of pollutants, prohibiting the discharge of toxic pollutants in toxic amounts, and implementing programs for control of non-point sources.
- 40 CFR Part 131.12 (applicable): Antidegradation Policy. Establishes standards to prevent a body of water which has an existing high standard from degrading to a lower standard.
- 40 CFR Part 141 (applicable): National Primary Drinking Water Regulations. This part establishes primary drinking water regulators pursuant to Section 1412 of the Public Health Service Act as amended by the Safe Drinking Water Act.
- 40 CFR Part 141.11 (applicable): Maximum Inorganic Chemical Contaminant Levels. This section establishes maximum contaminant levels (MCLs) for inorganic chemicals.
- 40 CFR Part 141.12 (applicable): Maximum Organic Chemical Contaminant Levels. This section establishes MCLs for organic chemicals.
- 40 CFR Part 264 Subpart F (relevant and appropriate): Releases from Solid Waste Management Units. Standards for protection of groundwater are established under this citation.
- 40 CFR Part 403 (applicable): Pretreatment Standards for the Discharge of Treated Site Water to a Publicly Owned Treatment Works (POTW). This part establishes pretreatment standards for the discharge of wastewater to POTWs.
- 6 NYCRR Chapter X (relevant and appropriate): This chapter establishes the requirements of the State Pollutant Discharge Elimination System.
- 6 NYCRR subparts 701 and 702 (applicable): These subparts establish surface water standards for protection of drinking water and aquatic life.
- 6 NYCRR subpart 703 (applicable): This subpart establishes groundwater standards specified to protect groundwater for drinking water purposes.
- 6 NYCRR subpart 375 (relevant and appropriate): This subpart contains the New York State rules for inactive hazardous waste disposal sites.
- 6 NYCRR subpart 373-2.6 and 373-2.11 (applicable): This regulation requires groundwater monitoring for releases from solid waste management units.
- 6 NYCRR subpart 373-2 (relevant and appropriate): This regulation establishes postclosure care and groundwater monitoring requirements.

- 10 NYCRR Part 5 (relevant and appropriate): This regulation establishes criteria for drinking water supplies. Specifically, NYSDOH has established MCLs for water.
- NYSDEC TOGS 1.1.1 (relevant and appropriate): This document compiles water quality standards and guidance values for use in NYSDEC programs.

Soil Quality

- 40 CFR Part 268 (relevant and appropriate): Land Disposal Restrictions. Restricts the disposal of listed and characteristic hazardous waste that contains hazardous constituents exceeding designated levels. Applies when the waste is "placed" on the land.
- 40 CFR subpart S parts 264.552 and 264.533 (relevant and applicable): Corrective Action for Solid Waste Management Action for Solid Waste Management Units. Allows for the consolidation of wastes, or the replacement of remediated wastes in land-based units without invoking the RCRA land-disposal requirement of 40 CFR 268.
- 6 NYCRR subpart 375 (relevant and appropriate): This subpart contains the New York State rules for inactive hazardous waste disposal sites. Specifically, cleanup levels for hazardous constituents in soil have been proposed by the State of New York through Technical and Administrative Guidance Manuals (TAGMs). The NYSDEC TAGM manual for cleanup levels for soils is #HWR-92-4046 and has been used as guidance for this remedial action. The final management of these materials will be the focus of the ultimate Record of Decision (ROD) and are not the focus of this action. TAGM 4046 is a "To Be Considered" guideline.

  Site Cleanup Goals (SCG) for semivolatile organic compounds, pesticides, PCBs, and metals have been determined as the maximum concentration to be protective of human health from ingestion of soils under the Industrial Use Scenario.

5.2.2 Location-Specific ARARs

Location-specific ARARs govern natural site features such as wetlands, floodplains, and sensitive ecosystems, and manmade features such as landfills, disposal areas, and places of historic or archaeological significance. These ARARs generally restrict the concentration of hazardous substances or the conduct of activities based solely on the particular characteristics or location of the site. Federal and State regulations which may apply to this removal action include the following:

Federal:

- Executive Orders on Floodplain Management and Wetlands Protection (CERCLA Floodplain and Wetlands Assessments) #11988 and 11990
- National Historic Preservation Act (16 USC 470) Section 106 *et seq.* (36 CFR 800) (Requires Federal agencies to identify all affected properties on or eligible for the National

Register of Historic Places and consult with the State Historic Preservation Office and Advisory Council on Historic Presentation)

- RCRA Location Requirements for 100-year Floodplains (40 CFR 264.18(b)).
- Clean Water Act, Section 404, and Rivers and Harbor Act, Section 10, Requirements for Dredge and Fill Activities (40 CFR 230)
- Wetlands Construction and Management Procedures (40 CFR 6, Appendix A).
- USDA/SCS - Farmland Protection Policy (7CFR 658)
- USDA Secretary's memorandum No. 1827, Supplement 1, Statement of Prime Farmland, and Forest Land - June 21, 1976.
- EPA Statement of Policy to Protect Environmentally Significant Agricultural Lands - September 8, 1978.
- Farmland Protection Policy Act of 1981 (FPPA)(7 USC 4201 et se q).
- Endangered Species Act (16 USC 1531).
- Fish and Wildlife Coordination Act (16 USC 661)
- Wilderness Act (16 USC 1131).

<u>New York State:</u>

- New York State Freshwater Wetlands Law (ECL Article 24, 71 in Title 23).
- New York State Freshwater Wetlands Permit Requirements and Classification (6 NYCRR 663 and 664).
- New York State Floodplain Management Act and Regulations (ECL Article 36 and 6 NYCRR 500).
- Endangered and Threatened Species of Fish and Wildlife Requirements (6 NYCRR 182).
- New York State Flood Hazard Area Construction Standards.

Endangered Species

- 40 CFR Part 257.3-2 (relevant and appropriate): Facilities or practices shall not cause or contribute to the taking of any endangered or threatened species.

Location Standards

- 40 CFR Part 264.18 (relevant and appropriate): Location Standards for Hazardous Waste Facilities. The general requirements for locating a hazardous treatment, storage, or disposal facility are found in this section. They include provisions for seismic considerations and floodplains.
- 40 CFR Part 241.202 (applicable): Site selection shall be consistent with public health and welfare. It shall also be consistent with land-use plans and air and water quality standards.

Antiquities

- 16 USC Part 469a-1 (applicable): The Archaeological and Historic Preservation Act require that action be taken to recover and preserve artifacts.
- 36 CFR Part 800 (relevant and appropriate): Action must be taken to preserve historic properties. Actions must be planned to minimize harm to national historic landmarks.

5.2.3 Action-Specific ARARs

Action-specific ARARs are usually technology- or activity-based- limitations that control actions at hazardous waste sites. Action-specific ARARs generally set performance or design standards, controls, or restrictions on particular types of activities. To develop technically feasible alternatives, applicable performance or design standards must be considered during the development of all removal alternatives. Action-specific ARARs are applicable to this site. The action-specific ARARs to be used will be determined by the Army based upon the technology chosen. Federal and State regulations which may apply include the following:

Federal:

- RCRA Subtitle C Hazardous Waste Treatment Facility Design and Operating Standards for Treatment and Disposal systems, (i.e., landfill, incinerators, tanks, containers, etc.) (40 CFR 264 and 265); Minimum Technology Requirements.
- RCRA, Subtitle C, Closure and Post-Closure Standards (40 CFR 264, Subpart G).
- RCRA Groundwater Monitoring and Protection Standards (40 CFR, Subpart F).
- RCRA Generator Requirements for Manifesting Waste for Offsite Disposal (40 CFR 262).
- RCRA Transporter Requirements for Off-Site Disposal (40 CFR 263).
- RCRA, Subtitle D, Non-Hazardous Waste Management Standards (40 CFR 257).
- Safe Drinking Water Act, Underground Injection Control Requirements (40 CFR 144 and 146).
- RCRA Land Disposal Restrictions (40 CFR 268) (On and off-site disposal of excavated soil).
- Clean Water Act, - NPDES Permitting Requirements for Discharge of Treatment System Effluent (40 CFR 122-125).
- Effluent Guidelines for Organic Chemicals, Plastics and Resins (Discharge Limits) (40 CFR 414).
- Clean Water Act Discharge to Publically - Owned Treatment Works (POTW) (40 CFR 403).
- DOT Rules for Hazardous Materials Transport (49 CFR 107, 171.1-171.500).
- Occupational Safety and Health Standards for Hazardous Responses and General Construction Activities (29 CFR 1904, 1910, 1926).
- SARA (42 USC 9601)
- OSHA (29 CFR 1910.120)
- Clean Air Act (40 CFR 50.61)

New York State:

- New York State Pollution Discharge Elimination System (SPDES) Requirements (Standards for Stormwater Runoff, Surfacewater, and Groundwater discharges (6 NYCRR 750-757).
- New York State RCRA Standards for the Design and Operation of Hazardous Waste Treatment Facilities (i.e., landfills, incinerators, tanks, containers, etc.); Minimum Technology Requirements (6 NYCRR 370-373).
- New York State RCRA Closure and Post-Closure Standards (Clean Closure and Waste-in-Place Closures) (6 NYCRR 372).
- New York State Solid Waste Management Requirements and Siting Restrictions (6 NYCRR 360-361), and revisions/enhancements effective October 9, 1993.
- New York State RCRA Generator and Transporter Requirements for Manifesting Waste for Off-Site Disposal (6 NYCRR 364 and 372).

Solid Waste Management

- 40 part CFR 241.100 (relevant and appropriate): Guidelines for the Land Disposal of Solid Wastes. These regulations are geared specifically toward sanitary landfills; however, they are applicable to all forms of land disposal and land-based treatment.
- 40 CFR Part 241.204 (applicable): Water Quality. The location, design, construction, and operation of land disposal facilities shall protect water quality.
- 40 CFR Part 241.205 (applicable): The design, construction, and operation of land disposal facilities shall conform to air quality and source control standards.
- 40 CFR Part 257.1 (relevant and appropriate): This part establishes the scope and purpose of criteria for use in assessing the possibility of adverse effects on health or the environment from solid waste disposal operations.
- 40 CFR Part 257.3 (relevant and appropriate): This part establishes criteria to assess the impact of disposal operations, including such considerations as floodplains, endangered species, air, surface water, groundwater, and land used for food-chain crops.
- 40 CFR Part 243.202 (relevant and appropriate): This part specifies the requirements for transporting solid waste, including provisions to prevent spillage.

Hazardous Waste Management

- 40 CFR 262.11 (applicable): This regulation requires a person who generates a solid waste to determine if that waste is a hazardous waste.
- 40 CFR Part 263.30 and 263.31 (relevant and appropriate): These regulations set forth the standards and requirements for action in the event of a release during transport.
- 40 CFR Part 264 (relevant and appropriate): This part establishes hazardous waste management facility standards and requirements. The onsite disposal areas used for stockpiling, mixing, and extended bioremediation of wastes must meet the substantive

requirements of 40 CFR subparts B (general facility standards), E (manifest system, record keeping, and reporting), F (releases from solid waste management units), G (closure and postclosure), L (waste piles), M (land treatment), and N (landfills). These regulations are applicable for hazardous wastes and are also relevant and appropriate for certain wastes which are not hazardous wastes.

- 40 CFR Part 270 subpart C (relevant and appropriate): This regulation establishes permit conditions, including monitoring, recordkeeping requirements, operation and maintenance requirements, sampling, and monitoring requirements. Although no permit is required for activities conducted entirely on site, the substantive requirements of these provisions are relevant and appropriate.
- 40 CFR Part 270 subpart B (relevant and appropriate): This part defines the required contents of a hazardous waste management permit application. The substantive requirements of these provisions are relevant and appropriate.

Occupational Health and Safety Administration

- 29 CFR Part 1910.95 (applicable): Occupational Noise. No worker shall be exposed to noise levels in excess of the levels specified in this regulation.
- 29 CFR Part 1910.1000 (applicable): Occupational Air Contaminants. The purpose of this rule is to establish maximum threshold limit values for air contaminants to which it is believed nearly all workers may be repeatedly exposed day after day without adverse health effects. No worker shall be exposed to air contaminant levels in excess of the threshold limit values listed in the regulation.
- 29 CFR Part 1910.1200 (applicable): This part requires that each employer compile and maintain a workplace chemical list which contains the chemical name of each hazardous chemical in the workplace, cross-referenced to generally used common names. This list must indicate the work area in which each such hazardous chemical is stored or used. Employees must be provided with information and training regarding the hazardous chemicals.
- 29 CFR Part 120 (applicable): This part applies to employers and employees engaged in sites that have been designated for cleanup, and other work related to RCRA and CERCLA. The regulation establishes proceedings for site characterization and control, and requirements for employee training and medical monitoring.

Transportation of Hazardous Waste

- 49 CFR Part 171 (applicable): General information, regulations, and definitions. This regulation prescribes the requirements of the DOT governing the transportation of hazardous material.
- 40 CFR Part 172 (applicable): Hazardous materials table, special provisions, Hazardous Materials Communications, Emergency Response Information, and Training requirements. This regulation lists and classifies those materials which the DOT has designated to be

hazardous materials for the purpose of transportation and prescribes the requirements for shipping papers, package marking, labeling and transport vehicle placarding applicable to the shipment and transportation of those hazardous materials.

- 49 CFR Part 177 (applicable): Carriage by Public Highway. This regulation prescribes requirements that are applicable to the acceptance and transportation of hazardous materials by private, common, or contract carriers by motor vehicle.
- 6 NYCRR Chapter 364 (applicable): New York Waste Transport Permit Regulation. This regulation governs the collection, transport, and delivery of regulated waste originating on terminating within the state of New York.
- EPA/DOT Guidance Manual on hazardous waste transportation (TBC).

5.3 CLEAN-UP GOALS

5.3.1 Clean-Up Goals for Soil

The goal of the removal action is to comply with NYSDEC's Technical and Administrative Guidance Memorandum #4046 – *Determination of Soil Cleanup Objectives and Cleanup Levels* (January 24, 1994). Verification sampling will be conducted after the excavation of debris and soils. The soil samples will be analyzed for VOCs, SVOCs, pesticides, and metals and the results compared to the soil cleanup goals presented in Tables 1, 2, 3, and 4 of TAGM 4046.

5.3.2 Discharge Criteria for Groundwater

Discharge criteria for constituents in groundwater will be adopted based on values as reported in the Division of Water Technical and Operational Guidance Series (TOGS 1.1.1 and 1.1.2) for Ambient Water Quality Standards And Guidance Values And Groundwater Effluent Limitations. This document includes the groundwater standards (6 NYCRR 703.5) and regulatory effluent limitations (6 NYCRR 703.6).

5.4 PROJECT SCHEDULE

The total duration for the removal action after regulatory approval is 3 months. Public notice for time-critical removal is required within 60 days of the action start date.

5.5 ESTIMATED COSTS

The estimated total project cost of $4.0 million is based upon a preliminary estimate developed by Parsons using the TRACES/MCACES for Windows v1.2 software **(Table 5.5-1**).

FINAL
DECISION DOCUMENT
TIME - CRITICAL REMOVAL ACTIONS AT
SEAD-59 and SEAD-71
SENECA ARMY DEPOT ACTIVITY

Prepared for:

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

and

US Army Corp of Engineers
Huntsville Center

Prepared by:

PARSONS
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Canton, Massachusetts 02021

Contract No. DACA87-95-D-0031
Delivery Order 17
734516

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APPENDICES

2 SITE CHARACTERIZATION

2.1 BASE DESCRIPTION AND HISTORY

This section provides a brief overview of SEDA and the conditions at the Fill Area West of Building 135 (SEAD-59) and the Alleged Paint Disposal Area (SEAD-71). The sites were evaluated in 1994 as part of an Army effort to determine the conditions at several SWMUs that were considered to potentially pose a threat to human health and the environment. A more detailed discussion can be found in the Draft Final *Project Scoping Plan for Performing a CERCLA Remedial Investigation / Feasibility Study (RI/FS) at the Fill Area West of Building 135 (SEAD-59), and the Alleged Paint Disposal Area (SEAD-71)*, (Parsons, February 1997), as well as the *Expanded Site Inspection - Seven Low Priority AOCs SEADs 60, 62, 63, 64 (A,B,C, and D), 67, 70, and 71,* (Parsons, April 1995), and *Expanded Site Inspection - Eight Moderately Low Priority AOCs SEADs 5, 9, 12 (A and B), 43, 56, 69, 44 (A and B), 50, 58, and 59*, (Parsons, December 1995), and *Draft Phase I Remedial Investigation (RI) at the Fill Area West of Building 135 (SEAD-59), and the Alleged Paint Disposal Area (SEAD-71),* (Parsons, July 1998).

SEAD-59 (Fill Area West of Building 135) is located in the east-central portion of SEDA (**Figure 2-1**). The site encompasses an area along both sides of an unnamed dirt road which provides access to Building 311 and runs perpendicular to the south side of Administration Avenue terminating at Building 311 (**Figure 2-2**). SEAD-59 is comprised of two pieces, one area located north of the access road to Building 311 and one area located to the south of the road. Each area is characterized by different topography with the area to the south of the road being relatively flat and sloping gently to the west, while the area to the north of the road contains a fill area with approximately 10 feet of relief.

The entire western border of the site is defined by a north-south trending drainage ditch. A drainage swale that is oriented east-to-west and parallels the railroad tracks that form the northern boundary of SEAD-59. At the northwestern corner of the site, the drainage swale turns to the north and passes under the railroad tracks. Drainage ditches are also located on each side of the access road to Building 311 and these are sloped from east-to-west and promote flow into the drainage ditch in the western portion of the site.

SEAD-59 was used for the disposal of construction debris and oily sludges. SEDA personnel have indicated that there may be a large quantity of miscellaneous "roads and grounds" waste buried at the site. It is not known when the disposal took place.

SEAD-71 (Alleged Paint Disposal Area) is located in the east-central portion of SEDA (**Figure 2-1**). The site is located approximately 200 feet west of 4th Avenue near Buildings 114 and 127 (**Figure 2-3**). The entire site is approximately 350 feet by 100 feet and bounded on the north and south by railroad tracks serving Buildings 114 and 127. A chain-link fence borders the east side of the site.

It is rumored that paints and/or solvents were disposed in burial pits at SEAD-71. It is not known what other activities occurred here. No dates of disposal are available nor is there any information on the number of suspected disposal pits.

2.2 GEOLOGIC / HYDROGEOLOGICAL SETTING

Regional Geology

The Finger Lakes uplands area is underlain by a broad north-to-south trending series of rock terraces mantled by glacial till. As part of the Appalachian Plateau, the region is underlain by a tectonically undisturbed sequence of Paleozoic rocks consisting of shales, sandstones, conglomerates, limestones and dolostones. **Figure 2-4** shows the regional geology of Seneca County. In the vicinity of SEDA, Devonian age (385 million years ago) rocks of the Hamilton Group are monoclinally folded and dip gently to the south. No evidence of faulting or folding is present. The Hamilton Group is a sequence of limestones, calcareous shales, siltstones, and sandstones.

These rocks were deposited in a shallow inland sea at the north end of the Appalachian Basin (Gray, 1991). Terrigenous sediments from topographic highs associated with the Arcadian landmass of western New England, eastern New York and Pennsylvania were transported to the west across a marine shelf (Gray, 1991). These sediments were deposited in a northeast-southwest trending trough whose central axis was near what are now the Finger Lakes (Gray, 1991).

The Hamilton Group, 600 to 1,500 feet thick, is divided into four formations. They are, from oldest to youngest, the Marcellus, Skaneateles, Ludlowville, and Moscow formations. The western portion of SEDA is generally located in the Ludlowville Formation while the eastern portion is located in the younger Moscow Formation. The Ludlowville and Moscow formations are characterized by gray, calcareous shales and mudstones and thin limestones with numerous zones of abundant invertebrate fossils that form geographically widespread encrinites, coral-rich layers, and complex shell beds. The Ludlowville Formation is known to contain brachiopods, bivalves, trilobites, corals and bryozoans (Gray, 1991). In contrast, the lower two formations (Skaneateles and Marcellus) consist largely of black and dark gray sparsely fossiliferous shales (Brett et al., 1991). Locally, the shale is soft, gray, and fissile. **Figure 2-5** displays the stratigraphic section of Paleozoic rocks of Central New York. The shale is extensively jointed and weathered at the contact with overlying tills. Joint spacings are 1 inch to 4 feet in surface exposures. Prominent joint directions are N 60° E, N 30° W, and N 20° E, with the joints being primarily vertical. Corings performed on the upper 5 to 8 feet of the bedrock revealed low Rock Quality Designations (RQD's), i.e., less than 5 percent with almost 100 percent recovery (Metcalf & Eddy, 1989), suggesting a high degree of weathering.

Pleistocene age (Wisconsin event, 20,000 years ago) glacial till deposits overlies the shales. **Figure 2-6**, the physiography of Seneca County, presents an overview of the subsurface sediments present in the area. The site is shown on as lying on the western edge of a large glacial till plain between Seneca Lake and Cayuga Lake. The till matrix, the result of glaciation, varies locally but generally consists of horizons of unsorted silt, clay, sand, and gravel. The soils at the site contain varying amounts of inorganic clays, inorganic silts, and silty sands. In the central and eastern portions of SEDA, the till is thin and bedrock is exposed or within 3 feet of the surface. The thickness of the glacial till deposits at SEDA generally ranges from 1 to 15 feet.

Darien silt-loam soils, 0 to 18 inches thick, have developed over Wisconsin age glacial tills. These soils are developed on glacial till where they overlie the shale. In general, the topographic relief associated with these soils is from 3 to 8 percent. **Figure 2-7** presents the U.S. Department of Agriculture (USDA) General Soil map for Seneca County.

Regional background elemental concentrations for soils from the Finger Lakes area of New York State are not available. However, elemental concentrations for soils from the eastern United States and in particular, New York State are available. **Table 2.2-1** cites data on the eastern United States from a United States Geological Survey (USGS) professional paper (Shacklette and Boerngen, 1984) and data on the New York State soils from a NYSDEC report.

Regional Hydrology/Hydrogeology

Regionally, four distinct hydrologic units have been identified within Seneca County (Mozola, 1951). These include two distinct shale formations, a series of limestone units, and unconsolidated beds of Pleistocene glacial drift. Overall, the groundwater in the county is very hard, and therefore, the quality is minimally acceptable for use as potable water.

Approximately 95 percent of the wells in the county are used for domestic or farm supply and the average daily withdrawal is approximately 500 gallons, an average rate of 0.35 gallons per minute (gpm). About five percent of the wells in the county are used for commercial, industrial, or municipal purposes. Seneca Falls and Waterloo, the two largest communities in the county, are in the hydrogeologic region which is most favorable for the development of a groundwater supply. However, because the hardness of the groundwater is objectionable to the industrial and commercial establishments operating within the villages, both villages utilize surface water (Cayuga Lake and Seneca River, respectively) as their municipal supplies. The villages of Ovid and Interlaken, both of which are without substantial industrial establishments, utilize groundwater as their public water supplies. Ovid obtains its supply from two shallow gravel-packed wells, and Interlaken is served by a developed seepage-spring area.

Regionally, the water table aquifer of the unconsolidated surficial glacial deposits of the region would be expected to flow in a direction consistent with the ground surface elevations. Geologic cross-sections from Seneca Lake and Cayuga Lake have been constructed by the State of New York, (Mozola, 1951, and Crain, 1974). This information suggests that a groundwater divide exists approximately half way between the two finger lakes. SEDA is located on the western slope of this divide and therefore regional groundwater flow is expected to be primarily westward towards Seneca Lake.

A substantial amount of information concerning the hydrogeology of the area has been compiled by the State of New York, (Mozola, 1951). No other recent state sponsored hydrogeological report is available for review. This report has been reviewed in order to better understand the hydrogeology of the area surrounding SEDA. The data indicates that within a four-mile radius of the site a number of wells exist from which geologic and hydrogeologic information has been obtained. This information includes: (1) the depth; (2) the yield; and (3) the geological strata through which the wells were drilled. Although the information was compiled in the 1950s, these data are useful in providing an understanding and characterization of the aquifers present within the area surrounding SEDA. A review of this information suggests that three geologic units have been used to produce water for both domestic and agricultural purposes. These units include: (1) a bedrock aquifer, which in this area is predominantly shale; (2) an overburden aquifer, which includes Pleistocene deposits (glacial till); and (3) a deep aquifer present within beds of limestone in the underlying shale. The occurrence of water derived from limestone is considered to be unusual for this area and is more commonplace to the north of SEDA. The limestone aquifer in this area is between 100 and 700 feet deep. As of 1957, twenty-five wells utilized water from the shale aquifer, six wells tapped the overburden aquifer, and one used the deep limestone as a source of water.

For the six wells that utilized groundwater extracted from the overburden, the average yield was approximately 7.5 gpm. The average depths of these wells were 36 feet. The geologic material which comprises this aquifer is generally Pleistocene till, with the exception of one well located northeast of the site. This well penetrates an outwash sand and gravel deposit. The yields from the five overburden wells ranged from 4 to 15 gpm. The well located in the outwash sand and gravel deposit, drilled to 60 feet, yielded only 5 gpm. A 20-foot hand dug well, located southeasterly of the outwash well, yielded 10 gpm.

The geologic information reviewed indicates that the upper portions of the shale formation would be expected to yield small, yet adequate, supplies of water, for domestic use. For mid-Devonian shales such as those of Hamilton group, the average yields, (which are less than 15 gpm), are consistent with what would be expected for shales (LaSala, 1968). The deeper portions of the bedrock, (at depths greater than 235 feet) have provided yields up to 150 gpm. At these depths, the high well yields may be attributed to the effect of solution on the Onondaga limestone which is at the base of the Hamilton Group. Based on well yield data, the degree of solution is affected by the type and thickness of overlying material (Mozola, 1951). Solution effects on limestones (and on shales which contain gypsum) in the Erie-Niagara have been reported by LaSala (1968). This source of water is considered to comprise a separate source of groundwater for the area. Very few wells in the region adjacent to SEDA utilize the limestone as a source of water, which may be due to the drilling depths required to intercept this water.

Local Geology

The site geology is characterized by gray Devonian shale with a thin weathered zone where it contacts the overlying mantle of Pleistocene glacial till. This stratigraphy is consistent over the entire site. The predominant surficial geologic unit present at the site is dense glacial till. The till is distributed across the entire site and ranges in thickness from less than 2 feet to as much as 15 feet although it is generally only a few feet thick. The till is generally characterized by brown to gray-brown silt, clay and fine sand with few fine to coarse gravel-sized inclusions of weathered shale. Larger diameter weathered shale clasts (as large as 6-inches in diameter) are more prevalent in basal portions of the till and are probably ripped-up clasts removed by the active glacier.

The general Unified Soil Classification System (USCS) description of the till on-site is as follows: Clay-silt, brown; slightly plastic, small percentage of fine to medium sand, small percentage of fine to coarse gravel-sized gray shale clasts, dense and mostly dry in place, till, (ML). Grain size analyses performed by Metcalf & Eddy (1989) on glacial till samples collected during the installation of monitoring wells at SEDA show a wide distribution of grain sizes. The glacial tills have a high percentage of silt and clay with trace amounts of fine gravel. Another study, conducted at the same site by the United States Army Environmental Hygiene Agency (USAEHA) determined the porosities of 5 gray-brown silty clay (i.e., till) samples. These ranged from 34.0 percent to 44.2 percent with an average of 37.3 percent (USAEHA Hazardous Waste Study No. 37-26-0479-85).

Darian silt-loam soils, 0 to 18 inches thick, have developed over the till, however, in some locations, the agricultural soils have been eroded away and the till is exposed at the surface. The surficial soils are poorly drained and have a silt clay loam and clay subsoil. In general, the topographic relief associated with these soils is from 3 to 8%. A zone of gray weathered shale of variable thickness is present below the till in almost all locations drilled at SEDA. This zone is characterized by fissile shale with a large amount of brown interstitial silt and clay.

The bedrock underlying the site is composed of the Ludlowville Formation of the Devonian age, Hamilton Group. Merin (1992) also cites three prominent vertical joint directions of northeast, north-northwest, and east-northeast in outcrops of the Genesse Formation 30 miles southeast of SEDA near Ithaca, New York. Three predominant joint directions, N60°E, N30°W, and N20°E are present within this unit (Mozola, 1951). These joints are primarily vertical. The Hamilton Group is a gray-black, calcareous shale that is fissile and exhibits parting (or separation) along bedding planes.

Table C-1 in Appendix C presents the local background metal concentrations for soils in the SEDA area.

Local Hydrology/Hydrogeology

Surface drainage from SEDA flows to four creeks. In the southern portion of the depot, the surface drainage flows through ditches and streams into Indian and Silver Creeks. These creeks then flow into Seneca Lake just south of the SEDA airfield. The central part and administration area of SEDA drain into Kendaia Creek. Kendaia Creek discharges into Seneca Lake near the Lake Housing Area. The majority of the northwestern and north-central portion of SEDA drain into Reeder Creek. The northeastern portion of the Depot, which includes a marshy area called the Duck Ponds, drains into Kendig Creek and then flows north into the Cayuga-Seneca Canal and subsequently to Cayuga Lake.

Characterization of the local hydrogeology is based upon hydrogeological information obtained from previous site investigations. USATHAMA (1989) conducted single-well aquifer tests (slug tests) in the Ash Landfill area to estimate the hydraulic conductivity of the water-bearing materials underlying the site. The slug tests were performed on five shallow groundwater monitor wells (PT-11, PT-12, PT-15, PT-21 and PT-23) screened in the overburden and upper (weathered) portion of the bedrock. Slug test data were analyzed according to the method developed by Bouwer and Rice (1976). The hydraulic conductivity values generated from the slug test analysis were used in conjunction with an estimate of soil porosity and the calculated groundwater flow gradient to develop an estimate for the average groundwater flow rate at the Ash Landfill site. Excluding PT-21, which had an unusually low hydraulic conductivity value of 5.87×10^{-11} centimeters per second (cm/sec) (1.66×10^{-7} ft/day), the average hydraulic conductivity, as determined by the slug test analysis, was 2.06×10^{-4} cm/sec (0.587 ft/day). Typical tight clay soils have hydraulic conductivity values that range from 3.53×10^{-5} to 3.53×10^{-8} cm/sec (Davis, 1969).

The effective porosity of the aquifer at the Ash Landfill site was estimated by ICF to be 11 percent. The average linear velocity of groundwater flow, calculated by ICF using Darcy's law, between PT-17 and PT-18 is 2.2×10^{-7} ft/sec, 1.9×10^{-2} ft/day or, 6.9 feet per year (ft/yr) based on a hydraulic conductivity of 3.3×10^{-5} cm/sec (9.33×10^{-2} ft/day).

Data from the Ash Landfill site quarterly groundwater monitoring program and previous field investigations indicate that the saturated thickness of the till/weathered shale overburden aquifer is variable, generally ranging between 1 and 8.5 feet. However, the aquifer thickness appears to be influenced by the hydrologic cycle and some monitoring wells dry up completely during portions of the year. Based upon a review of two years of data, the variations of the water table elevations are likely a seasonal phenomenon. The overburden aquifer is thickest during the spring recharge months and thinnest during the summer and early fall. During late fall and early winter, the saturated thickness increases. This cycle of variations in the aquifer thickness appears to be consistent with what would be expected based upon an understanding of the hydrologic cycle. Although rainfall is fairly consistent at SEDA, averaging approximately 3 inches per month, evapotranspiration is a likely reason for the large fluctuations observed in the saturated thickness of the over-burden aquifer.

On-site hydraulic conductivity determinations were performed by M&E (1989) on monitoring wells MW-8 through MW-17 at the Open Burning Grounds. These wells are all screened within the glacial till unit. The data were analyzed according to a procedure described by Hvorslev (1951). The average hydraulic conductivity measured for the ten monitoring wells was 5.0×10^{-1} ft/day (1.8×10^{-4} cm/sec). The hydraulic conductivities ranged from 2.02×10^{-2} ft/day (7.06×10^{-6} cm/sec) to 1.47 ft/day (5.19×10^{-4} cm/sec). These hydraulic conductivity measurements were within an order of magnitude agreement with previous results reported by O'Brien and Gere (1984). O'Brien and Gere determined the average hydraulic conductivity of the till material to be approximately 2.8×10^{-1} ft/day (9.9×10^{-5}cm/sec). A comparison of the measured values with the typical range of hydraulic conductivities for glacial tills indicates that the glacial till at the site is at the more permeable end of typical glacial till values.

Soils samples were collected during the 1984 USAEHA Phase IV investigation of the Open Burning Grounds to characterize the permeability of the burning pad soils. Soil permeabilities were measured by recompacting the soil in a mold to 95% standard proctor density. The average permeability for 5 measurements was 1.01×10^{-3} ft/day (3.56×10^{-7} cm/sec). The typical range for glacial tills, described by Freeze and Cherry (1979), is between 3×10^{-1} ft/day (1×10^{-4} cm/sec) and 3×10^{-7} ft/day (1×10^{-10} cm/sec).

2.3 AREA METEOROLOGY

Table 2.3-1 summarizes climatological data for the SEDA area. The nearest source of climatological data is the Aurora Research Farm located approximately 10 miles east of the site which provided precipitation and temperature measurements. Meteorological data collected from 1965 to 1974 at Hancock International Airport in Syracuse, New York, were used in preparation of the wind rose. The airport is located approximately 60 miles northeast of SEDA, and is representative of wind patterns at SEDA. The wind rose is presented in **Figure 2-8**.

A cool climate exists at SEDA with temperatures ranging from an average of 23°F in January to 69°F in July. Marked temperature differences are found between daytime highs and nighttime lows during the summer and portions of the transitional seasons. Precipitation is well-distributed, averaging approximately 3 inches per month (**Figure 2-9**). This precipitation is derived principally from cyclonic storms which pass from the interior of the county through the St. Lawrence Valley. Seneca, Cayuga and Ontario Lakes provide a significant amount of the winter precipitation and moderate the local climate. The annual average snowfall is approximately 100 inches. Wind velocities are moderate, but during the winter months there are numerous days with sufficient winds to cause blowing and drifting snow. The most frequently occurring wind directions are westerly and west-southwesterly.

As **Table 2.3-1** shows, temperature tends to be highest from June through September. Precipitation and relative humidity tend to be rather high throughout the year. The months with the greatest amount of sunshine are June through September. Mixing heights tend to be lowest in the summer and during the morning hours. Wind speeds also tend to be lower during the morning, which suggests that dispersion will often be reduced at those times, particularly during the summer. No episode-days are expected to occur with low mixing heights (less than 500 m) and light wind speeds (less than or equal to 2 m/s).

Daily precipitation data measured at the Aurora Research Farm in Aurora, New York (approximately 10 miles east of the site) for the period (1957-1991) were obtained from the Northeast Regional Climate Center at Cornell University. The maximum 24-hour precipitation measured at this station during this period was 3.91 inches on September 26, 1975. The reported mean annual pan evaporation was 35 inches, and annual lake evaporation was a reported 28 inches. An independent value of 27 inches for mean annual evaporation from open water surfaces was estimated from an isopleth presented in *Water Atlas of the United States* (Water Information Center, 1973).

Information on the frequency of inversion episodes for a number of National Weather Service stations is summarized in *Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States* (George C. Holzworth, US EPA, 1972). The closest stations for which inversion information is available are in Albany, New York, and Buffalo, New York. The Buffalo station is nearer to SEDA but almost certainly exhibits influences from Lake Erie. These influences would not be expected to be as noticeable at SEDA.

SEDA is located in the Genesse-Finger Lakes Air Quality Control Region (AQCR). The AQCR is designated as non-attainment for ozone and attainment or unclassified for all other criteria pollutants. Data for the existing air quality in the area which surrounds the SEDA, cannot be obtained since the nearest state air quality stations are 40 to 50 miles away from the Depot, (Rochester of Monroe County or Syracuse of Onondaga County), and is not representative of the conditions at SEDA. A review of the data for Rochester, which is in the same AQCR as the SEDA, indicates that all monitored pollutants (sulfur dioxide, particulates, carbon monoxide, lead, and ozone) are below state and federal limits, with the exception of ozone. In 1987, the maximum ozone concentration observed in Rochester was 0.127 ppm; however, this value is not representative of the SEDA area which is a more rural environment.

2.4 LAND USE

The SEDA is situated between Seneca and Cayuga Lakes and encompasses portions of Romulus and Varick Townships. Land use in this region of New York is largely agricultural, with some forestry and public land (school, recreational and state parks). The most recent land use report is that issued by Cornell University (Cornell 1967). This report classifies land uses and environments of this region in further detail. Agricultural land use is categorized as inactive and active use. Inactive agricultural land consists of land committed to eventual forest regeneration, land waiting to be developed, or land presently under construction. Active agricultural land surrounding SEDA consists largely of cropland and cropland pasture.

Forest land adjacent to SEDA is primarily under regeneration with sporadic occurrence of mature forestry. Public and semi-public land use surrounding and within the vicinity of SEDA are Sampson State Park, Willard Psychiatric Center, and Central School (at the Town of Romulus). Sampson State Park entails approximately 1,853 acres of land and includes a boat ramp on Seneca Lake. Historically, Varick and Romulus Townships within Seneca County developed as agricultural centers supporting a rural population. However, increased population occurred in 1941 due to the opening of SEDA. Population has progressed since then largely due to the increased emphasis on promoting tourism and recreation in this area.

The total area of SEDA is 10,587 acres, of which 8,382 were once designated storage areas for ammunition, storage and warehouse, and open storage and warehouse. Land use at the Depot was previously by the facility mission, but is now subject to change based on the LRA's recommendations. The entire facility has restricted access and is surrounded by chain-link fencing topped with barbed wire. The Depot has a roadway network consisting of paved macadam, concrete, and gravel roads totaling approximately 141 miles.

The intended land use plan for SEAD-59 and 71 is represented in **Figure 2-10**. A property transfer by the Army, according to CERCLA, Sections 120 (h)(1),(2), and (3), requires that the prospective owner must be notified that hazardous substances were possibly stored on the parcel, including the quantity and type of the substances that were stored. Under CERCLA, the content of the deed must include a covenant warranting that all remedial actions necessary to protect human health and the environment with respect to any such hazardous substances remaining on the property have been taken before the date of the transfer. In addition, Section 30 of the IAG requires that the Army notify the EPA and NYSDEC at least 90 days prior to any transfer. The Army shall ensure that all response actions undertaken will not be impeded or impaired by the transfer of the property.

2.5 SITE-SPECIFIC GEOLOGY

2.5.1 SEAD-59

Determination of the site geology was based on the drilling program conducted for the ESI at SEAD-59. This program included 5 soil borings and 3 monitoring wells which were drilled to a maximum depth of 20 feet below ground surface. Based on the results of the drilling program, fill material, till, weathered dark gray shale, and competent gray-black shale are the four major geologic units present on-site. Very little topsoil was present at most of the boring locations. Several of the borings were drilled on a gravel surface, and no topsoil was encountered at these locations.

Fill material was encountered in the seven borings located within the fill area, north of the access road. The borings in which fill was not encountered were the two downgradient monitoring well locations, MW59-1 and MW59-2. The fill was lithologically similar to the till encountered in the area. It was characterized as silt with minor components of sand and shale fragments, but was different from the till in its color, which tended to be gray brown or tan, and by the presence of gravel, asphalt, wood and other organic material. The fill was found at depths of up to 10.5 feet.

The till was characterized as light brown in color and composed of silt, very fine sand, and clay, with minor components of gray-black shale fragments. Larger shale fragments (rip-up clasts) were observed at some locations at the top of the weathered shale. The thickness of the till ranged from 3.1 to 8.6 feet.

The weathered shale that forms the transition between till and competent shale was encountered at five of the nine boring locations. At boring locations MW59-3 and SB59-2, the contact between till and weathered shale was distinct. At the remaining three boring locations, the weathered shale interval was comprised of weathered shale interbedded with till. Competent gray-black shale was observed at MW59-3 and SB59-1 at 8.0 and 10.5 feet below grade, respectively. At the remainder of the boring locations (SB59-3A and SB59-5 excepted), bedrock was inferred from the point of auger or spoon refusal at depths ranging from 9.5 to 20.5 feet below grade.

2.5.2 SEAD-71

Determination of the site geology was based on the results of the subsurface exploration program conducted during the ESI at SEAD-71. This program included three soil borings, which were completed as monitoring wells, and two test pits. The soil borings were drilled to a maximum depth of 9.4 feet below ground surface and the test pits were excavated to a maximum depth of 5.7 feet.

Based on the results of the subsurface exploration program, till, calcareous weathered shale, and competent shale are the three major types of geologic materials present on-site. The till in the storage area was characterized as olive gray clay with little silt, very fine sand, and shale fragments (up to 1 inch in diameter) and ranged in thickness between 4.7 and 7.8 feet. In the southern section of the storage area, the till consisted of light brown silt with little clay and trace amounts of shale fragments (up to 1 inch in diameter). Large shale fragments (rip-up clasts) were observed at or near the till/weathered shale contact at all soil boring locations. In the western half of the site, the till consisted of olive gray silt and was found to be approximately 4 feet thick.

The weathered shale that forms the transition between the till and competent shale was encountered at all soil boring and test pit locations. The depth of the weathered shale ranged from 4.7 to 8.3 feet below ground surface. Competent, calcareous gray shale was encountered at depths between 5.2 and 9.4 feet below ground surface.

2.6 SITE-SPECIFIC HYDROLOGY AND HYDROGEOLOGY

2.6.1 SEAD-59

SEAD-59 is comprised of two areas, one area located north of the access road leading to Building 311, while the other is located to the south of the road. Each area is characterized by different topography: the area to south of the road is relatively flat and slopes gently to the west, while the area to the north of the road contains a fill area with approximately 10 feet of relief.

Surface water flow from precipitation events is controlled by the local topography. Surface water flow in the southern area is to the west following the local topographic slope, and this water is likely captured either by the north-south trending drainage swale that is located in the western portion of the site or by the drainage ditch which parallels the south side of the access road. This latter drainage ditch also captures runoff from SEAD-5, which is located adjacent to SEAD-59 and to the east.

In the area north of the access road, a hill composed of fill material has approximately 10 feet of vertical relief. To the west, the hill slopes steeply to the north-south trending drainage swale which turns north and eventually passes under the railroad tracks north of the site. To the north, the fill material hill slopes towards a sustained drainage ditch approximately two feet deep. This drainage ditch originates east of the site near Building 128 and extends to the west paralleling the railroad tracks and the northern boundary of SEAD-59. At the northwestern corner of the site, the drainage swale passes to the north under the railroad tracks. To the east, the fill area hill slopes downward to a graded gravel surface used for storing large equipment. Surface water from this area also drains into the northern drainage swale, flowing along the northern boundary of the site, as described above. To the south, the fill area slopes to the access road that runs through the site. Surface water from the southern portion of the fill area drains into the drainage ditch that parallels the access road and runs along the north side. This drainage ditch drains to the west and intersects the north flowing drainage ditch in the western portion of SEAD-59.

As part of the ESI program, three monitoring wells were installed at SEAD-59 and three wells were installed at SEAD-5. SEAD-5 is located immediately adjacent to SEAD-59, just east of the area that is to the south of the access road. Based on the data collected during the ESI, the groundwater flow direction is primarily southwest across SEAD-59.

2.6.2 SEAD-71

Surface water flow from precipitation events is controlled by local topography, although there is little topographic relief on the site. There are no sustained surface water bodies on-site. In the fenced storage area located in the eastern half of the site, the area is covered with asphalt, which provides an impermeable surface resulting in an increased amount of surface water runoff from the site. Based on topographic relief, surface water flow is to the southwest towards the SEDA railroad tracks (to the south), which are topographically lower than the site.

As part of the ESI program, three monitoring wells were installed at SEAD-71. Based on the data collected during the ESI, the groundwater flow direction in the till/weathered shale aquifer on the site is to the west-southwest.

2.7 CONTAMINATION ASSESSMENT

Geophysical surveys and test pits were performed during the ESI and RI to identify burial sites at SEADs59 and 71. Soil (surface, subsurface), soil gas, and groundwater were collected and analyzed as part of the investigations (**Figures 2-11 and 2-12**). The results are presented in the *Draft Phase I Remedial Investigation (RI) SEAD-59 and SEAD-71* (Parsons, 1998), *the ESI Report for Seven Low Priority AOCs - SEADs 60, 62, 63, 64 (A, B, C, and D), 67, 70, and 71* (Parsons, 1995a) and the *Expanded Site Inspection - Eight Moderately Low Priority AOCs SEADs 5, 9, 12 (A and B), 43, 56, 69, 44 (A and B), 50, 58, and 59* (Parsons, December 1995). The following sections summarize the nature and extent of contamination identified at these sites.

2.7.1 Soil Gas Survey

2.7.1.1 SEAD-59

A total of 241 soil gas points were sampled and analyzed during the Phase I RI investigation at SEAD-59. This sampling effort revealed one large area and four smaller areas of elevated total volatile organic compounds (VOCs), as shown in **Figures 2-11 and 2-13**. The larger area of elevated soil gas encompasses most of SEAD-59, extending from north of the unnamed road to the west of the 60,000 gallon oil storage tank, including the mounded fill area. The highest soil gas concentrations measured were found within the boundaries of the fill area. Maximum total VOC concentrations of greater than 10 ppmv were observed at three separate locations within the fill area. The four smaller areas of elevated soil gas VOC concentrations were detected in an area southeast of the fill area, an area directly southwest of the fill area, another area south of the fill area, and an additional area northwest of the fill area.

2.7.1.2 SEAD-71

A soil gas survey was not performed at SEAD-71.

2.7.2 Geophysics: Seismic Survey

2.7.2.1 SEAD-59

Four seismic refraction profiles were performed during the ESI on 4 lines positioned along each boundary line of SEAD-59. The seismic refraction profiles detected 5 to 10 feet of unconsolidated overburden (1,050 to 1,730 ft/sec) overlying bedrock (10,500 to 15,500 ft/sec). Saturated overburden was not detected by the seismic survey due to limited thickness of the saturated overburden. The elevations of the bedrock surface indicated that the bedrock sloped to the west, generally following the surface topography. Based upon the results of the seismic survey, the groundwater flow direction was also expected to be to the west, following the slope of the bedrock surface.

2.7.2.2 SEAD-71

Four seismic refraction profiles were performed as part of the geophysical investigations for the ESI on four lines positioned along each boundary line of the storage area in the eastern half of SEAD-71. The seismic refraction profiles detected 6 to 9 feet of unconsolidated overburden (1,125 to 1,500 ft./sec.) overlying bedrock (12,800 to 16,200 ft./sec.). Saturated overburden was not detected by the seismic survey due to limited thickness of the saturated overburden. The elevations of the bedrock surface indicated that the bedrock slopes to the west, generally following the surface topography. Based on the results of the seismic survey, the groundwater flow direction is also expected to be to the west, following the slope of the bedrock surface.

2.7.3 Geophysics: EM-31 Survey

2.7.3.1 SEAD-59

Electromagnetic (EM-31, EM-61) surveys were performed for the ESI and the Phase I RI at SEAD-59 to delineate the limits of the landfill and to identify locations where metallic objects were buried. Fill areas can generally be delineated since these areas contain metallic objects which can be easily detected using electromagnetic techniques. Areas within the fill where magnetic anomalies are prevalent also serve as a basis for performing test pit exploration, especially when these areas coincide with elevated soil gas anomalies.

Figure 2-14 shows the EM-31 quadrature response, which is proportional to the apparent ground conductivity that was collected during the ESI. Several apparent ground conductivity anomalies were observed in the northeastern portion of the EM grid which coincided with areas used for site access and equipment storage. A large area of elevated ground conductivity, also located in the northeastern portion of the EM grid, could be attributed to an increase in the clay content of the fill material, to the presence of dissolved solids in the groundwater, or to soil moisture. A north-south trending lineament was detected near the western boundary of the EM grid and was correlated to a drainage swale having a large quantity of clay sediment along its length.

Ten localized anomalies were identified as a result of the EM-31 survey completed at SEAD-59. Two of the 10 localized anomalies were correlated to surface features: one was attributed to a drainage culvert located under the railroad track along the northern boundary of the EM grid, and the second was correlated to an area of surface debris located in the southwestern portion of the EM grid. The sources of the remaining eight localized anomalies could not be attributed to surface features.

The results of the in-phase response, which reflect the presence of buried ferrous objects, are shown in **Figure 2-15**. Eight of the localized in-phase response anomalies are roughly coincident with the eight apparent ground conductivity anomalies of unknown origin previously mentioned. Several larger anomalies were identified in the northeastern quadrant of the EM grid and were associated to cultural features. Although many anomalies were observed in both the apparent ground conductivity and in-phase data, no clearly defined boundaries of the large fill area in the northeastern portion of the EM grid could be determined based upon the geophysical results.

The results of the electromagnetic (EM-61) survey performed for the Phase I RI at SEAD-59 are shown in **Figures 2-11** and **2-13**. Fifty-seven localized anomalies were identified as a result of the EM-61 survey completed at SEAD-59. Eighteen of the 57 localized anomalies were correlated to known surface features such as the drainage culvert located under the railroad track along the northern boundary of the EM grid, and the area of surface debris located in the southwestern portion of the EM grid. The sources of the remaining 39 localized anomalies could not be attributed to surface features and are due to unknown buried sources.

2.7.3.2 SEAD-71

The EM-31 survey was performed for the ESI at SEAD-71 in the western half of the site to help locate the burial pits. **Figure 2-16** shows the EM-31 quadrature response, which is proportional to the apparent ground conductivity survey. **Figure 2-17** shows the results of the in-phase response, which reflects the presence of buried ferrous objects.

Interferences from many cultural effects (e.g., railroad tracks, fences, etc.) along the perimeter of the surveyed area complicated the interpretation of the data. A review of the EM-31 data from SEAD-71 revealed one area, in the south central portion of the grid, where both the apparent conductivity and the in-phase response decreased noticeably. One other area of increased apparent ground conductivity measurements was detected along the west-central portion of the grid; however, an associated in-phase response was not observed.

2.7.4 Geophysics: GPR Survey

2.7.4.1 SEAD-59

Ground penetrating radar (GPR) data were acquired during the ESI at SEAD-59 along profiles spaced at 50-foot intervals. In addition, GPR data from two profiles were also collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources. The GPR profiles revealed 17 locations where buried metallic objects were suspected. A small disposal pit was also detected in the southeastern portion of the area investigated. Twelve of the buried metallic object locations were situated within the suspected disposal area in the northeastern quadrant of SEAD-59. Ten of the GPR anomaly locations were either situated over a localized EM anomaly or within 15 feet of a localized EM anomaly.

GPR data were also acquired during the Phase I RI at SEAD-59 over each distinct EM-61 anomaly to provide better characterization of the suspected metallic sources. Test pit locations were selected based on GPR data indicating the strongest presence of disposal pits or debris.

2.7.4.2 SEAD-71

GPR data was acquired for the ESI at SEAD-71. The data from these surveys revealed an underground utility line or conduit running northwest - southeast across the northeastern corner of the storage compound. One area of anomalous subsurface reflections, typical of reflections from metallic objects, was detected in the south-central portion of the storage compound. The GPR survey conducted in the area west of the storage compound revealed five localized anomalies and three zones with multiple anomalies. The source of these EM-31 and the GPR anomalies was identified during test pit excavations as construction debris composed of chain-link fencing, sheet metal, asphalt, and a crushed, yellow, twenty gallon drum. Weathered shale, encountered at a depth of 5.5 feet, limited any further advancement of the excavation. There were no readings above background levels (0 ppmv of organic vapors and 10-15 micro rems per hour of radiation) during the excavations.

GPR data were also acquired during the Phase I RI at SEAD-71 in the area depicted in **Figure 2-12** to provide better characterization of the suspected metallic sources. Test pit locations were selected based on GPR data indicating the strongest presence of disposal pits or debris.

2.7.5 <u>Test Pitting Program</u>

2.7.5.1 SEAD-59

Test pits were excavated during both the ESI and Phase I RI in areas identified by geophysics and soil gas as anomalies. Test pit excavations were performed to investigate the nature of the anomaly and to collect chemical data to identify the presence of constituents of concern. The excavated material from all the test pits excavated during the Phase I RI was continuously screened for organic vapors with a Thermo Environmental Organic Vapor Meter (OVM) 580 PID. With the exception of the OVM readings cited below, no other readings above background levels (0 ppmv of organic vapors) were observed during the excavations.

Five test pits were excavated during the ESI and nineteen test pits were excavated during the Phase I RI at SEAD-59. Their locations are shown on **Figure 2-11**. Test pit logs can be found in the appendices of the ESI (Parsons, 1995) and Phase I RI (Parsons, 1998) reports. Test pit locations were selected based on the results of the EM-31, EM-61, GPR and soil gas anomalies located throughout the site. Geophysical anomalies that coincided with the presence of soil gas anomalies were considered to represent the greatest potential for contamination.

Ten test pits (TP59-2, TP59-3, TP59-4, TP59-7, TP59-10, TP59-11, TP59-14, TP59-15, TP59-16 and TP59-17) were excavated within the fill area during the ESI and Phase I RI. Debris consisting of concrete, asphalt, metal, and wood were found in this area. A layer of petroleum hydrocarbon stained silt (having a petroleum odor) was observed in the 1.4 to 1.8 feet depth interval of test pit TP59-4. A maximum reading of 132 ppmv of organic vapors was recorded from this depth interval with a hand-held Organic vapor meter (OVM). Soil sample TP59-4-1 was collected from this depth interval to confirm the presence of contamination.

Three, 55-gallon drums were found at approximately 3 feet below grade at the TP59-3 location. One drum had been buried in an upright position and the two others were found in a horizontal position. The excavation was halted when these drums were unearthed; therefore, the possible presence of additional drums at greater depths is unknown. Soils from the spaces between the drums were collected and identified as soil sample TP59-3. One end of one of the horizontally positioned drums was separated from the body of the drum, revealing a white, flexible, plastic-like substance. Some areas of this white substance showed a dark-yellow staining. A small amount of this substance was collected in a VOC vial and submitted for VOC analysis as sample number TP59-3X.

Drums were also found in test pits TP59-15 and TP59-16. A crushed 15-gallon drum containing black oily stains was located six feet below ground surface in TP59-15. An OVM reading of 16 ppmv was recorded at this location. Sample TP59-15-1 was collected from the exterior of the drum. Another drum was found in TP59-16. This drum did not appear to be leaking and no OVM reading was recorded. Sample TP59-16-1 was collected from beneath this drum. Corroded drum fragments having no contents were found in TP59-10.

Test pits TP59-13A, TP59-13B, and TP59-13C were excavated, in the area directly southwest of the fill area. Little debris was encountered in these pits. However, a petroleum-type odor was noted at a depth of 3.5 and 4 feet below grade in TP59-13A and an OVM reading of 7.4 ppmv was recorded. In addition, a sheen was observed on the water surface that was encountered at the top of the shale bedrock at four feet below ground surface. A silty sheen having no odor was also observed in water encountered at approximately the same depth in TP59-13C. Samples TP59-13A-1 and TP59-13C-1 were collected from the intervals above the bedrock where the water was encountered (between 3 to 4 feet below ground surface).

In the area south of the fill area, test pits TP59-1, TP59-5, TP59-6, TP59-12A, TP59-12B and TP59-12C were excavated. The excavation at TP59-1 revealed a large quantity of filled 2-gallon paint cans buried approximately 1 foot below the ground surface. Several zones of paint stained soil were observed and screened with an OVM. Soil and paint residues from the zone with the highest organic vapor reading (560 ppmv) were collected and submitted for chemical analysis as soil sample TP59-1. A 0.6-foot thick layer of construction debris had been disposed of over the paint cans. This debris included a crushed, yellow, 20-gallon waste can and chain-link fencing. A 5-inch thick layer of crushed shale gravel overlaid the construction debris. A 5-gallon paint can was observed one foot below the surface at TP59-12A as well as a paint globule and a crushed 1-gallon paint can. No organic vapors were detected and sample TP59-12A-1 was collected from between 1 and 1.5 feet below ground surface. At test pit TP59-12B, a 5-gallon paint can leaking a brown grease-like substance was also uncovered one foot below the surface. White solidified paint was also observed in this interval. An OVM reading of 274 ppmv was recorded. Construction debris was encountered in TP59-5, the westernmost test pit at SEAD 59, and TP59-6, one of the southernmost test pits at SEAD-59.

Construction debris was encountered in the test pits excavated in the area southeast of the fill area (TP59-8, TP59-9 and TP59-18). Some iron-stained soil was noted between 1.5 and 2 feet below ground surface at TP59-18.

2.7.5.2 SEAD-71

Four test pits were excavated during the Phase I RI at SEAD-71 to characterize the source of the geophysical anomalies. Two test pits were excavated during the ESI as well. The locations of the test pits are shown on **Figure 2-12**. The test pit logs are presented in the appendices of the ESI (Parsons, 1995) and RI (Parsons, 1998) reports. The excavated material from the test pits was continuously screened for organic vapors during the Phase I RI with a Thermo OVM 580 PID. Except for the OVM readings cited below, no readings above background levels (0 ppm of organic vapors) were observed during the excavations.

The source of the EM-31 and the GPR anomalies identified during the ESI at the TP71-1 location was identified as construction debris composed of chain-link fencing, sheet metal, asphalt, and a crushed, yellow, 20-gallon drum. This debris was situated 0.75 to 1.3 feet below the ground surface. A 0.75 foot thick layer of fine angular black debris (resembling creosote or soot) was observed immediately below the construction debris layer. A weathered shale layer, encountered at a depth of 5.5 feet, limited any further advancement of the excavation.

Test pit TP71-2 was centered over a GPR anomaly located in the storage area. This location was situated along the southern boundary of compacted roadstone. A dark gray to black, possibly stained, fine shale gravel layer was encountered from 0.25 to 1.0 foot below ground surface. The source of the GPR anomaly was not identified at this test pit location. Changes in the electrical properties of the soils within a layer may give rise to spurious radar wave reflections resembling GPR signatures observed over metallic objects.

Test pit TP71-3 was located over a GPR anomaly located north of the road and near the steel garage. Sand and stone slabs were encountered between 0.5 and 2 feet. At 8 feet below ground surface, a slight hydrocarbon odor was noticed and an OVM reading of 4 to 6 ppmv was recorded. Sample TP71-3-1 was collected from between 8.5 and 9 feet below the ground surface. The soil at this depth was stained with a gray-brown color. A trace of an oily sheen was noted on the clay soil at ten feet and stones at 10.5 to 11 feet were covered with a brown oily liquid. Sample TP71-3-2 was collected from between 10.5 and 11 feet below ground surface.

Test pit TP71-4 was located over a GPR anomaly located north of the road. A stone slab layer was encountered at 1 foot below the surface and other slabs mixed with lumber sand and stone were located between 3 and 7 feet below the surface. At ten feet below ground surface, some iron staining was noted on the soil and an OVM reading of 6 ppm was recorded.

Test pit TP71-5 was located over a GPR anomaly located between the south edge of the road and the southern railroad tracks. Railroad ties were encountered at 3 to 7 feet below ground surface which matched the GPR anomaly. Sample TP71-5-1 was collected from between 7 and 7.5 feet below ground surface. At 12.5 feet below ground surface, an OVM reading of 8 ppmv was recorded and sample TP71-5-2 was collected from between 12.5 and 13 feet below ground surface for on-site screening.

Test pit TP71-6 was located south of the road and north of the railroad and salt shed. Fill within this test pit consisted of black cinders, wood, asphalt bricks, fencing, piping and railroad ties. Sample TP71-6-3 was collected from beneath the black cinders between 3 and 3.5 feet below ground surface. Two other samples (TP71-6-1 and TP71-6-2) were collected from the native soils beneath this test pit.

2.7.6 Summary of Affected Media

2.7.6.1 SEAD-59

The ESI and Phase I RI conducted at SEAD-59 identified several areas which have been impacted by releases of volatile organic compounds, semivolatile organic compounds, total petroleum hydrocarbons, and to a lesser extent, heavy metals.

Soil Data

Sampling conducted in SEAD-59 indicated impacts to soils from volatile organic compounds, semivolatile organic compounds, total petroleum hydrocarbons, and to a lesser extent, metals. A total of 24 soil samples were collected from soil borings and test pits as part of the ESI for SEAD-59. A total of 105 samples were collected during the Phase I RI for field screening and 34 of those samples were sent to the laboratory for confirmatory analysis. **Table 2.7-1** presents a summary of the compounds detected during these investigations. **Table A-1** in Appendix A presents all validated data for soil from SEAD-59.

Six VOCs including acetone, methylene chloride, methyl ethyl ketone, methyl chloride, carbon disulfide, and trichloroethene, were detected in soil samples at concentrations that were below NYSDEC recommended soil cleanup levels.

In the fill area, PAH compounds were found in surface soil and subsurface soil samples at concentrations exceeding their NYSDEC soil cleanup objective levels. Total petroleum hydrocarbons were detected in the majority of the soil samples collected from the fill area. In the area directly southwest of the fill area, there is both physical and chemical evidence of the presence of hydrocarbons. In the area south of the fill area, several paint cans containing paint were found. BTEX constituents were detected in the sample from this location at concentrations exceeding their associated NYSDEC recommended soil cleanup objective levels. **Figure 2-18** presents the distribution of benzo[a]pyrene, chosen as an indicator of the distribution of PAHs throughout SEAD-59.

Endrin aldehyde was detected in 11 of the 55 soil samples in which it was analyzed for, at a maximum concentration of 15 ug/Kg. There is no NYSDEC recommended cleanup value for this compound.

A total of 22 metals were detected in soil samples collected from SEAD-59. Fifteen metals were detected in one or more samples at concentrations that exceeded their associated NYSDEC cleanup criteria values. Exceedances were reported in all but 11 of the soil samples collected. A variety of the metals were found at concentrations just slightly above their cleanup criteria levels, and approximately half of these exceedances appear to reflect natural variations in site soils. The exceptions to this are the metals antimony, calcium, lead, mercury, silver, sodium, and zinc which were reported at concentrations that are at least two times their recommended cleanup criteria levels.

Groundwater Data

One round of groundwater sampling was conducted at SEAD-59 during the ESI field program in 1994. The sampling procedure used at that time was not the EPA Region II low-flow groundwater sampling method and therefore the results may not be representative of the groundwater at the site due to turbidity in the groundwater samples.

The analytical results of the groundwater analyses (**Table A-2** in Appendix A of the Decision Document) indicate that the groundwater at SEAD-59 has been moderately impacted by total petroleum hydrocarbons and, to a lesser extent, by metals and semivolatile organic compounds. Total petroleum hydrocarbons were detected at low concentrations in both of the downgradient groundwater samples, but it was not detected in the upgradient groundwater sample. Aluminum was detected in all three wells at concentrations above its EPA secondary MCL of 50 ug/L; the highest concentration measured for aluminum in groundwater was found in the upgradient well. Iron and sodium were also detected at concentrations above their associated groundwater criteria in all three wells, and again the highest concentrations measured for these compounds were found in the upgradient well. Thallium was found in the upgradient and one downgradient groundwater sample at concentrations above its federal MCL. Manganese was found in one downgradient sample at a concentration above NYSDEC's groundwater criteria. One SVOC, phenol, was reported at estimated concentrations above its groundwater criteria level.

The results of the ESI and RI have identified significant releases of BTEX and PAH compounds in the materials comprising the fill area and disposal pits at SEAD-59. It is important to note that trace quantities of total petroleum hydrocarbons detected in the fill materials are presumably being leached into the groundwater beneath the site.

2.7.6.2 SEAD-71

Soil and groundwater were sampled as part of the ESI conducted at SEAD-71 in 1994. Soils were also sampled as part of the Phase I RI conducted in 1998. Sampling and analyses were based upon historical usage of the area for the disposal of paint and solvents. The results of these investigations were detailed in the ESI and Phase I RI reports (Parsons, April 1995, July 1998). To evaluate whether each media (soil and groundwater) is being impacted, the chemical analysis data from both investigations were compared to available New York State and Federal standards, guidelines, and criteria. Only those state standards which are more stringent than federal requirements were used as criteria during the comparisons.

Soil Data

Twenty-one (21) surface soil (i.e., 0-0.2 ft) samples were obtained for chemical analysis as part of the Phase I RI for SEAD-71. Nine soil samples were collected from four test pits and screened for BTEX compounds using immunoassay field screening tests and five of these samples were sent to the laboratory for confirmatory chemical analysis. The chemical data for these surface soil and test pit soil samples in addition to the eight soil samples collected from two test pits during the ESI are summarized in **Table 2.7-2.** **Table B-1** in Appendix B presents all validated data from the two investigations at SEAD-71. The following sections describe the nature and extent of contamination identified at SEAD-71.

The Phase I RI confirmed the findings of the ESI conducted at SEAD-71. No burial pit for paint and solvents was uncovered during either investigation, although the investigations did indicate the soils at SEAD-71 have been impacted by the waste materials which have been disposed in at least one disposal pit on site. At three test pit locations, PAHs were present at concentrations exceeding their associated criteria levels identified in NYSDEC's TAGM #4046. Heavy metals concentrations above their recommended soil cleanup levels were also present in these three test pits. There is clear evidence that surface soils at SEAD-71 have been impacted by waste materials disposed in the area. Both PAHs and heavy metals were detected above their associated NYSDEC criteria levels in every surface soil sample collected during the Phase I RI. **Figure 2-19** presents the benzo[a]pyrene concentrations detected at SEAD-71. Benzo[a]pyrene was selected as the indicator chemical for PAHs.

Groundwater Data

One round of groundwater sampling was conducted at SEAD-71 during the ESI field program in 1994. The sampling procedure used at that time was not the EPA Region II low-flow groundwater sampling method and therefore the results may not be representative of the groundwater at the site due to turbidity in the groundwater samples.

Groundwater at SEAD-71 has not been significantly impacted. Metals were the only constituents detected, with 20 being found in the samples collected. Five of the detected metals (aluminum, iron, lead, manganese, and thallium) were found at concentrations exceeding comparative criteria (**Table B-2** in Appendix B).

3 RECOMMENDATIONS

This section presents the Army's recommendation that a time-critical removal action be conducted at SEAD-59 and SEAD-71, both of which are located in a portion of SEDA that is designated for Planned Industrial Development. The time-critical removal action would consist of excavation of the debris and visually impacted soil, off-site disposal, verification sampling and analysis, backfilling, and re-establishment of grade surface and vegetation at each excavation site. Soil excavated from the site that was determined not to pose a risk to human health or groundwater quality would be used as part of the backfill for the excavations. Verification sampling would be conducted after the excavation of debris and soils.

3.1 REMEDIAL ACTION OBJECTIVE

For SEAD-59 and SEAD-71, the remedial objective is to remove the source of potential risks to human health, the environment, and groundwater quality.

The results of the test pitting investigations have confirmed the presence of 55-gallon drums, paint cans, and other containers at SEADs-59 and 71. The presence of such buried objects is of concern since the nature of the contents is unknown. The uncertainty of the contents of the buried items that may remain in the disposal area and at geophysical anomalies and the contamination in soils and groundwater are considered justification for performing removal actions at SEADs-59 and 71. While removal of drums, paint cans, and other containers is the focus of the planned removal actions for both sites, the potential for contamination to be present in the soils and groundwater that surround these items will also be addressed by this action.

3.2 REMEDIATION GOALS

Soil verification samples will be collected from the base and side walls of each excavation and analyzed for contaminants of concern. The results obtained will be compared to the NYSDEC's recommended soil cleanup goals presented in Tables 1, 2, 3, and 4 of TAGM #4046. The soil data will also be used to complete the RI/FS process and to evaluate the risk at the sites.

3.3 RECOMMENDED REMOVAL ACTION

SEAD-59 consists of two areas that are located north and south of an access road that bisects the site from east to west. The area north of the road is a fill area and the area south of the road was used as a staging area for heavy equipment and construction materials.

As part of the removal action at SEAD-59, approximately 23,025 cy of soil will be excavated (**Figure 3-1**). The fill area (Area 1) will be excavated. Geophysical anomalies located south of the road will be excavated. Drums, paint cans, and construction debris will be screened out and disposed off-site at approved facilities. The excavation limits will be determined based on the visual extent of contamination. Excavation will continue until all debris and visually impacted soils have been removed. Cleanup verification sampling of soil will be collected from the bottom and sides of the excavations based on a 50 feet by 50 feet grid. For small excavations measuring less than 2,500 square feet, five samples will be collected (1 from the base and one from each sidewall) at each excavation site. Confirmatory samples will not be collected in areas where only inert surface debris such as concrete or scrap metal is removed.

Following excavation, soils will be placed in 150 cy piles for testing to ensure that they comply with the cleanup goals established for the site. One confirmatory sample will be collected per 150 cy pile. Soils with concentration of VOCs, SVOCs, pesticides, and metals exceeding the cleanup goals will be disposed of at an off-site facility. These soils will also be analyzed for the characteristic of toxicity via the Toxicity Characteristic Leaching Procedure (TCLP) (every 150 cy), which is required for landfill disposal. Soils from SEAD-59 are not expected to exceed TCLP limits. Based on the soil data obtained from SEAD-59, it was assumed that 65% of the excavated soil will contain concentrations of compounds above the associated cleanup goals and will require off-site disposal. There is a possibility that some soils from SEAD-59 will also exceed the TCLP limits. These soils will be treated offsite. Once treatment of necessary soils has occurred, these contaminated soils will be transported to an off-site, Subtitle D, solid waste industrial landfill for disposal.

Prior to backfilling, the Army will provide the results of the confirmatory sampling analyses to the NYSDEC and EPA for prior written approval of the excavated material as backfill. Excavated soil that is not found to contain concentrations of contaminants in excess of NYSDEC TAGM 4046 criteria will be used as backfill into the former fill area or the area south of the road. Additional clean fill will be brought on-site to supplement the soil recovered from the excavations. The sites will be regraded. A two-foot thick vegetative cover will be placed over the former fill area. It is assumed that provisions of NYCRR Part 360 will no longer apply to SEAD-59 because the fill area is being removed. The remaining areas will be covered with crushed stone.

The excavations at SEAD-59 will be dewatered and the water will be collected and placed in holding tanks. Any groundwater collected will be treated via air stripping and disposed in accordance with applicable state and federal regulations in a storm drain or drainage ditch.

A contingency plan will be added to the Removal Action Work Plan in case additional debris, or debris that does not fit the description of materials excavated to date is found and excavated. The contingency plan will also provide procedures to be followed if drums, similar to those encountered in the test pits conducted during the Phase I RI, are encountered.

At SEAD-71, approximately 861 cubic yards of geophysical anomalies and soils with concentrations exceeding the soil cleanup goals for the site will be excavated (**Figure 3-2**). Paint cans and debris will be screened out and disposed offsite. The excavation limits will be determined based on the visual extent of contamination. Excavation will continue until all debris and visually impacted soils have been removed. Cleanup verification sampling of soil will be collected from the bottom and sides of the excavations based on a 50 feet by 50 feet grid. For small excavations, five samples will be collected (one from the based and one from each sidewall) at each excavation site. Confirmatory samples will not be collected in areas where only inert surface debris such as concrete or scrap metal is removed.

Following excavation, soils will be placed in 150 cy piles for testing to ensure that they comply with the cleanup goals developed for the site. One confirmatory sample will be collected from each 150 cy pile of excavated soil. Soils with concentration of VOCs, SVOCs, and metals exceeding the cleanup goals will be disposed at an off-site facility. These soils will also be analyzed for the characteristic of toxicity via the Toxicity Characteristic Leaching Procedure (TCLP) (every 150 cy) which is required for landfill disposal. About 3% (26 cy) of SEAD-71 soils are expected to exceed TCLP limits due to elevated levels of lead. There is a possibility that more than 3% of the soil may exceed the TCLP limits. These soils will be treated offsite. Once treatment of necessary soils has occurred, these contaminated soils will be transported to an off-site, Subtitle D, solid waste industrial landfill for disposal.

Prior to backfilling, the Army will provide the results of the confirmatory sampling analyses to the NYSDEC and EPA for prior written approval of the excavated material as backfill. Excavated soil that is not found to contain concentrations of contaminants in excess of NYSDEC TAGM 4046 criteria will be used as backfill at SEAD-71. No backfilling will occur without prior written approval from the NYSDEC. The area will be covered with crushed stone.

3.4 JUSTIFICATION

A time-critical removal action at both SEAD-59 and SEAD-71 is proposed due to the increased potential for exposure of workers and other re-users now present at the Depot to chemicals and debris that have been identified at these sites. The presence of drums and other containers and the uncertainty of their contents is also justification for a removal action at both sites.

Since the historic military mission of the Depot has been terminated, the Depot has been closed by the DoD and the US Army. This time-critical removal action would eliminate contaminants that have been identified in the soil that represent a potential threat to the environment and neighboring populations. In accordance with provisions of the DoD's BRAC process, the land and the facilities of the former Depot have been surveyed and evaluated, and prospective beneficial uses of the facility have been identified. Portions of the Depot are now being released to the public and private sectors for reuse under the

BRAC process. As portions of the former Depot are released for other beneficial uses, increased access is afforded to all portions of the former Depot. This may result in an increased potential for exposure of populations to any residual chemicals that are present at former solid waste management units (SWMUs) remaining at the depot pending clean-up. Therefore, the goal of the proposed time-critical removal action at SEAD-59 and SEAD-71 is to remove debris and visually contaminated soil. This removal action would remove or at least lessen the magnitude of the potential threat that it represents to surrounding populations and the environment.

3.5 POST-REMOVAL VERIFICATION SAMPLING

Verification of the surrounding soil quality will be demonstrated and documented by conducting post-removal verification sampling and analysis (i.e., confirmational sampling and analysis). Analytical results produced from the analysis of the samples will be compared to soil cleanup levels presented in Tables 1, 2, 3, and 4 of TAGM 4046.

Cleanup verification sampling of soil will be collected from the bottom and sides of the excavations based on a 50 feet by 50 feet grid. For small excavations measuring less than 2,500 square feet, five samples will be collected (1 from the base and one from each sidewall) at each excavation site. Confirmatory samples will not be collected in areas where only inert surface debris such as concrete or scrap metal is removed. At the proposed spacing of the confirmational soil samples, the Army anticipates that approximately 162 confirmational samples will be collected from SEAD-59 and 37 samples will be collected from SEAD-71.

All of the collected samples will be analyzed in accordance with NYSDEC CLP procedures at a state-certified laboratory. Each of the proposed SEAD-59 confirmatory samples will be analyzed for VOCs, SVOCs, pesticides, and metals. Each of the proposed SEAD-71 confirmatory samples will be analyzed for VOCs, SVOCs, and metals. Specific details of the proposed confirmational sampling are provided in **Appendix F** of this Action Memorandum and Decision Document.

3.6 REMEDIAL ACTION COSTS

Preliminary capital costs for excavation, off-site disposal of debris and on-site backfilling of soil were developed using TRACES/MCACES for Windows v1.2 software. The estimated capital cost and present worth cost for this alternative is $4,077,107. Annual costs associated with this removal action include maintenance of the vegetative covers. **Table 3.6-1** provides the cost breakdown, with cost backup and assumptions provided in **Appendix D**.

APPENDIX F
Confirmatory Sampling Plan

3. Number, Frequency and Location of Confirmatory Sampling

In general, confirmatory soil samples will be collected from the base and sidewalls of each excavation, except in the circumstance where the depth of the excavation measures 12 inches or less. In situations where the sidewalls of an excavation are 12 inches or less in depth, sidewall samples will not be collected, but will be replaced by confirmatory samples that are collected from the ground surface outside the perimeter of the excavation. Confirmatory samples will also be collected from locations beneath and around every aboveground soil pile or berm structure that is removed. Confirmatory samples will not be collected in areas where only inert surface debris such as concrete or scrap metal is removed.

At least one discrete sample will be collected from each face of an open excavation that is 12 inches in depth or greater. Thus, a minimum of five confirmatory samples (i.e., one base, and four sidewall samples) will be collected at each excavation. Confirmatory samples will be collected at a rate of at least one per every 2,500 square feet of surface area.

For excavations where the depth of the excavation is less than or equal to one foot below grade, confirmatory samples will be collected from the perimeter of the excavation at a rate of no less than one sample per every 100 linear feet of length on each edge of the excavation. A minimum of one sample will be collected along each edge of the excavation. Additionally, at least one sample will be collected from the base of the excavation, and additional samples will be collected from the base of the excavation at a rate of at least one per every additional 2,500 square feet or less of bottom area.

Locations of confirmatory sampling will be biased towards areas that are most likely to be contaminated. Visual and olfactory sensing and use of portable field monitoring devices (e.g., photo-ionization detectors) should be used, within the bounds of the site-specific health and safety plan and good operating procedures, to assist in the selection of confirmatory sampling locations.

Additional confirmatory samples may be collected and analyzed based on results of field screening and observations, or based on professional judgment.

4. Site-Specific Confirmatory Sampling Details

SEAD-59

Confirmatory sampling proposed for SEAD-59 is anticipated to conform to the general specifications provided above for excavations, increased as necessary to address site-specific field observations and findings. Based on this specification, it is currently anticipated that a minimum of 162 confirmatory samples will be collected from the proposed areas of the excavation and perimeter. Inert surface debris will be removed from several areas of geophysical anomalies particularly south of the unnamed dirt road. For these locations, no confirmatory samples will be collected. Each of the proposed SEAD-59 confirmatory samples will be analyzed for Target Compound List (TCL) VOCs (EPA SW-846 Method 8260B), TCL SVOCs (EPA SW-846 Method 8270C), pesticides (EPA SW-846 Method 8081), and Target Analyte List (TAL) metals by EPA Method 6010.

SEAD-71

Confirmatory sampling proposed for SEAD-71 is anticipated to conform to the general specifications provided above for excavations, increased as necessary to address site-specific field observations and findings. Based on this specification, it is currently anticipated that 37 confirmatory samples will be collected from the proposed area of the excavation and its perimeter. Each of the proposed SEAD-71 confirmatory samples will be analyzed for Target Compound List (TCL) VOCs (EPA SW-846 Method 8260B), TCL SVOCs (EPA SW-846 Method 8270C), and Target Analyte List (TAL) metals by EPA Method 6010.

5. Sampling Method

Once the excavation is complete, a drawing of the completed excavation will be prepared and necessary measurements shall be recorded in the field notes. Specific measurements collected will include the length, width, and depth (if subsurface excavation) of the excavation. The depth of the excavation will be reported at each corner, and at intermediate locations that are no further than 100 feet apart. These measurements will be used to document that sufficient samples have been collected from the excavation to reasonably assess whether residual contamination remains in the area of the excavation.

Once the drawing of the excavation is prepared, all proposed sampling locations will be marked and labeled and information describing the location of each proposed sampling location will be transcribed into the field notes and onto site maps. Each sampling location must be uniquely identified with a sample location.

Confirmatory samples will be collected from a depth of not less than one-inch below the excavation's surface and not more than six inches below the excavation's surface. The one-inch minimum is recommended to ensure that soils exposed directly to the atmosphere, which could result in the off-gassing of volatile organic or inorganic (e.g., sulfide or cyanide) compounds and a decreased level of volatile content over time, are not collected and used for the volatile compound analyses. The depth from which confirmatory samples are obtained will be recorded in the field notes at the time of collection.

At the time of their collection, confirmatory soil samples will be visually described for:

1. soil type,
2. color,
3. moisture content,
4. texture,
5. grain size and shape,
6. consistency,
7. visible evidence of staining or discoloration, and
8. any other observations (e.g., odors).

All data collected at the time of sample collection will be transcribed into the field records. The identity of the sampler, the date and time of sample collection, the location of the sample collection (i.e., location id), the identity of the sample (i.e., sample number), a description of the sampling method (e.g., auger, trowel, spade, homogenized, etc.) used, the number of sample containers collected, and the intended analysis that will be completed will be recorded.

All sampling will be completed using decontaminated, inert (e.g., stainless steel, Teflon®, etc.) sampling equipment. Selected sampling equipment may be used for all collection activities conducted at one location (e.g., the sample and its duplicate for all required analyses) during one contiguous time period; however, once the equipment has been used at one location, it can not be used at another location until it has been thoroughly decontaminated per prescribed procedures.

Samples collected for volatile compound analyses (e.g., volatile organic compounds or cyanide) will be collected first and will be transferred directly from the ground to the appropriate sample container (e.g., EnCore™). Samples for volatile compound analyses will not be homogenized. Samples collected for non-volatile analyses (e.g., semivolatile organic compounds, pesticides, metals, nitrate, TOC, TPH) should be collected and transferred to an inert mixing bowl and homogenized prior to being placed into their final sample bottles.

6. Recommended Sampling Order

A recommended order for sample collection is provided below:

<u>Collected without homogenization</u>
Volatile Organic Compound

<u>Collected, homogenized, and split into required bottles</u>
Semivolatile Organic Compounds
Pesticides
Metals