65-14

BCT AGENDA

January 18-19, 2000
1330 – 1630 January 18, 2000
0830 – 1230 January 19, 2000

NCO CLUB

TUESDAY, JANUARY 18

1330-1630

→ FOST – North End Comments

WEDNESDAY, JANUARY 19

0830-1130

→ RI Comments
 SEAD 4
 SEAD 16/17

→ ECO Risk Conservation Area
 Army Letter

→ Termination Update
 NRC License (John Cleary)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

OCT - 7 1999

OSWER Directive 9285.7-28 P

MEMORANDUM

SUBJECT: Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites

FROM: Stephen D. Luftig, Director
Office of Emergency and Remedial Response

TO: Superfund National Policy Managers
Regions 1 - 10

I. PURPOSE

This guidance is intended to help Superfund risk managers make ecological risk management decisions that are based on sound science, consistent across Regions, and present a characterization of site risks that is transparent to the public. It provides risk managers with six principles to consider when making ecological risk management decisions. The ability to make sound ecological risk management decisions is dependent upon the quality and extent of information provided in the ecological risk assessment (ERA). All ERAs should generally be performed at every site according to the eight-step process described in: *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (ERAGS, EPA 540-R-97-006, OSWER Directive # 9285.7-25, June 1997). The principles provided in this guidance supplement the ERAGS guidance and will aid remedial project managers (RPMs) and on-scene coordinators (OSCs) in planning ERAs of appropriate scope and complexity and in identifying response alternatives in the feasibility study or engineering evaluation/cost analysis that are protective of the environment. (See Text Box 1.) By incorporating these principles into their decision-making, risk managers will be able to present a clear rationale for their ecological risk management actions which they can communicate to the public in the proposed plan and the Record of Decision, or the Action Memo. Implementation of this guidance should not restrict the ability of natural resource trustees to investigate injuries to natural resources, assess damages, and/or restore habitats.

II. BACKGROUND

As the Superfund program has matured, it has given more and more consideration to the potential effects of hazardous substances releases on ecological receptors. This increased focus on ecological risks has highlighted the need for more guidance on ecological risk management.

Text Box 1. Risk Management vs. Risk Assessment

This document deals with the application of principles that help to accomplish the management of ecological risk in a consistent and appropriate manner. This includes decisions about whether to respond and how to select a response alternative that is protective. The 1997 ERA guidance provides a standardized approach to identify adverse effects and the severity of those effects. That guidance does not suggest that all ecological risk assessments must be identical, nor does it suggest that all ecological risk assessments will require the same level of effort to allow appropriate risk management decisions.

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) states that: "Alternatives shall be assessed to determine whether they can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site by eliminating, reducing, or controlling exposures to levels established during development of remediation goals consistent with § 300.430(e)(2)(I)." (40CRF 300.430(e)(9)(iii)(A)). The NCP establishes a protective risk range for human health, but provides little guidance regarding developing remediation goals considered to be adequate for protecting ecological receptors. The NCP also states that applicable or relevant and appropriate requirements (ARARs) shall be considered in determining remediation goals. Thus, ARARs that are set based on risks to ecological receptors, such as water quality criteria/state standards established under sections 303 and 304 of the Clean Water Act, must be considered in determining remediation goals that are protective, but other factors also influence this determination. Although some states may also have promulgated standards for soil or sediment, there generally are no current federal ARARs for sediment or soil.

Establishing remediation goals for ecological receptors is considerably more difficult than establishing such goals for the protection of human health due to the paucity of broadly applicable and quantifiable toxicological data. Further, owing to the large variation in the kinds and numbers of receptor species present at sites, to their differences in their susceptibility to contaminants, to their recuperative potential following exposure, and to the tremendous variation in environmental bioavailability of many contaminants in different media, protective exposure levels are best established on a site-specific basis.

III. ECOLOGICAL RISK ASSESSMENT/ MANAGEMENT PRINCIPLES

A goal of the Superfund program is to select remedies that are protective of human health and the environment, both in the short-term and long-term. Since ecological receptors at sites exist within a larger ecosystem context, remedies selected for protection of these receptors should also assure protection of the ecosystem components upon which they depend or which they support. Except at a few very large sites, Superfund ERAs typically do not address effects on entire ecosystems, but rather normally gather effects data on individuals in order to predict or postulate potential effects on local wildlife, fish, invertebrate, and plant populations and communities that occur or that could occur in specific habitats at sites (e.g., wetland, floodplain, stream, estuary, grassland, etc.). Ecological risk assessments incorporate a wide range of tests and studies to either directly estimate community effects (e.g., benthic species diversity) or indirectly predict local population-level effects (e.g., toxicity tests on individual species), both of which can contribute to estimating ecological risk. Superfund remedial actions generally should not be designed to protect organisms on an individual basis (the exception being designated protected status resources, such as listed or candidate threatened and endangered species or treaty-protected species that could be exposed to site releases), but to protect local populations and communities of biota. Levels that are expected to protect local populations and communities can be estimated by extrapolating from effects on individuals and groups of individuals using a lines-of-evidence approach. The performance of multi-year field studies at Superfund sites to try to quantify or predict long-term changes in local populations is not necessary for appropriate risk management decisions to be made. Data from discrete field and laboratory studies, if properly planned and appropriately interpreted, can be used to estimate local population or community-level effects.

Risk managers should generally adhere to the six principles listed below when scoping ecological risk assessments and when making ecological risk management decisions.

Principle No. 1 -Superfund's goal is to reduce ecological risks to levels that will result in the recovery and maintenance of healthy local populations and communities of biota. The goal of the Superfund program is to select a response action that will result in the recovery and/or maintenance of healthy local populations/communities of ecological receptors that are or should be present at or near the site. Superfund risk managers and risk assessors should select assessment endpoints and measures (as defined in the 1997 ERAGS) that: 1) are ecologically relevant to the site; i.e., important to sustaining the ecological structure and function of the local populations, communities and habitats present at or near the site, and 2) include species that are exposed to and sensitive to site-related contaminants. In addition, if individual threatened or endangered species or critical habitats for such species are present at a site, the federal Endangered Species Act or a state endangered species act may be an ARAR.

Principle No. 2 - Coordinate with Federal, Tribal, and State Natural Resource Trustees. It is Superfund's goal that our response actions will not only achieve levels that are protective, but will also minimize the residual ecological risks at sites. Due to factors such as technical implementability and response costs at some sites, however, EPA recognizes that its response action may not lead to complete recovery of the ecosystem and that additional restoration activities by the natural resource trustees may be needed to bring natural resources back to their baseline condition within an acceptable time frame. It is important, however, that EPA and the Trustees coordinate both the EPA investigations of risk and the trustee investigations of resource injuries in order to most efficiently use federal and state monies and to not duplicate efforts.

Principle No. 3 - Use site-specific ecological risk data to support cleanup decisions. Site specific data should be collected and used, wherever practicable, to determine whether or not site releases present unacceptable risks and to develop quantitative cleanup levels that are protective. Site-specific information can include, but is not limited to, plant and animal tissue residue data, toxicity test data, bioavailability factors, and population- or community-level effects studies. Data collection efforts should be coordinated with other efforts to collect data for a human health assessment or for a natural resource injury assessment by trustees. As in all risk assessments, its scope should be tailored to the nature and complexity of the site problems being addressed and the response alternatives being considered, including their costs and implementability.

Principle No. 4 - Characterize site risks. When evaluating ecological risks and the potential for response alternatives to achieve acceptable levels of protection, Superfund risk managers should characterize site risks in terms of: 1) magnitude; i.e., the degree of the observed or predicted responses of receptors to the range of contaminant levels, 2) severity; i.e., how many and to what extent the receptors may be affected), 3) distribution; i.e., areal extent and duration over which the effects may occur, and 4) the potential for recovery of the affected receptors. It is important to recognize, however, that a small area of effect is not necessarily associated with low risk; the ecological function of that area may be more important than its size.

Principle No. 5 - Communicate risks to the public. Superfund risk managers, in collaboration with ecological risk assessors, should clearly communicate to the public the scientific basis and ecological relevance of the assessment endpoints used in site risk assessments and the relationship between the effect or exposure measures used to determine if there are any adverse effects to any of the assessment endpoints. For example, earthworms are not normally perceived by the public as important to ecosystem functioning but are very important in many habitats as they are the main food source for many birds and small mammals and they play a critical role in recycling soil nutrients and in improving the soil quality for other plants and invertebrates.

Principle No. 6 - Remediate unacceptable eco risks. Working within the framework of the NCP, Superfund's goal is to eliminate unacceptable ecological risks due to any release or threatened release. Contaminated media that are expected to constrain the ability of local populations and/or communities of plants and animals to recover and maintain themselves in a healthy state at or near the site (e.g., contamination that significantly reduces diversity, increases mortality, or diminishes reproductive capacity) should be remediated to acceptable levels. (See the following discussion under question #3 for additional guidance).

IV. QUESTIONS RISK MANAGERS AND RISK ASSESSORS SHOULD ADDRESS

Although all site cleanup decisions are ultimately the responsibility of EPA's Regional Administrator or the appropriate designee, no ecological risk management decisions should be made without coordinating with the regional ecological risk assessor, usually the Regional Biological Technical Assistance Group (BTAG) Coordinator, and the representative(s) from the appropriate natural resource trustee agency(s). The BTAG Coordinators are listed at the end of this document. Frequent coordination among the risk manager, risk assessor, and trustees is critical in selecting remedies that provide acceptable levels of protection. The eight-step ERAGS process with its five key risk assessor/risk manager decision points (Scientific/Management Decisions Points) should always be used in conjunction with this guidance. Addressing the following four questions, which highlight fundamental ecological risk assessment and risk management issues, should facilitate reaching sound decisions at these five points in the process.

1. *What ecological receptors should be protected?*

ERAGS provides information on identifying and selecting assessment endpoints for evaluating the ecological risk to biotic receptors at sites. An assessment endpoint is defined as: "an explicit expression of the environmental value that is to be protected." Superfund risk assessments should use site-specific assessment endpoints that address chemical specific potential adverse effects to local populations and communities of plants and animals (e.g., reductions in populations of fish-eating birds, or reductions in survival, reproduction or species diversity of indigenous benthic communities). The number and breadth of the assessment endpoints depends on the number and type of contaminated habitats at the site. Risk assessment measures (i.e., measures of effect, measures of exposure, measures of ecosystem and receptor characteristics) should then be selected based on site-specific conditions and used to infer effects on the local population or community of concern. Examples might include: toxicity test results, tissue concentrations, and physio-chemical measurements related to fate and transport of the contaminants.

2. *Is there an unacceptable ecological risk at the site?*

Unless the ecological impacts are apparent (e.g., no vegetation will grow on the contaminated portion of the site or no benthic organisms exist in the sediment downstream from the release), site specific biological data should be developed in order to determine if there are unacceptable risks. The baseline risk assessment may include site-specific toxicity tests with test organisms that address the assessment endpoints selected for the site. These readily available test organisms are considered surrogates for the actual species exposed. The Regional BTAG coordinator can identify the tests and species most appropriate for the site. Other techniques to estimate the magnitude and severity of risks may include modeling to predict food-chain transfer and secondary toxicity of bioaccumulative chemicals to upper trophic level receptors, the measurement of tissue concentrations, the performance of species diversity studies (e.g., Rapid Bioassessment Protocols), and *in-situ* bioassays (e.g., caged fish/bivalves). Through the use of field studies and/or toxicity tests, several types of data may be developed to provide supporting information for a lines-of-evidence approach to characterizing site risks. This approach is far superior to using single studies or tests or measurements to determine whether or not the observed or predicted risk is unacceptable.

If studies or tests performed with site soil, sediment, or water demonstrate or predict serious adverse effects (e.g., increased mortality, diminished growth, impaired reproduction, etc.) on the selected assessment endpoints as compared to studies or tests conducted at an appropriate reference site or using reference media, there is usually sufficient evidence to assume that unacceptable adverse effects have occurred or may occur at the site. Indigenous species, however, may be more or less sensitive than test organisms, and although toxicity tests may demonstrate that contaminants are present in amounts potentially toxic to susceptible organisms, the actual risks to site organisms may be of limited severity, very short-lived or reversible. Conversely, the adverse effects may result in the loss of a critical species, which may entirely change the dominant structure and properties of the community.

Sufficient information should be collected in the ecological risk assessment to allow the risk assessor to make a reasoned decision about: (1) causality between levels of contamination and effects, (2) whether the observed or predicted adverse effect on the site's local population or community is of sufficient magnitude, severity, areal extent, and duration that they will not be able to recover and/or maintain themselves in a healthy state, and (3) whether these effects appear to exceed the natural changes in the components typical of similar non-site-impacted habitats (i.e., reference areas). The information gathered in the ecological risk assessment should provide a clear and concise estimate of overall risk to the site under review.

3. *Will the cleanup cause more ecological harm than the current site contamination?*

Whether or not to clean up a site based on ecological risk can be a difficult decision at some sites. When evaluating remedial alternatives, the NCP highlights the importance of considering both the short-term and long-term effects of the various alternatives, including the no action alternative, in determining which ones "adequately protect human health and the environment." Even though an ecological risk assessment may demonstrate that adverse ecological effects have occurred or are expected to occur, it may not be in the best interest of the overall environment to actively remediate the site. At some sites, especially those that have rare or very sensitive habitats, removal or *in-situ* treatment of the contamination may cause more long-term ecological harm (often due to wide spread physical destruction of habitat) than leaving it in place. Conversely, leaving persistent and/or bioaccumulative contaminants in place where they may serve as a continuing source of substantial exposure, may also not be appropriate.

The likelihood of the response alternatives to achieve success and the time frame for a biological community to fully recover should be considered in remedy selection. Although most receptors and habitats can recover from physical disturbances, risk managers should carefully weigh both the short- and long-term ecological effects of active remediation alternatives and passive alternatives when selecting a final response. This does not imply that there is a preference for passive remediation; all reasonable alternatives should be considered. For example, the resilience and high productivity of many aquatic communities allows for aggressive remediation, whereas the removal of bottomland hardwood forest communities in an area in which they cannot be restored due to water management considerations may argue heavily against extensive action in all but the most highly contaminated areas.

The evaluation of ecological effects resulting from implementing various alternatives should be discussed in the Feasibility Study or the Engineering Evaluation/Cost Analysis and should include input from the ecological risk assessor and the federal and/or state trustees responsible for the resources that may be impacted by the response. (See Text Box 2.)

Text Box 2. Deciding Whether to Respond

Before making a response decision, the risk manager, in consultation with an ecological risk assessor, should consider in the context of a nine-criteria evaluation under the NCP at least the following factors:

- the magnitude of the observed or expected effects of site releases and the level of biological organization affected (e.g., individual, local population or community),
- the likelihood that these effects will occur or continue,
- the ecological relationship of the affected area to the surrounding habitat,
- whether or not the affected area is a highly sensitive or ecologically unique environment,
- the recovery potential of the affected ecological receptors and expected persistence of the chemicals of concern under present site conditions, and
- short- and long-term effects of the remedial alternatives on the site habitats and the surrounding ecosystem.

4. *What cleanup levels are protective?*

When a decision is made that a response action should be taken at a site based on unacceptable ecological risk, the risk manager normally then selects chemical-specific cleanup levels that are acceptable; i.e., provides adequate protection of the ecological receptors (as represented by the selected assessment endpoints) at risk. The risk assessor can use the same toxicity tests, population or community-level studies, or bioaccumulation models that were used to determine if there was an unacceptable ecological risk to identify appropriate cleanup levels. Sufficient testing and interpretation should be performed at various site locations to quantify the relationship between chemical concentrations and effects. The data can then be used to establish a concentration and response gradient to define the concentration that represents an acceptable (i.e., protective) level of risk. At some relatively small sites, however, it may be more cost effective to remove, treat, or contain all contamination rather than to generate a concentration and response gradient.

The difficulty is in determining the acceptable level of adverse effects for the receptors to be protected; e.g., what percent reduction in fish survival or in benthic species diversity is no longer protective? There is no "magic" number that can be used; it is dependent on the assessment endpoints selected and the risk assessment measures used including chemical and biological data gathered from the range of contaminated locations and compared to the reference locations. While it may be desirable to identify a standard numerical level of risk reduction that is protective, it is impracticable to do this for each possible species that could be exposed. It is for this reason that surrogate measures or representative species are used to evaluate the ecological risks to the assessment endpoints at the site. The acceptable level of adverse effects should be discussed by the risk assessor and risk manager as early as possible in the risk assessment process and should be coordinated with the trustees. At sites in locations where a large amount of data exists relating abundances or population/community indices with chemical concentrations (e.g., Puget Sound, San Francisco Bay, the states of Ohio and Florida, and some of the Environmental Monitoring and Assessment Program provinces), biotic indices, instead of chemical concentrations, may also be used to select acceptable levels and to delineate the area needing remediation.

V. IMPLEMENTATION

These principles should be followed at all sites with a planned or on going baseline ecological risk assessment. It is the responsibility of the risk manager, in consultation with the risk assessor, to select and document a response and cleanup levels for the site that are protective of human health and the environment and meet or waive ARARs. The final selection of the remedy from among alternatives that satisfy these threshold criteria can be made only after a thorough consideration of the other seven balancing and modifying NCP criteria. The complex nature of ecosystems, the many parameters that can affect bioavailability, and the large number of species potentially affected at a given site may result in a relatively high degree of uncertainty concerning the levels deemed necessary to provide overall protection of the environment. At these sites, the risk manager should incorporate a long-term monitoring plan and a review schedule in the Record of Decision. The data collected should be adequate to determine if recovery is occurring in an acceptable and ecologically relevant time frame or if any additional response action is warranted.

The Superfund program may update this guidance as more scientific information becomes available regarding the nature of adverse effects on ecological resources resulting from hazardous substance releases and the effectiveness of various response alternatives in alleviating those effects. For any additional information or questions about this guidance, please contact Steve Ells (703) 603-8822 or David Charters (732) 906-6825.

REGIONAL BTAG COORDINATORS

Region 1	Patti Tyler, Cornell Rosiu
Region 2	Mindy Pensak
Region 3	Jeff Tuttle (Acting)
Region 4	Lynn Wellman, Sharon Thoms
Region 5	Brenda Jones, James Chapman
Region 6	Jon Rauscher, Susan Roddy
Region 7	Steve Wharton, Bob Koke
Region 8	Dale Hoff, Gerry Henningsen
Region 9	Clarence Callahan, Ned Black
Region 10	Joe Goulet

NOTICE: This document provides guidance to EPA staff and is designed to communicate national policy on assessing and managing ecological risks. The document does not, however, substitute for EPA's statutes or regulations, nor is it a regulation itself. Thus, it does not impose legally-binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon the circumstances of the site. EPA may change this guidance in the future, as appropriate.

cc: Tim Fields, OSWER
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U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES

REPORT OF SAMPLE DELIVERY GROUP #9900096

Project: SENECA ARMY DEPOT
Analysis Procedure: Plutonium
Date Reported: 01/12/2000

SAMPLES

NAREL Sample #	Client Sample ID	Type	Matrix	Date Collected	Date Received
99.07313Y	SS12-9	SAM	SOIL	12/07/1999	12/09/1999
99.07314Z	SS12-2	SAM	SOIL	12/07/1999	12/09/1999
99.07315A	SS12-13	SAM	SOIL	12/07/1999	12/09/1999
99.07316B	SS12-14	SAM	SOIL	12/07/1999	12/09/1999
99.07317C	EPA12-1	SAM	SOIL	12/07/1999	12/09/1999
99.07318D	EPA12-2	SAM	SOIL	12/07/1999	12/09/1999
99.07319E	EPA12-3	SAM	SOIL	12/07/1999	12/09/1999
99.07320X	EPA12-4	SAM	SOIL	12/07/1999	12/09/1999
99.07321Y	EPA12-5	SAM	SOIL	12/07/1999	12/09/1999
99.07322Z	EPA12-9	SAM	SOIL	12/07/1999	12/09/1999
99.07323A	EPA12-11	SAM	SOIL	12/07/1999	12/09/1999
99.07324B	EPA12-12	SAM	SOIL	12/07/1999	12/09/1999
99.07325C	EPA12-6	SAM	SOIL	12/13/1999	12/15/1999
99.07326D	EPA12-7	SAM	SOIL	12/13/1999	12/15/1999
99.07327E	EPA12-8	SAM	SOIL	12/13/1999	12/15/1999
99.07328F	EPA12-10	SAM	SOIL	12/13/1999	12/15/1999
99.07329G	EPA12-13	SAM	SOIL	12/13/1999	12/15/1999
99.07330Z	EPA12-14	SAM	SOIL	12/13/1999	12/15/1999
99.07331A	EPA12-15	SAM	SOIL	12/13/1999	12/15/1999
99.07332B	EPA12-16	SAM	SOIL	12/13/1999	12/15/1999

EXCEPTIONS

1. Packaging and Shipping - No problems were observed.
2. Documentation - No problems were observed.
3. Sample Preparation - No problems were encountered.
4. Analysis - NAREL samples 99.7313 through 99.7322 only are reported in this data package. The results for NAREL samples 99.7323 through 99.7332 will be reported later.
5. Holding Times - All holding times were met.

QUALITY CONTROL

1. QC samples - All QC analysis results met NAREL acceptance criteria.
2. Yields - All chemical yields were within acceptance limits.
3. Instruments - Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Chief of the Monitoring and Analytical Services Branch and the NAREL Quality Assurance Coordinator, or their designees, as verified by the following signatures.

James B. Moore 1/13/00

James B. Moore — Date
Quality Assurance Coordinator

John Griggs 1/13/00

John Griggs, Ph.D. — Date
Chief, Monitoring and Analytical Services Branch

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
DBD	Double blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample (blank spike)
MS	Matrix spike
MSD	Matrix spike duplicate
RBK	Reagent blank

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

EVALUATION OF QC ANALYSES

A reagent blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "*Z* scores." A *Z* score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The *Z* score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The *Z* score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the *Z* score is computed.

Each standard uncertainty used to compute a *Z* score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

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PU ANALYSES
SDG #9900096

ANALYSIS SUMMARY

Analysis Procedure: PU
Title: Plutonium

NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Prep Batch #	QC Batch #
99.07313Y		N/A	01/11/2000	0003560T	0001332N
99.07313Y	DUP	N/A	01/11/2000	0003560T	0001332N
99.07314Z		N/A	01/11/2000	0003560T	0001332N
99.07314Z	MS	N/A	01/11/2000	0003560T	0001332N
99.07314Z	MSD	N/A	01/11/2000	0003560T	0001332N
99.07315A		N/A	01/11/2000	0003560T	0001332N
99.07316B		N/A	01/12/2000	0003562V	0001332N
99.07317C		N/A	01/12/2000	0003562V	0001332N
99.07318D		N/A	01/12/2000	0003562V	0001332N
99.07319E		N/A	01/12/2000	0003562V	0001332N
99.07320X		N/A	01/12/2000	0003562V	0001332N
99.07321Y		N/A	01/12/2000	0003562V	0001332N
99.07322Z		N/A	01/12/2000	0003562V	0001332N
RBK-00403020U *	RBK	N/A	01/11/2000	0003560T	0001332N

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

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PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07313Y	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003560T
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.628e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	68.91 %	Analyst:	SPK
Ash/dry weight:	92.20 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/10/2000 15:53	1000.0	AS01	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	-3.85e-03	3.6e-02	7.8e-02	PCI/GDRY	01/10/2000
Pu239	2.69e-02	2.6e-02	3.0e-02	PCI/GDRY	01/10/2000

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PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07313Y	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003560T
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	4.419e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	68.91 %	Analyst:	SPK
Ash/dry weight:	92.20 %	QC type:	DUP

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/10/2000 15:53	1000.0	AS03	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	-5.99e-03	2.9e-02	6.8e-02	PCI/GDRY	01/10/2000
Pu239	9.16e-03	1.6e-02	2.9e-02	PCI/GDRY	01/10/2000

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PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07314Z	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003560T
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.553e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	79.23 %	Analyst:	SPK
Ash/dry weight:	94.80 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/10/2000 15:53	1000.0	AS04	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	2.87e-02	4.0e-02	6.5e-02	PCI/GDRY	01/10/2000
Pu239	1.28e-02	2.9e-02	5.8e-02	PCI/GDRY	01/10/2000

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PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07314Z	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003560T
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.512e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	79.23 %	Analyst:	SPK
Ash/dry weight:	94.80 %	QC type:	MS

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/10/2000 15:53	1000.0	AS05	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	-5.46e-02	4.0e-02	1.2e-01	PCI/GDRY	01/10/2000
Pu239	5.02e+00	5.8e-01	7.2e-02	PCI/GDRY	01/10/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07314Z	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003560T
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.542e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	79.23 %	Analyst:	SPK
Ash/dry weight:	94.80 %	QC type:	MSD

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/10/2000 15:53	1000.0	AS06	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	-2.06e-02	6.6e-02	1.4e-01	PCI/GDRY	01/10/2000
Pu239	4.76e+00	5.5e-01	6.0e-02	PCI/GDRY	01/10/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07315A	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003560T
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.577e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	70.32 %	Analyst:	SPK
Ash/dry weight:	92.80 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/10/2000 15:53	1000.0	AS07	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	8.56e-03	1.9e-02	3.9e-02	PCI/GDRY	01/10/2000
Pu239	1.28e-02	1.8e-02	1.9e-02	PCI/GDRY	01/10/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07316B	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003562V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.586e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	74.10 %	Analyst:	SPK
Ash/dry weight:	91.20 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/11/2000 16:54	1000.0	AS01	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	1.55e-02	4.7e-02	9.0e-02	PCI/GDRY	01/11/2000
Pu239	-2.21e-03	4.4e-03	3.4e-02	PCI/GDRY	01/11/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07317C	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003562V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.946e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	83.12 %	Analyst:	SPK
Ash/dry weight:	96.40 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/11/2000 16:54	1000.0	AS03	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	-8.63e-03	4.2e-02	9.8e-02	PCI/GDRY	01/11/2000
Pu239	1.32e-02	2.3e-02	4.1e-02	PCI/GDRY	01/11/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07318D	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003562V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.033e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	62.13 %	Analyst:	SPK
Ash/dry weight:	86.80 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/11/2000 16:54	1000.0	AS04	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	1.43e-02	2.6e-02	4.9e-02	PCI/GDRY	01/11/2000
Pu239	5.24e-02	4.1e-02	4.4e-02	PCI/GDRY	01/11/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07319E	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003562V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.663e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	81.44 %	Analyst:	SPK
Ash/dry weight:	93.60 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/11/2000 16:54	1000.0	AS05	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	-8.66e-03	5.4e-02	1.2e-01	PCI/GDRY	01/11/2000
Pu239	2.89e-03	2.8e-02	6.8e-02	PCI/GDRY	01/11/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07320X	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003562V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.014e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	79.71 %	Analyst:	SPK
Ash/dry weight:	94.20 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/11/2000 16:54	1000.0	AS06	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	-4.73e-02	4.8e-02	1.2e-01	PCI/GDRY	01/11/2000
Pu239	7.46e-03	2.3e-02	5.1e-02	PCI/GDRY	01/11/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07321Y	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003562V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	3.250e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	85.57 %	Analyst:	SPK
Ash/dry weight:	95.20 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/11/2000 16:54	1000.0	AS07	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	9.11e-03	2.0e-02	4.2e-02	PCI/GDRY	01/11/2000
Pu239	6.83e-03	1.4e-02	2.0e-02	PCI/GDRY	01/11/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

Sample #:	99.07322Z	QC batch #:	0001332N
Matrix:	SOIL	Prep batch #:	0003562V
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.590e-01 GASH	Analysis procedure:	PU
Dry/wet weight:	83.78 %	Analyst:	SPK
Ash/dry weight:	94.00 %	QC type:	ANA

Comment: 0"-2"

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/11/2000 16:54	1000.0	AS08	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	7.71e-03	5.0e-02	1.0e-01	PCI/GDRY	01/11/2000
Pu239	7.20e-02	5.0e-02	4.7e-02	PCI/GDRY	01/11/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

SAMPLE ANALYSIS REPORT

QC Sample #: RBK-00403020U

QC batch #: 0001332N
Prep batch #: 0003560T
Prep procedure: N/A
Analysis procedure: PU
Analyst: SPK
QC type: RBK

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
01/10/2000 15:53	1000.0	AS08	DPG

ANALYTICAL RESULTS

Analyte	Activity	± 2σ Uncertainty	MDC	Unit	Date
Pu238	2.48e-03	1.6e-02	3.2e-02	PCI	01/10/2000
Pu239	3.31e-03	7.4e-03	1.5e-02	PCI	01/10/2000

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
PU ANALYSES
SDG #9900096

QC BATCH SUMMARY

QC batch #: 0001332N
Preparation procedure: N/A
Analysis procedure: PU

NAREL Sample #	QC Type	Yield (%)	± 2σ Uncertainty (%)	Analyst
99.07313Y		84.94 %	6.50 %	SPK
99.07313Y	DUP	74.92 %	6.09 %	SPK
99.07314Z		75.38 %	6.07 %	SPK
99.07314Z	MS	78.92 %	6.18 %	SPK
99.07314Z	MSD	82.55 %	6.43 %	SPK
99.07315A		79.85 %	6.33 %	SPK
99.07316B		74.09 %	5.98 %	SPK
99.07317C		81.56 %	6.41 %	SPK
99.07318D		77.92 %	6.19 %	SPK
99.07319E		77.20 %	6.10 %	SPK
99.07320X		81.86 %	6.40 %	SPK
99.07321Y		84.71 %	6.56 %	SPK
99.07322Z		76.89 %	5.70 %	SPK
RBK-00403020U *	RBK	65.82 %	5.19 %	SPK

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

National Air and Radiation Environmental Laboratory
QC Batch Report

QC Batch #: 0001332N Analytical Procedure: PU

REAGENT BLANKS (PCI)

Sample ID	Nuclide	Activity ± 2σ
00403020U	PU238	2.48e-03 ± 1.6e-02
00403020U	PU239	3.31e-03 ± 7.4e-03

LABORATORY DUPLICATES (PCI/GASH)

Sample ID	Nuclide	Original ± 2σ	Duplicate ± 2σ	RPD	Z
99.07313Y	PU238	-4.17e-03 ± 3.9e-02	-6.50e-03 ± 3.2e-02	0.00	-0.09 OK
99.07313Y	PU239	2.92e-02 ± 2.8e-02	9.93e-03 ± 1.7e-02	98.50	-1.16 OK

MATRIX SPIKES (PCI/GASH)

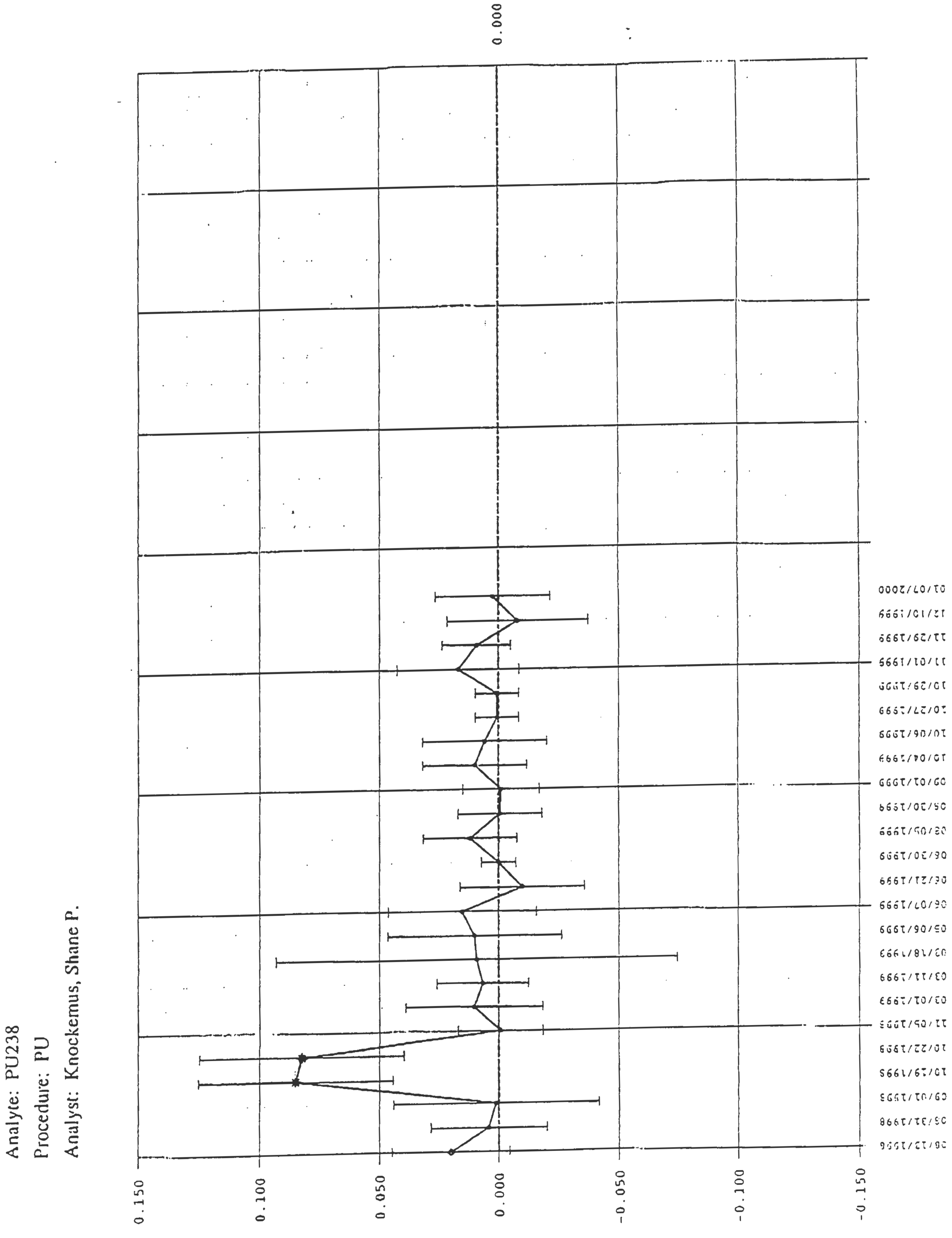
Sample ID	Nuclide	Amt Added ± 2σ	Native ± 2σ	Measured ± 2σ	%R	Z
99.07314Z	PU238	NO SPIKE DATA				
99.07314Z	PU239	5.91e+00 ± 2.8%	1.35e-02 ± 3.0e-02	5.30e+00 ± 6.1e-01	89.46	-1.50 OK

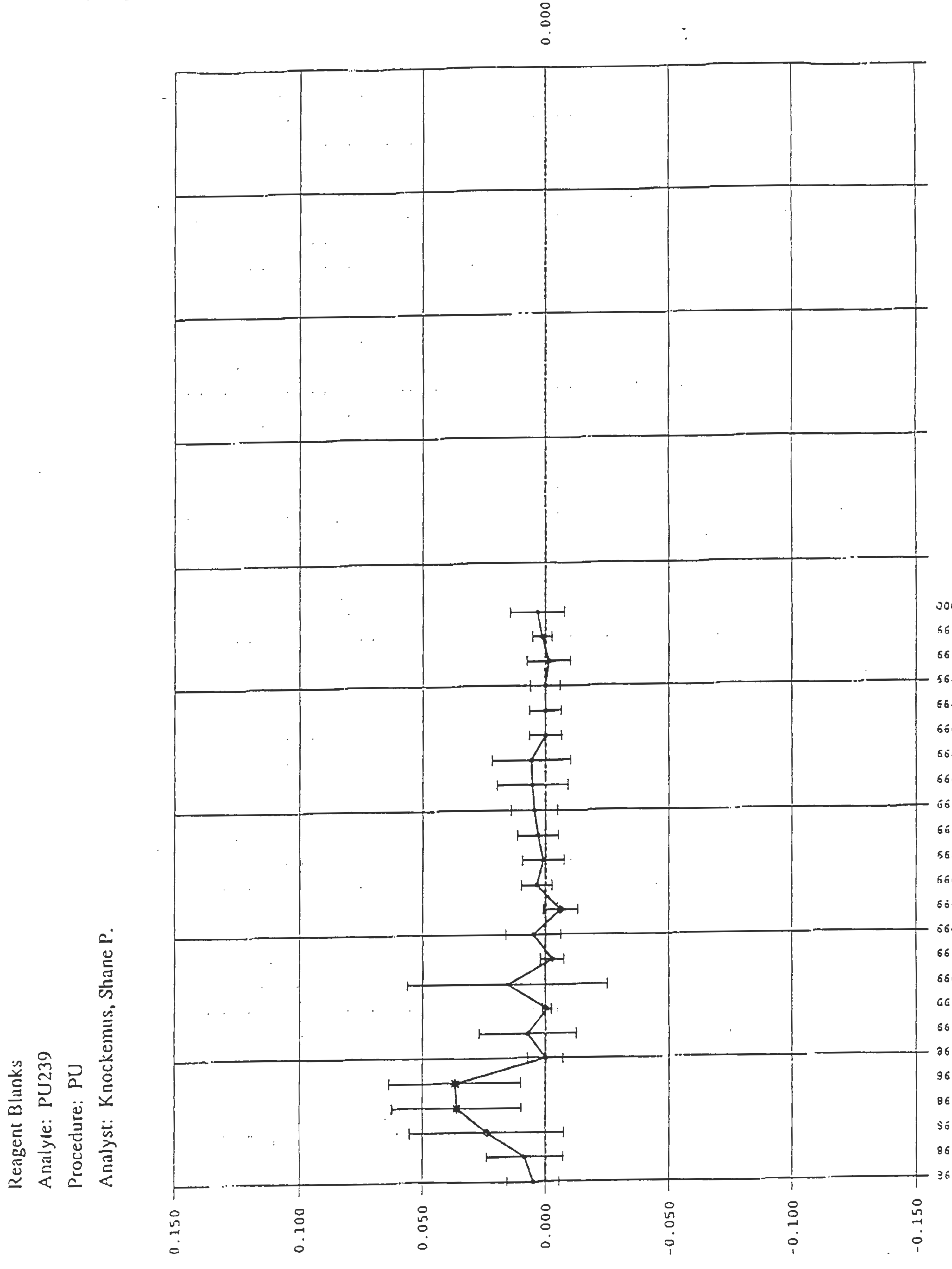
MATRIX SPIKE DUPLICATES (PCI/GASH)

Sample ID	Nuclide	Amt Added ± 2σ	Measured ± 2σ	RPD	Z	%R	Z
99.07314Z	PU238	NO SPIKE DATA					
99.07314Z	PU239	5.84e+00 ± 2.8%	5.02e+00 ± 5.8e-01	4.18	0.38 OK	85.80	-2.10 OK

Analyst: [signature] 1/11/2000
Knockemus, Shane P.

QA Officer: [signature] 1/11/2000


Reagent Blanks
Analyte: PU238
Procedure: PU
Analyst: Knockemus, Shane P.
0.150
0.100
0.050
0.000
-0.050
-0.100
-0.150


Reagent Blanks
Analyte: PU239
Procedure: PU
Analyst: Knockemus, Shane P.
0.000
0.150
0.100
0.050
0.000
-0.050
-0.100
-0.150
01/07/2000

BCT AGENDA

February 15-16, 2000
1330 – 1630 February 15, 2000
0830 – 1230 February 16, 2000

NCO CLUB

TUESDAY, FEBRUARY 15

1330-1630

→ Site Tour and Discussion for new State Program Manager

WEDNESDAY, FEBRUARY 16

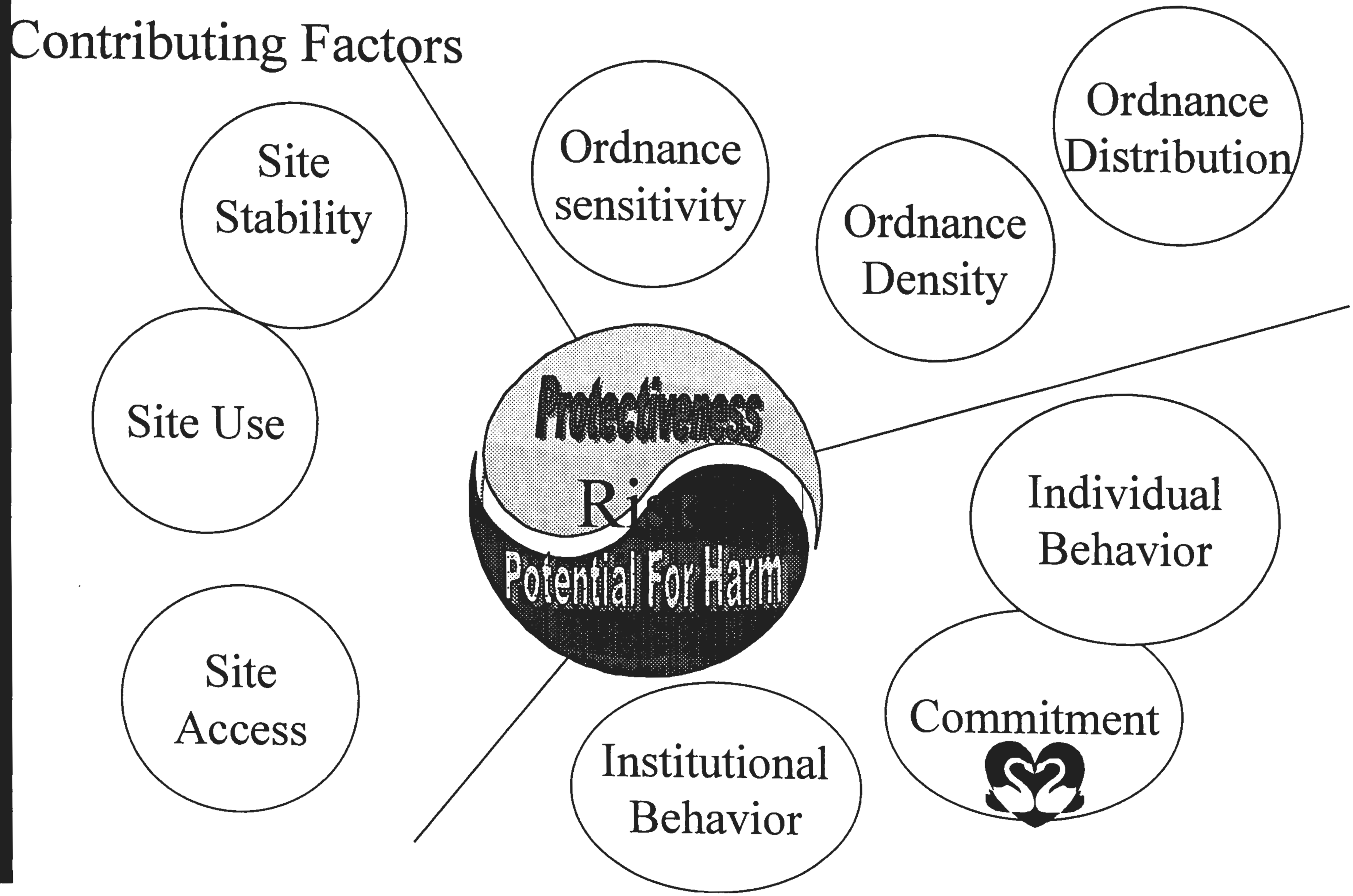
0830-1130

→ UXO Sites

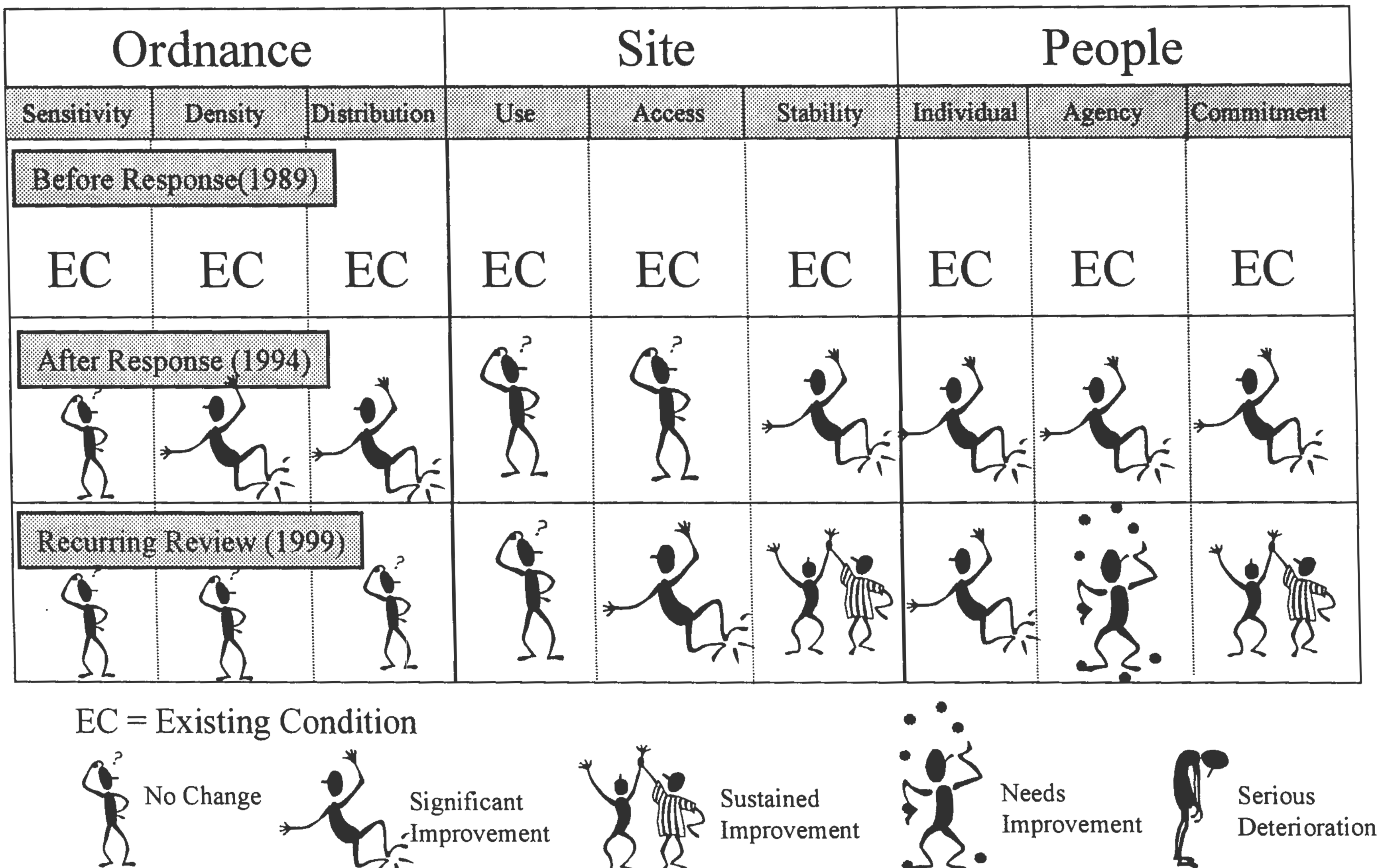
→ UXO – Igloo Area

→ SEAD 4 Remediation Options

Potential for an OE Accident



Measuring Protectiveness



Figures assigned by comparison to previous 5 year interval

6500 ACRES
$5000/ACRE

} CHARACTERIZATION

6500 ACRES
$10,000/ACRE (TO 4 FEET)

} REMOVAL

BCT AGENDA

March 21-22, 2000
1330 – 1630 March 21, 2000-NCO CLUB
0830 – 1230 March 22, 2000- BLDG 123

⇒ **Investigation Derived Waste**
  - **Disposal Status**

⇒ **Ash Landfill Rod Schedule**

⇒ **SEAD-5, Sludge Piles**
  - **Comments**

⇒ **Schedules**
  - **OB Grounds**
  - **Paint Disposal Area SEAD 59/71**
  - **SEAD 25/26 Fire Training Areas**
  - **SEAD 16 Abandoned D.F.**
  - **SEAD 4 Ammo Washout Area**
  - **FOST for Prison**

⇒ **Ecological Risk Assessment - Summary**

Meeting Minutes Summary
Ecological Risk Assessment Conference, Albany NY, NYSDEC Headquarters, 50 Wolf Road
Thursday March 9, 2000

Attendees:
Steve Absolom – Base Environmental Coordinator, Seneca Army Depot Activity (SEDA)
Randy Battaglia – CENAN, Seneca Army Depot Project Manager
Keith Hoddinott – USACHPPM, Risk Assessor
Steve Paszko – NYSDEC, Seneca Army Depot Project Manager
Marsden Chen – NYSDEC, Section Chief
Julio Vazquez – USEPA, Seneca Army Depot Project Manager
Michael Duchesneau – Parsons, Program Manager
Jackie Travers – Parsons, Project Manager, SEAD-12
Eliza Schacht – Parsons, Project Manager SEAD-4
Steve Washburn – Environ/AEC, Ecological Risk Assessor
Gina Ferreira – USEPA, Ecological Risk Assessor
Bob McConnell – Parsons, Tampa (On Phone Connection)
Jeff Duffy – Parsons, Tampa (On Phone Connection)
Mindy Penzak – EPA, BTAG Coordinator, (On Phone Connection)
Richard Koeppicus – Biologist with NYSDEC – Fish & Wildlife

The meeting was called to order at approximately 11:00. Marsden Chen inquired about the status of the LTTD/Deactivation Furnace Conversion Project. He asked if Parsons had proposed to perform 3 runs for each test. Michael Duchesneau responded that each condition would include triplicate sampling, similar to a standard trial burn run. Mr. Duchesneau indicated that only 2 conditions were to be tested. One condition was operation at 4 tons per hour and the other was at 6 tons per hour. He indicated that samples from each condition would be collected in triplicate. Marsden asked where the sampling ports were located, before or after the afterburner. Mr. Duchesneau responded that the sampling ports were located in the stack which was located after the afterburner and all the other air pollution control equipment. Marsden inquired as to what types of contaminants were to be tested, i.e. volatile chlorinated organics. Mr. Duchesneau responded that the materials to be tested during the upcoming planned demonstration test were collected from SEAD-60, which was an oil spill. The contaminated soil did contain low levels of PCBs but no chlorinated solvents. He indicated that the goal of the demonstration test was to collect vital engineering operational and performance data to see if that former deactivation unit could be used as a low Temperature Thermal Desorption (LTTD) soil treatment unit. This data will provide an indication to the Army as to the economic benefit of investing additional efforts in system modifications, such as adding or moving the cyclone before the afterburner to prevent solids overloading to the afterburner. In addition, if the throughput was shown to be small, i.e. less than 4 tons per hour, the Army may decide that the time and manpower required to treat a large amount of soil was uneconomical and would decide to pursue other treatment options. After the test was shown to be successful, individual sites that contained other contaminants, such as chlorinated solvents, would be tested to demonstrate treatment effectiveness, prior to full scale treatment operation. Marsden asked if an approval letter was required and Mr. Duchesneau responded that the letter would allow him to schedule the stack sampling personnel, who would be coming from a Parsons California Office. This would allow the process to proceed.

Ecological Risk Assessment Meeting

Mr. Steve Absolom chaired the Ecological Risk Assessment Meeting and opened the meeting by providing a summary of the current status of the Seneca Army Depot Activity program. The meeting comments are summarized below.

Background

Mr. Absolom began the meeting by providing a historical overview of the status of the sites within the Depot. He noted that the facility is being closed under the requirements of the Base Realignment and Closure (BRAC) process. The facility will be turned over to the public for beneficial use, with the exception of the ore storage piles and a decontamination fluid storage area. Reuse for the Depot has been defined by the community, i.e. the Land Redevelopment Agency (LRA). Before reuse can occur, each of the sites within the Depot must be addressed by the Army. It is therefore essential that the decision making process for site evaluation and clean-up be clearly understood. He stated that it is the Army's intent to get sites cleaned-up in order to allow for reuse by the community as soon as possible. The Army is intent on doing what is right and appropriate. However, Mr. Absolom is continually subjected to review and auditing, by the Army, to ensure that the time and costs associated with the program are being spent effectively. Ecological risk assessment and the decisions made from these assessments have been subjected to Army criticism.

He noted that 72 Solid Waste Management Units (SWMU)s were identified by the Army when the Depot was placed upon the National Priorities List (NPL). Some of these 72 sites are governed other programs (SPEDES, etc.) and therefore these sites were dropped from further consideration. Some of the sites were classified as no action sites. For many of the remaining sites there were insufficient data to determine what the status of the site should be, therefore, Expanded Site Investigations (ESI)s were performed to determine if contaminants of concern were present or not. After this, the Army classified areas into operable units e.g. landfill areas, fire training areas, etc. based upon similar contamination. This was all done before BRAC so there was no land re-use plan. The Army developed a schedule with the agencies for areas to be investigated based upon expected risk. The worst sites were generally considered first, however, base closure changed the priorities. BRAC was initiated and a land reuse plan had been adopted by the Land Redevelopment Authority (LRA) that described the reuse for the Depot. The plan governs future land use and influences remediation decisions.

Since many of the sites were located in reuse areas where the future use included industrial/commercial activities (i.e. the prison area, the North End institutional area, or the industrial area), ecological issues were not seemingly a driver for remediation. However, several of the remaining sites are located in the area, whose future use has been identified by the Industrial Development Agency (IDA), as conservation/recreation. For these sites, which are in different phases of RI s, the ecological risk assessment is likely to be a driver for many future decisions regarding remediation in this area. With all the recent changes and new guidance regarding ecological risk assessment and ecological risk management, the intent of this meeting is to understand the requirements of NYSDEC and EPA and to discuss the concerns of the Army regarding how risk management decisions will be made.

Conservation/Recreation Area – Mr. Absolom indicated that the community views this land, comprising approximately 6500 to 7000 acres, as a resource compatible with hiking and viewing wildlife, such as birds, deer, etc. The requirements for operation and maintenance of such an area has not been defined but it seems that a minimal effort would be required to allow for uses such as hiking, birdwatching, cross-country skiing, snowshoeing etc. The community has indicated that this area should not be a large camping area that would compete against other established area campgrounds but should be able to support occasional camping activities, such as boyscout jamborees, etc.

The Army believes that there is a need to better understand how the ecological RA process will work at these sites. The Army needs to know what the regulatory agencies will want or will accept. There are eleven (11) operable units within this area. Resolution of these sites is expected to cost a lot of money. This will place the burden on Mr. Absolom to defend the required level of remediation (possibly driven by ecological risks) in order to receive the appropriate level of funding for each site.

Goal of Meeting

The goal of this meeting is to understand the ecological risk management process, without focusing on any specific issue or site so that the Army can move forward with the process of reuse. Mr. Absolom indicated that the meeting should focus on questions such as: What are the decision points? Who will be the risk assessors and who will be the risk managers?

Risk Managers/Assessors

Mr. Vazquez from EPA indicated that he is a risk manager. Ms. Ferreira from EPA indicated that she and Mindy Penzak, the BTAG Coordinator from EPA are ecological risk assessors. Mr. Koeppicus from NYSDEC Fish and Wildlife indicated that he is a risk assessor and a risk manager. Mr. Paszko indicated that he is a risk manager.

Ecological Endpoints

The Army believes that identification of ecological endpoints should be addressed so that decisions will be clearly documentable and defendable. Once ecological endpoints have been identified, then decisions can be made that focus on protecting these endpoints. EPA guidance on managing ecological risk begins by the ecological risk assessors and the ecological risk managers identifying ecological endpoints. Mr. Absolom noted that with numerous sites within an area of similar habitat, it might be reasonable to develop a uniform approach for each site. This is because the Conservation/Recreational Area is a contiguous area, with similar habitat comprised of wetlands, forested areas, grasslands, approximately 100 miles of roadway and drainage ditches that feed Creeks that discharge to Seneca Lake or the Erie Canal system. There is nothing unique about the ecology of any one site within this area and therefore sites within this area should have similar ecological endpoints. This might include combining sites and evaluating the entire conservation/recreation area as a whole. This seems like an approach that could address valued ecological resources that have a large home range, such as deer or raptors.

Change in Ecological Risk Assessment Guidance

Mr. Absolom noted that a factor that has delayed finalization of the decisions at several of the sites at the Depot has been the evolution of the guidance for conducting ecological/human health risk assessments. Since 1995, when the Seneca Generic Workplan, was first presented, the EPA guidance has been evolving. The latest EPA guidance on managing ecological risk was published in October, 1999. EPA published Ecological Risk Assessment Guidance for Superfund (ERAGS) in 1997. The Army has tried to tailor each scoping plan to specific sites, for ease of contracting and to avoid duplication of workplan preparation. Scoping plans were done at same time (generally) for each operable unit. The problem has been that as EPA guidance and policy changes, the scoping plans have not always changed to reflect the new changes described by the guidance. The guidance that is currently being followed is the EPA ERAGS and the New York State Department of Environmental Conservation Fish and Wildlife Impact Analysis (FWIA) Guidance. The Army does their best to tailor the actual reports to the latest guidance.

Deer Meat for Residential Consumption

Mr. Marsden Chen asked if residential use scenarios had been considered and if deer meat consumption was considered in the risk assessment. Mr. Duchesneau indicated that residential scenarios had been considered in the risk assessment portion of the RI but clean-up to residential conditions was not considered appropriate, since the sites were not in an area that had been designated for residential use. Also, the Army did not include ingestion of deer meat. During the formulation of risk assessment exposure scenarios this ingestion of deer meat was considered and not evaluated because previous Army studies, conducted at the Joliet Army Ammunition Plant, had not shown that bioaccumulation of similar contaminants was occurring. Further studies at the Aberdeen Site also confirmed that bioaccumulation in deer meat was not a viable transport scenario. Further, since the deer's home range area is much larger than any one site, it would be nearly impossible to assign any significance to any one site, if bioaccumulation of contaminants had been observed. Mr. Chen noted that if bioaccumulation of contaminants in deer meat was observed then such an occurrence could be assigned to entire R/C area. He suggested that consumption of deer meat should be considered.

Mr. Hoddinott reiterated that since there are no standards it would be difficult to judge if the deer meat data was suggestive of a problem. What are the endpoints in deer meat bioaccumulation that we want to measure? Mr. Koeppicus stated that deer is difficult to assess for ecological risk. In his opinion, deer are not generally affected by contaminants and tend to be insensitive to contamination at a site. Mr. Chen indicated that NYSDEC would need to talk to NYSDOH about deer meat consumption to determine if using other Army studies would be an acceptable basis for eliminating consideration of ingestion of deer meat at Seneca. Is it acceptable to do one assessment considering deer meat ingestion rather than an assessment for each site? Mr. Chen felt that one assessment of deer for the entire R/C Area would be more appropriate. However, he would still expect a human health and ecological assessment for each site.

Valued Ecological Receptors

Regarding the question of what ecological receptors are valued Mr. Koeppicus stated that NYSDEC considers all receptors to be of value. This means that NYSDEC protects individual ecological receptors, i.e. an individual shrew. Exceedance of a guideline value for any sample would potentially constitute a condition that would require an action. He noted that each species is dependent on each other and site conditions affect all these species since they are all interrelated. Mr. Absolom noted that guidance does allow for the selection of assessment endpoints. NYSDEC considers some species to have more weight when evaluating the overall ecological environment but there is no specific guidance regarding how different species are evaluated. The evaluation is made based upon all the factors that describe the site, including the presence of wetlands, the presence of Threatened and Endangered Species, the type of contaminants and the distribution of the contaminants.

Mr. Koeppicus was aware that EPA looks to protect communities and populations, but NYSDEC does not. EPA does protect at the individual level if the individual was an endangered species. He noted that it is possible to make judgment regarding population by using reference studies, but it is difficult to assess ecological risk on individuals from these studies. This is why NYSDEC generally compares concentrations to benchmark values, rather than looking at observations on a population or community level.

Screening Level Assessments vs. Additional Ecological Studies

It was generally recognized that the ecological risk assessments that have been done have been screening level assessments. What else would have to be done to show that no risk exists at these sites? Mr. Duchesneau noted that at the Ash Landfill site, biological studies had been done to evaluate ecological risk. In addition to describing the ecological setting, these efforts also included population studies that involved small mammal trapping, fish seining and macroinvertibrate sampling. After all these studies were complete the result was that there was no observed ecological impacts. However, following the ecological risk assessment calculation steps, the outcome produced results was that could be interpreted to suggest that concentrations in soil, estimated to be protective of an ecological receptor, such as a mouse, were exceeded. Mr. Koeppicus asked if tissue studies were conducted or if mock recapture was performed. Mr. Duchesneau responded that no such studies were performed. The question was raised if such studies were valuable in determining if ecological risk could be assessed. Mr. Koeppicus responded that NYSDEC would probably not use them to address ecological risk, instead the decisions are based upon comparisons to guideline values.

The Army wants to get into an overall risk management process, not just comparison to soil screening levels. NYSDEC has no such guidance and therefore risk management defaults to calculations. Following these calculations and comparisons, the NYSDEC looks at the need for remediation and usually all sides sit down to make a decision.

Mr. Koeppicus indicated that he doesn't think the approaches are that different between NYSDEC and USEPA. Ms. Ferreira noted that she felt that Scientific Management Decision Points (SMDP) need to be identified early in the process. Mr. Koeppicus noted that if a specific study is not done then the only thing available to make a decision are screening levels. NYSDEC has surface water Ambient Water Quality Standards (AWQS) that need to be complied with. Sediment Criteria are available that are used for screening. NYSDEC does not have soil criteria but usually adopts the soil screening levels developed at the Oak Ridge Site by Suter. Mr. Koeppicus said that beyond screening levels, some field studies may be appropriate, but metals are difficult to assess. NYSDEC says you can take any path you want to come up with clean up goals but if no levels are provided then the NYSDEC will adopt these levels for decision making since this is all that is available.

The Army believes that the investigation for SEAD-4, the former Munitions Washout Facility has gone through Step 2 of ERAGs. Should the Army go on to do further study? What type of study would be acceptable? At this point there did not seem to be a need to develop a study as these usually require long timeframes. Mr. Koeppicus felt that the site conditions were not complicated to warrant doing a long-term study. NYSDEC would expect to see a site-specific clean-up number. He noted that he would like to see a series of plots of site concentrations where values are above screening levels. This will be useful to show where areas are that are above the screening levels. NYSDEC generally puts more weight on aquatic environments rather than terrestrial, since fish and amphibians are directly exposed to contamination for a longer time. Exceedances over screening criteria are not necessarily criteria for cleanup. USEPA also wants to see maps as well, but does look at ecological risk quotients. The State says ecological risk quotients are another type of screening criteria. Mr. Koeppicus indicated that TAGMs, i.e. TAGM 4046, has no ecological relevance. Future land uses need to look at potential future habitats, such as if beaver builds a dam and floods the area converting a former terrestrial area to an aquatic environment.

Army Funding of Risk-Based Clean Up

The Army is concerned that if ecological risk assessment is driving a large million dollar cleanup then there may be a problem in defending the expenditure of funds. This is because the Army cannot justify a large clean-up based upon protecting a species, such as a mouse or a shrew. The irony is the Army spends a great deal of money on one side of the facility to destroy these species as pests and on the other side the Army spends money to protect these species. The Army is not opposed to doing remediation based on ecological risk, but has generally been concerned that, at Seneca, the expenditure is not legitimate since valued ecological receptors have not been identified. Further, comparison to guideline values is not consistent with EPA policy for ecological risk management decisions. Mr. Chen suggested that the Army decision-makers, which are questioning the expenditure, be involved in understanding the NYSDEC approach, which is protection of individuals and protection of all species. He also noted that the decision for a remedial action is always based upon more than protecting one mouse at a site. These decisions rely on the nine EPA criteria of technical feasibility, effectiveness, implementibility and cost. Mr. Koeppicus noted that it is not the job of NYSDEC to provide goals for remediation, instead the Army should propose remedial goals to the NYSDEC. If the goals are justified and well-documented then the NYSDEC will likely agree with the goals and adopt them.

The Role of Ecological Study Beyond Screening Level Comparison

The Army asked for guidance regarding Step II Contaminant-Specific Impact Analysis of the NYSDEC Fish and Wildlife Impact Analysis Guidance. Part C of this guidance describes evaluating the toxic effects on an organism level, population level and community level. This seems to suggest the possibility that ecological protection could be evaluated on a higher level than simply comparing numbers and protecting each individual organism. Could a population study be performed, after the comparison to guidelines, criteria or standards was done, to determine if there were any ecological impacts. Mr. Koeppicus indicated that a community or population evaluation is more applicable to terrestrial environment where there are no criteria. The NYSDEC uses the Sediment Criteria to protect sediment and Ambient Water Quality Criteria to protect surface water but neither EPA nor NYSDEC have criteria for terrestrial environment. EPA is in the process of developing guidelines for protection of the terrestrial environment. In the meantime, both EPA and NYSDEC use values derived from Oak Ridge by Suter, et. al. Mr. Duchesneau indicated that the Oak Ridge numbers were obtained by taking the lowest values from several species. If a species used by Suter to obtain the lowest number, such as the American Woodcock, was not shown to be present at the depot or if a species, such as the whitetail deer, were shown to be a resource to be protected could these values be used instead of the lowest ones. Mr. Koeppicus indicated that the final values proposed in the Oak Ridge document should be adopted.

ERAGS Integration into RI/FS Process

The steps of conducting an ecological risk assessment, as described in the EPA ERAGS document were discussed. It was generally agreed that most of the ecological risk assessments performed at Seneca to date constitute a screening risk assessment and would mean that the process is at Step 2 of ERAGS. Normally, the "screening" risk assessment would be performed after the Preliminary Assessment (PA) was performed. In the CERCLA process, the PA is conducted prior to the RI and is used to rank the sites for inclusion on the NPL. Since this was not done for each SWMU at the Depot, the "screening" risk assessment was conducted as part of the RI since in many instances no data was available until the RI was performed. The Army pointed out that the ERAGS eight step process is out of step with the CERCLA process and if it is necessary to do the eight-step ERAGS process then the RI/FS and ROD process will be delayed, while Steps 3, 4, 5 and 6 are performed. If completing the remaining steps of ERAGS involves toxicity testing/tissue testing, this could take at least a year or more. NYSDEC did not see the practicality of performing the "screening" risk assessment before RI, as described in ERAGS. Except for PCBs, NYSDEC has not seen studies that were completed with enough intensity so that the results were clear and useful in making a decision. NYSDEC accepts other literature/evaluation, as described in Step 3 of ERAGS. However, NYSDEC does have a problem with area use factors, the NYSDEC looks at ecological risks on a point-by-point basis instead of areas. On the other hand, EPA does use these factors. The process of evaluating ecological risk, from the NYSDEC perspective, relies predominantly on professional judgment. All available factors, including the number and location of exceedances, whether aquatic receptors are impacted, the results of the ecological risk calculation, the description of the ecological setting, etc. are considered in making the judgment. The EPA relies on a "weight of evidence" approach. This can involve risk-based food-chain modeling. The process described is vague, especially in regards to the basis of how decisions are made. Moreover, the need or value gained by conducting more sophisticated and expensive ecological toxicity or bioaccumulation studies following the "screening" risk assessment also appears unclear. Risk management decisions are therefore difficult to integrate into the ecological risk assessment process. To avoid these difficulties it was suggested that the NYSDEC and EPA risk assessors and managers be involved earlier in the process.

Risk Assessor vs. Risk Manager

The Army asked if there was a conflict of interest in having the risk assessor also be the risk manager for NYSDEC. Mr. Koeppicus stated that this was not a conflict because the final risk management decision is not with Mr. Koeppicus but rather with the Deputy

Department Administrator. In many instances the risk management decisions made by Mr. Koeppicus is modified.

Use of Screening Levels to Assess Risk/Justify RA

Mr. Absolom raised the issue of setting precedent if the Army agreed to adopt screening levels for setting final clean-up goals. He felt that this could be a problem at other sites, where the screening level would constitute a much higher cost impact than at another sites where this screening level was applied. NYSDEC stated that each site is unique and clean-up levels are site-specific, however, for lack of any alternative the NYSDEC will adopt the guidelines or criteria that are available or adopted prior. Mr. Absolom reiterated that the Army management levels above him object to spending money remediating a site unless either there is an exceedance of an ARAR, i.e. a promulgated standard such as an Ambient Water Quality Standard or if the risk, either human health or ecological, are above promulgated acceptable values. In the past, the Army has objected to remediation if there is an exceedance of a screening level because this does not mean there is risk. Mr. Koeppicus acknowledged that the NYSDEC process of assessing ecological risk is apparently more conservative than other states or EPA regions.

Impact of Remedial Action on Ecological Receptors

Mr. Absolom asked how NYSDEC would address a situation where implementing a remedial action does more damage on ecological receptors than leaving the site conditions the way they are. From Mr. Koeppicus current understanding of the conditions at Seneca, he did not feel that there is anything out at Seneca that could not be restored eventually. The short-term effects of a remedial action were not thought to represent a deterrent to implementing a remedial action. He mentioned that even if some shrews were destroyed as a result of the action, he felt that they would come back. Overall, in the long-run he felt that hawks would be better off if the contaminant levels were reduced by the action. Wetlands and threatened and endangered species may be two instances when the impact of remediation may be a deterrent to implementation of a remedial action. In such instances there may be a requirement to replace the wetland.

SUMMARY

- The EPA and NYSDEC approaches to ecological risk assessment in general are the same with one major difference: NYSDEC protects individuals, EPA protects communities and populations, except in cases of endangered species. Therefore, the acceptability of field observation effects on communities or populations may be acceptable to EPA to show no significant risk to certain habitats, but generally is not acceptable to NYSDEC. Point-by-point exceedances of AWQS and NYSDEC sediment criteria are major driving forces in NYSDEC's assessment of risk.

 DRAFT

- Risk assessors identified are: Ms Gina Ferreira (USEPA), Ms. Mindy Penzak (USEPA), Mr. Richard Koeppicus (NYSDEC), Parsons ES (for the Army).
- Risk managers identified are: Mr. Julio Vazquez (USEPA), Mr. Richard Koeppicus (NYSDEC), Mr. Steven Paszko (NYSDEC), potentially the NYSDEC Deputy Administrator, and Steven Absolom (for the Army).
- There is a need for risk assessors/managers to be involved earlier in process, e.g. during the scoping plan. The Army should submit the "screening" risk assessment performed in RI before the full RI is submitted. Screening levels should be discussed at this meeting.
- At this stage in the process, EPA doesn't think that it makes sense to go back and do additional studies at the active sites since the RI process is underway. In addition, NYSDEC sees little value in these studies unless done very intensely over a long period of time. For on-going site evaluations at Seneca, the approach will be to do the screening ecological risk assessment, compare the data, plot the exceedances on a site map and meet to discuss what remedial actions, if any, would be required. Second tier screening levels could be developed, prior to implementing an action, if the screening level ecological risk assessment shows the potential for ecological risk. Cost will be a factor in considering whether or not a remedial action will be required. Risk Assessors and Risk Managers should discuss Remedial Alternatives at this stage.
- NYSDEC will coordinate with NYSDOH to determine if consumption of deer meat should be considered in the human health risk assessment.
- In general, NYSDEC feels that the ecological impacts of implementing a remedial action (e.g. excavation of an area) at Seneca do not outweigh the overall ecological benefit that would be realized through the implementation of the remedial action.
- The ecological risk assessments including Steps 1 and 2 should be labeled as screening ecological risk assessments, not baseline ecological risk assessments.
- Future documents should use more color plots and possibly overlays to depict the area where exceedances are noted. The documents should avoid repetition.

DEPARTMENT OF THE ARMY
SENECA ARMY DEPOT ACTIVITY
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ROMULUS, NEW YORK 14541-5001

REPLY TO
ATTENTION OF

July 26, 1999

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SUBJECT: **Resolution of Remaining Issues Pertaining to the Ash Landfill Site**

Dear Ms. Struble and Mr. Quinn:

This letter is in response to the March 15, 1999 EPA letter regarding the proposed plan for the Ash Landfill site. Although discussions during the BCT included separating the Ash Landfill into two operable units, one for the soil and one for the groundwater, the Army believes that such a separation would be unnecessary if agreement can be reached regarding the entire site. We consider the differences between us to be relatively minor and feel that compromises can be made that will move the process forward. This letter is intended to identify the differences that remain and propose a compromise plan that may be acceptable to all parties.

Given the complexities associated with establishing clean-up values based upon ecological risk assessment and the agencies positions, the Army proposes to revisit the previous Draft Proposed Remedial Action Plan (PRAP) with the intent of identifying and resolving the remaining issues.

REMAINING UNRESOLVED ISSUES

ISSUE #1 - Ecological Risk to Plants and Mallards

The first issue pertains to the ecological condition at the Ash Landfill. The October 17, 1997 EPA comment letter on the Draft PRAP indicates that the Ecological Risk Assessment (ERA) revealed that cadmium, lead, zinc and acenaphthene, in surface soils, pose a risk to plant life. These compounds were detected at concentrations above levels in soil that may be phytotoxic. Phytotoxic levels were obtained from a literature search. The EPA comment letter also states that lead in surface soils may pose a risk to mallards.

In developing a response to the EPA comment, we have reviewed the ERA and believe that the ecological condition at the site is protective of ecological receptors. The ecological risk assessment identified both the deer mouse and the mallard as two potential ecological endpoint receptors for soil and sediment. The deer mouse was selected as the terrestrial endpoint receptor and the mallard was selected as the sediment endpoint receptor. The exposure concentration for the deer mouse was derived from on-site surface soil. Sediment from on-site wetland areas, totaling 12 samples, and Kendaia Creek, totaling 4 samples, were combined and used as the exposure concentration for the mallard. The combination of on-site and off-site sediment is considered conservative since there are no on-site surface water bodies at the Ash Landfill and it is unlikely that mallards would utilize the on-site wetlands. Since the soils appear to retain sufficient moisture to encourage the growth of wetland vegetation but do not retain enough to allow an open water body, such as a pond, to form, the Ash Landfill site wetlands are not considered to be habitat for a species, such as a mallard. Such a species would likely seek an open water body, such as the nearby Seneca Lake or Kendaia Creek.

Soil and sediment screening concentrations for chronic toxicity were derived for the deer mouse and the mallard by back-calculation. The concentration for protection of the terrestrial receptor, the deer mouse, from exposure to lead in soil for was derived at 800 mg/kg. The lead exposure concentration for the deer mouse was determined to be 265 mg/kg, which is below the 800 mg/kg value. The concentration for protection of the mallard from lead in sediment was derived at 139 mg/kg. The sediment exposure concentration for lead in all sediment, including on-site wetlands and sediment in Kendaia Creek, was determined to be 96 mg/kg, which is below the 139 mg/kg value. Since the habitat of the mallard is aquatic, not terrestrial, the soil exposure concentration value, of 265 mg/kg, should not be compared to the sediment value for protection of the mallard, which was derived at 139 mg/kg. The sediment lead exposure concentration for all sediment data of 96 mg/kg would be even lower if the on-site sediment data is removed from consideration since the on-site habitat is not likely to support an aquatic species such as a mallard. Based upon this, the ecological risks from lead to aquatic bird and terrestrial mammal species are acceptable.

The derivation of the 139 mg/kg concentration for protection of mallards from lead in sediment is considered to be conservative based upon several factors including bioavailability, the estimate of the No Observed Effect Level (NOEL) and the home range of the mallard. The derivation has assumed that all the ingested lead, from sediment mixed with food, is bioavailable to the mallard. The form of lead in sediment that would be ingested by a mallard at the Ash Landfill lead is likely to be as lead oxide. This is because the lead is present as a component of incinerator ash and was generated during combustion of municipal trash, an oxidizing process. Since the derivation of the 139 mg/kg was based upon a LD-50 value which used a soluble form of lead, i.e. lead nitrate, as the source of lead, all the lead was available to be absorbed. Since the lead in the sediment at the Ash Landfill is likely to be as the insoluble lead oxide, it is not readily soluble and it is likely that a large portion of the ingested lead would not be absorbed through the gut and would pass through the mallard. Since we have not developed a value for bioavailability of lead in sediment at the Ash Landfill we have assumed that all lead is available, yet we believe that this is a conservative assumption.

There are no published NOELs available for exposure of lead to the mallard. For this analysis a NOEL was estimated by applying a factor of 0.015 (1.5%) to the LD-50, as described by Layton et al (1987). A LD-50 value of 25 mg-lead/kg body weight for lead exposure to mallards was used that was using lead nitrate. This yielded an estimated NOEL of 0.38 mg/kg, which was then used to derive the allowable concentration of 139 mg/kg. Eisler (1988) has reported a LD-50 value of 107 mg-lead/kg body weight, obtained for tetraethyllead, which, if used, would increase the allowable concentration of lead in sediment from 139 mg/kg to 594 mg/kg, approximately 4 times larger.

The derivation of the 139 mg/kg value assumed that a mallard ingested sediment from only the Ash Landfill area. The analysis did not account for incorporation of sediment from foraging areas other than the wetlands of the Ash Landfill area and a portion of Kendaia Creek. The most recent Wildlife Exposure Factors Handbook, (1993), indicates that an adult, laying, female mallard has a mean home range of 274 acres, (111 hectares). The adult female, total, mallard has a mean home range of 1,156 acres, (468 hectares). The total of the six (6) on-site wetland areas, identified during the remedial investigation, comprise approximately 2 acres, which comprise less than one percent of the total home range of a female mallard. The derived value for protection of mallards from lead in sediment could be increased to a larger value to account for the probability that a mallard will range equally over the entire home range. Since this was not taken into account, the 139 mg/kg value is considered to be a conservative estimate for protection of mallards.

Comparisons of site concentrations to available guideline values were also performed for other potential contaminants of concern. Allowable chronic concentrations of chemicals in soil were either derived or obtained from a literature search. These values are not site-specific and were intended to be used as screening criteria. The exposure concentration of cadmium in surface soils for plants was determined to be 5.5 mg/kg. This is slightly over the reported range of cadmium concentrations considered to be phytotoxic in plants, which is between 2.5 mg/kg to 5.0 mg/kg. The exposure concentration of lead in surface soils was determined to be 265 mg/kg. This is within the reported range of lead concentrations considered to be phytotoxic, which is between 150 mg/kg to 1,000 mg/kg. The exposure concentration of zinc in surface soils was determined to be 1,580 mg/kg. This is within the reported range of zinc concentrations considered to be phytotoxic, which is between 500 mg/kg to 2,000 mg/kg. The exposure concentration of acenaphthene in surface soils was determined to be 538 ug/kg. Although this is above the upper range of concentrations considered to be phytotoxic, which was estimated to be 500 ug/kg, it is only slightly above the range. In addition, the screening concentration value for acenaphthene is conservative. The literature reference, Hulzebos et al, 1993, determined an Effect Concentration (EC50) as the concentration at which lettuce *(Lactuca sativa)* growth was 50% of the control. From two different independent laboratories, the EC50 concentration for acenaphthene, was determined to be 37,000 ug/kg in soil and 25,000 ug/kg of soil. The 500 ug/kg value was then derived by taking 2% of the lower of the two values. This was done to account for uncertainties associated with differences between site vegetation and the indicator species, lettuce. With no specific guidance available at the time of the analysis, the basis for applying the 2% factor to the empirically derived value for protection of lettuce was professional judgment, which, in hindsight, was likely overly conservative. It would be reasonable to use the mean of the two EC50 values, which would be 31,000 ug/kg, as the EC50 value. Applying the 2% factor yields a protective value of 620 ug/kg, in which case the site concentration of 538 ug/kg would be acceptable. The point is that there is large amount of conservativeness and uncertainty associated with the derivation of the soil screening value for acenaphthene that is protective of site vegetation. The site, including areas over the Ash Landfill and the NCFL, is completely vegetated with numerous grass types. It would appear that chronic phytotoxicity concentration levels, obtained or derived from the literature review, have not been expressed in the vegetative community at the site as the vegetative community appears healthy and diverse.

The ecological evaluation included fish trapping, identification and counting, benthic macroinvertibrate sampling, identification and counting and small mammal species trapping identification and counting. In addition, a vegetative survey was performed to identify the plant species that are present. Off-site reference areas were also identified and surveyed to provide a basis for comparison to on-site conditions. The conclusions, from these field efforts, indicated a diverse and healthy aquatic and terrestrial environment. Field observations were considered a significant indicator of the overall ecological health at the site. It is generally recognized that acute effects of pollutants are easily observable during the field observation. No conditions that would be indicative of acute toxicity effects were noted during the field observation. Although long-term chronic effects are more difficult to observe during a field inspection, such effects may be noted since a sufficient timeframe has passed for these effects to be expressed. Again, no such observations were noted between the reference area and the site. Therefore, from site observations, there does not appear to be any noticeable impacts to ecological receptors.

Overall, the site ecological risks appear limited to slight exceedances of a derived screening value for protection of plants. Additionally, field observations do not confirm that vegetative species are adversely impacted.

ISSUE #2 - Clean-up Criteria

While the ecological risks at the site appear to be minimal, the Army has agreed to cover areas where heavy metals in surface soils have been determined to be present at the highest concentrations. However, we have concerns regarding the clean-up criteria proposed by the EPA in their October 17, 1997 comment letter. The October 17, 1997 EPA comment letter recommends that "clean fill" be placed over of the existing surface soil concentrations equal to or greater than 60 ppm lead, 2 ppm cadmium, 200 ppm for zinc and 0.1 ppm for acenaphthene. These values were adopted from the U.S. Fish and Wildlife Service publication, *Evaluating Soil Contamination, Biological Report 90, (2), July 1990.*

EPA has selected the above referenced clean-up levels from Table 3 from the above referenced document. This table references soil clean-up criteria that have been derived by the Canadian province of Ontario for decommissioning industrial sites. The lead value selected by EPA as the proposed clean-up value for the Ash Landfill, 60 mg/kg, corresponds to a value for lead in Table 3 that is protective for agricultural land use. While the proposed EPA clean-up level of 60 mg/kg corresponds to the lead value listed in Table 3, the clean-up goals listed in Table 3 do not match the proposed EPA clean-up levels for cadmium or zinc. The values listed in Table 3 for cadmium is 1-6 mg/kg and the value listed for zinc is 220 mg/kg. There is no proposed guideline in Table 3 from the U.S. Fish and Wildlife Service publication for acenaphthene. It appears that the acenaphthene was selected from another table, Table 1, of the U.S. Fish and Wildlife Service publication.

Since the intended future use of this parcel of land within the depot has been designated as conservation/recreational use, not agricultural, we believe that the correct criteria from Table 3 should be obtained from the column heading labeled as residential/parkland. Although residential development is not a future land use, parkland does more closely match the intended future land use. The values listed in Table 3 as clean-up criteria for metals at parklands are: 4 mg/kg for cadmium, 500 mg/kg for lead and 800 mg/kg for zinc. Adoption of these values as the criteria for placing the cover would limit the cover to the Ash Landfill and the NCFL only. The current preferred plan identified in the Draft PRAP proposed to place a vegetative cover over these two areas, the Ash Landfill and the NCFL. In addition, the plan involved removal of the debris piles and disposal in an off-site landfill to eliminate the presence of lead, cadmium and zinc. No cover would be required once the debris pile areas are removed.

We have reviewed the New York State requirements for land application of sewage sludge and septage as factors to consider in establishing consistent guidelines for clean-up levels for allowable metals in soil. Although the requirements for the application of sewage sludge involve a rigorous permitting and monitoring program, it does provide another guideline that is useful in determining what concentrations of metals may be applied to surface soil. Since land application of sludge containing trace metals has positive benefits to growing crops and vegetation for consumption by cattle, the State of New York has established allowable concentrations of metals in soil. Presumably, such concentrations would not be toxic to vegetation or other, non-domesticated, wildlife species who may also use the area as a source of food. These values could therefore be considered protective of ecological receptors since the requirements for land application of sewage sludge do not prohibit ecological receptors from exposure. Section 360-4.4(a) of 6 NYCRR , Part 360, Title 6 of the Official Compilation of Codes, Rules and Regulations for the State of New York Department of Environmental Conservation describe the operational requirements for the land application of sewage sludge and septage. This section indicates that the sewage sludge and septage destined for land application must not exceed the following contaminant concentrations:

Parameter	Maximum Concentration (mg/kg-dry weight)
Cadmium	25
Lead	1000
Zinc	2500

Presumably, the maximum concentrations would be mixed with soil so that the actual soil concentrations in soil would be expected to be less than this. However, should mixing be less than perfect it is possible to envision a pocket of soil with sewage sludge resting at the surface with concentrations at or near these maximum concentration levels.

Further, recognizing that continued application of metals containing sludge may involve an unwanted accumulation of metals in soils, an additional requirement limits the cumulative loading of metals in soil for agricultural and non-agricultural lands. These limits are expressed in terms of pounds of metals per acre. Assuming the sludge is applied over the top 2, 6 or 9 inches of non-agricultural soil, with a density of 110 lbs. per cubic foot, an allowable metals soil concentration can be derived. Our analysis yields the following values as allowable cumulative limits for metals in soils, expressed as mg/kg.

Parameter	Cumulative Loading Limit (lbs. per acre)	Allowable Cumulative Concentration (mg/kg)		
		Soil Mixing Zone		
		2 inches	6 inches	9 inches
Cadmium	10	126	4.2	2.8
Lead	1000	1,257	417	278
Zinc	500	629	208	139

Based upon the previous discussion and analysis, we believe that concentrations of metals in soil proposed by EPA as clean-up levels at the Ash Landfill, 60 PPM lead, 2 PPM cadmium, 200 PPM for zinc are overly conservative. Instead, we propose to adopt the criteria identified in Table 3 of the U.S. Fish and Wildlife Service publication, *Evaluating Soil Contamination, Biological Report 90, (2), July 1990,* that were developed for protection of sites considered for redevelopment as residential/parkland areas. We believe the intended future use of the Ash Landfill will be as a recreational/conservation area. As a result, the level of protection afforded by adoption of the residential/parkland values obtained from Table 3 of the above referenced document provides adequate protection and is more consistent with this intended future use of the site and should be adopted instead of the values proposed by EPA, which correspond to protection for agricultural use. The alternative criterion for protection from lead in soil is 500 mg/kg, for cadmium, the criterion is 4 mg/kg and for zinc, the criterion is 800 mg/kg.

ISSUE #3 - Vegetative Cover

The proposed plan for source control identified in the March 17, 1997 Draft PRAP proposes to remove several debris piles to an off-site landfill and maintain the current vegetative cover that exists at the Ash Landfill and the Non-Combustible Fill Landfill (NCFL). The October 17, 1997 USEPA comment letter, Page 2, to the Draft PRAP recommends that a one-foot minimum vegetative cover be placed over the Ash Landfill, the NCFL, the excavated debris piles, if following removal surface soil concentrations exceed the proposed EPA target clean-up levels, and the areas where the Interim Removal Measure (IRM) action was performed (Area A and Area B). This should be performed to protect wildlife that may use the area for hunting, feeding and nesting.

The letter also recommends that "clean fill" be placed over the existing surface soil concentrations equal to or greater than 60 ppm lead, 2 ppm cadmium, 200 ppm for zinc and 0.1 ppm for acenaphthene. These values were adopted from the U.S. Fish and Wildlife Service publication, *Evaluating Soil Contamination, Biological Report 90, (2), July 1990.*

Although we disagree with the proposed the alternative clean-up values as discussed under Issue #2, the Army would agree to provide a vegetative cover for the Ash Landfill and the NCFL. The debris piles would be removed to an off-site landfill. As the piles would no longer exist, any risk posed by the piles would also no longer exist and there should be no need to cover the location where the former pile would have been.

In addition, there is no need for a vegetative cover over the area where soil was removed, treated via Low Temperature Thermal Desorption (LTTD) and replaced in the removal area. The removal action involved heating soil to approximately 900°F and was successful in eliminating Volatile Organic Compounds (VOC)s from soil and reducing the levels of Polynuclear Aromatic Hydrocarbons (PAH)s to either non-detect or levels that range from 100 to 500 ug/kg. Approximately 156 analyses were performed of the post-treatment soils, prior to placement back into the excavation pit. Our review of these data indicates that none of the five (5) target VOCs, trichloroethene, 1,2-dichloroethene, vinyl chloride, toluene and xylene, were detected in any sample above the soil clean-up values adopted from the New York State Technical Administrative Guidance Memorandum (TAGM), Number 4046. For example, trichloroethene were detected in approximately 13% of the post-treatment samples, the maximum detected value was 46 ug/kg. Ten (10) semi-volatile organic compounds were also analyzed in the post-treatment soils. The compound acenaphthene, identified by EPA as a target site clean-up compound, was not one of the ten targeted semi-volatile organic compounds during the LTTD soil treatment program. The ten (10) semi-volatile compounds that were targeted during the soil treatment program were selected from the human health risk assessment. Acenaphthene was dropped as a chemical of concern during the human health risk assessment during the screening portion of the risk assessment. Since it was not a chemical of concern (COC) in the human health risk assessment, this compound was not identified as a targeted compound for the LTTD soil treatment program. However, it was included in the ecological risk assessment as an indicator of potential phytotoxic effects to vegetation. The derived value for acenaphthene shown in the ecological risk assessment was 500 ug/kg, not the value of 100 ug/kg presented by EPA as the target clean-up value. The mean concentration of the post treatment soils for the ten (10) semi-volatile organic compounds is presented below. For this analysis, it is assumed that all non-detected compounds are equal to one-half of the detection limit. Where detected values are provided, the actual value provided by the laboratory was used whether the qualifier was an estimated value or a non-qualified value.

Since the laboratory reported any detected values, which were lower than one-half of the detection limit, as estimated values, the mean concentrations calculated by this analysis is probably higher than what the true mean value actually is. This is because if a non-detected value was present at one-half the detection limit the laboratory would have reported it as a qualified value. Since the laboratory did not report the value as a qualified value the true sample value is likely to be lower than one-half the detection limit. Table 2 provides an indication of the average concentration of semi-volatile organics in the area where the LTTD treatment process was conducted. Acenaphthene is not included in the table as it was not a targeted PAH compound. As mentioned, these concentrations are likely higher than what would be expected as the true mean since the value used for this calculation assumed the concentration for non-detect values at one-half the detection limit. The detection limit was generally at 660 ug/kg.

Table 2

Concentrations of PAH Compounds in the Area of the LTTD Treatment

Parameter	Mean Concentration (ug/kg)	Number of Detections	Post Treatment Data Total Count
Napthalene	221.9	61	156
Phenanthrene	115.1	120	156
Fluoranthene	132.7	129	156
Pyrene	127.2	109	156
Indeno(1,2,3-CD)pyrene	159.4	73	156
Benzo(a)anthracene	74.5	149	156
Chrysene	103.5	129	156
Benzo(a)pyrene	78.2	146	156
Dibenzo(a,h)anthracene**	43.8	102	156

We recognize that the LTTD treatment process would have minimal affect on the concentrations of metals in soil but we also note that only limited amounts of metals were present in the soil to begin with. The unavoidable mixing of soil during the excavation and thermal treatment process has undoubtedly reduced the concentration of metals in these locations. Post treatment confirmation sampling for the LTTD treatment program did not include total metals and therefore no post treatment concentrations for the soil replaced into the excavation are available. Assuming the treatment process did not reduce the concentration of metals in the soil that was treated, it is possible to calculate, from the previous RI data collected where soil was treated, the concentration of these three (3) metals. We believe that the mean of the RI data will provide a reasonable representation of what the current conditions are at the site, since the treatment process involved a rotating soil through a heated eight (8) foot diameter drum. This process produced a soil that is thoroughly mixed. Fifteen (15) soil borings were performed during the RI in the areas that were excavated and treated. These borings include: B-2, B-15, B-27, B-28, B-29, B-30, B-31, B-32, B-36, B-37, B-38, B-39, B-46, B-47 and B-48. Soil samples were collected and analyzed from the several depths including the surface, 0-2', 2'-4', 4'-6' and 6'-8'. A total of 49 soil samples, corresponding to 61 analyses, were collected from these sample boring locations and analyzed for organic and inorganic contaminants. The increased numbers of analyses were due to duplicates and laboratory required reanalysis of samples. Our analyses included averaging each location where either a duplicate or reanalysis was performed. We have tallied these data and have determined that the mean of the concentration of lead in these samples to be 30 ppm, for cadmium the mean is 1.5 ppm, for zinc the mean is 75.9 ppm. Table 3 provides a summary of all the metals data evaluated. These data suggests that the soil in this area is below the EPA target levels for protection of ecological receptors. As a result, there does not seem to be a justification to place an additional 1-foot of vegetative cover over an area that has been treated to reduce or eliminate the organic compounds and has reduced the inorganic components of concern. The treatment process also involved establishing a vegetative cover of 6 inches. Our last inspection of the Ash Landfill area indicated that this vegetative cover is established. A review of the above data indicates that concentrations for cadmium, lead and zinc in the area of treatment are below the EPA proposed criteria for concentrations equal to or greater than 60 ppm lead, 2 ppm cadmium, 200 ppm for zinc. Therefore, a vegetative cover over the area should not be required.

In summary, we believe that any ecological impacts at the site are minimal. However, some "hot spot" areas of the site, where elevated concentrations of metals exist at the surface, may pose a limited ecological threat. Using this as the criteria for protection of ecological receptors the Army proposes to excavate each of the debris piles and place a vegetative cover over the NCFL and the former Ash Landfill of 12 inches. We do not propose to place a vegetative cover over the two areas, Area A and Area B, that were excavated and treated using Low Temperature Thermal Desorption because concentrations of organic compounds have been reduced to acceptable levels through treatment. Concentrations of lead and cadmium in soil within these areas were not above the clean-up criteria. Zinc levels were elevated but have also been reduced due to the unavoidable process of mixing soil during treatment. We believe that this plan is a cost effective action that will be protective of human health and the environment.

As we would like to achieve closure at the Ash Landfill site we hope that this discussion will be helpful in achieving an agreeable plan. We await your thoughts and comments and look forward to future discussions. Please do not hesitate to call Mr. Stephen Absolom at (607) 869-1309 if you have any questions.

Sincerely,

Brian K. Frank
LTC, U.S. Army
Commanding Officer

Copy furnished:

Commander, U.S. Army Corps of Engineers, Huntsville Division, ATTN: CEHND-PE-E (Mr Kevin Healy), P.O. Box 1600, Huntsville, Alabama 35807

Commander, U.S. Corps of Engineers, Seneca Army Depot Activity, ATTN: CENAN-PP-M (Randall Battaglia), Seneca Office for Project Management, Romulus, New York 14541-5001

Commander, USACHPPM, 5158 Blackhawk Road, ATTN: Keith Hoddinott, Aberdeen Proving Ground, Maryland 21010-5422

Commander, U.S. Army Environmental Center, ATTN: SFIM-AEC-IRP (Mr. John Buck), Aberdeen Proving Ground, MD 21010-5410

Mr. Michael Duchesneau, Parsons Engineering Science, Inc., 30 Dan Road, Canton, MA 02021

Commander, U.S. Corps of Engineers, Seneca Army Depot Activity, ATTN: CENAN-PP-M (Thomas Enroth), Seneca Office for Project Management, Romulus, New York 14541-5001

Commander, U.S. Corps of Engineers, Seneca Army Depot Activity, ATTN: CENAN-PP-M (Ms. Janet Fallo), Seneca Office for Project Management, Romulus, New York 14541-5001

Commander, U.S. Army Industrial Operations Command, ATTN: AMSIO-EQE (R. Nida), Rock Island, IL 61299-6000

Mary Farnsworth

Table 3
Concentrations of Metals in the Area of the LTTD Treatment

Metals (mg/kg)	MEAN	FREQUENCY OF DETECTION	NUMBER OF DETECTS	NUMBER OF RI ANALYSES
Aluminum	13700	98%	48	49
Antimony	7.7	10%	5	49
Arsenic	5.0	98%	48	49
Barium	51.9	100%	49	49
Beryllium	0.7	83%	34	41
Cadmium	1.5	59%	29	49
Calcium	34775	100%	49	49
Chromium	22.7	100%	49	49
Cobalt	11.7	100%	49	49
Copper	27.6	100%	49	49
Iron	29475	100%	49	49
Lead	30.6	100%	48	48
Mercury	0.04	49%	22	45
Nickel	37.9	100%	49	49
Zinc	75.9	98%	48	49

BCT AGENDA

May 16-17, 2000
NCO CLUB
1330 – 1630 May 16, 2000
0830 – 1130 May 17, 2000

⇒ **FOST Comments**

⇒ **FOSL Explanation**

⇒ **Site Visit of Operable Units**

BCT AGENDA

June 20-21, 2000
NCO CLUB
1330 – 1630 June 20, 2000
0830 – 1130 June 21, 2000

- **OB Grounds Update**
- **FY01 Workload**
  FTE/DSMOA
- **OD GROUNDS: Removal Action**
- **SEAD 13 Decision Document**
  NYS Letter dated 14 Jun 2000
- **Draft Decision Document**
  NYS Letter dated 14 June 2000

  CONFERENCE call.
- **EBS Sites**
  The Next Step?? Perform SI
- **819 FOSL**
  How can we go faster
- **PID FOSL**
  How can we move forward
- **No Action Sites**
  ROD Language

BCT Agenda
19 July 2000
1330-1630 Hours
Building 123

1. FFA Document Submission Requirements for EE/CA, Remedial Design, Remedial Action for upcoming work.

2. MARRISM TRAINING ---Interest, Attendance, Dates -for site specific training class.

3. Attachment 5 Dates, Upcoming documents, review status. Funding impacts on delays.

4. SEAD 44A status for UXO work.

ATTACHMENT 5
SCHEDULES

The schedule of IRP work completed to date and planned through completion of all restoration work at SEDA is as follows:

RELEVANT MILESTONES (1)(2)

ASH LANDFILL (SEAD-003, 006, 008, 014, and 015) OU1

Draft Work Plan	(04 Dec 90)
Draft RI	(20 Oct 93)
Draft FS	(19 Sep 94)
Draft PRAP	(07 Mar 97)
Draft ROD	(30 Aug 98)

OPEN BURNING GROUNDS (SEAD-023) OU2

Draft Work Plan	(29 Aug 91)
Draft RI	(28 Jan 94)
Draft FS	(09 Mar 94)
Draft PRAP	(04 Jul 96)
Draft ROD	(14 Nov 97)

REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES (3)(4)
FIRE TRAINING AREAS (SEAD-025, 026) OU3

Draft RI/FS Work Plan	(29 Mar 95)
Draft RI Submission	(27 Jun 96)
Draft FS Submission	(05 Dec 97)
Draft PRAP	(20 Jun 00)
Draft ROD	(02 Dec 00)

DEACTIVATION FURNACES (SEAD-016, 017) OU4

Draft RI/FS Work Plan	(29 Mar 95)
Draft RI Submission	(08 May 97)
Draft FS Submission	(21 Nov 97)
Draft PRAP	(28 Aug 00)
Draft ROD	(11 Mar 01)

RAD SITES (SEAD-012, 063) OU5

Draft RI/FS Work Plan		(19 Dec 95)
Draft RI Submission -	See Footnote #7	(22 May 00)
Draft FS Submission		(14 Oct 00)
Draft PRAP		(01 Feb 01)
Draft ROD		(15 Aug 01)

SEAD-059, 071 Fill Area/Paint Disposal

Draft RI/FS Work Plan		(30 Jan 96)
Draft RI Submission	See Footnote #8	(16 Jul 98)
Draft FS Submission	(On Hold)	(10 Nov 98)
Draft PRAP	(On Hold)	(28 Feb 99)
Draft ROD	(On Hold)	(11 Sep 99)

SEAD-004 Munitions Washout Facility

Draft RI/FS Work Plan	(25 Oct 95)
Draft RI Submission	(15 Nov 99)
Draft FS Submission	(16 Jan 01)
Draft PRAP	(06 May 01)
Draft ROD	(17 Nov 01)

SEAD-011, 64A, 64D Old Construction Debris Landfills (5)

Draft RI/FS Work Plan		(15 Jun 95)
Draft RI Submission	See Footnote #9	(06 Nov 98)
Draft FS Submission	(On Hold)	(31 Mar 99)
Draft PRAP	(On Hold)	(19 Jul 99)
Draft ROD	(On Hold)	(30 Jan 00)

SEAD-013 IRFNA Disposal Site

Draft RI/FS Work Plan	(14 Nov 95)
Draft RI Submission	(29 Aug 99)
Draft FS Submission	(22 Jan 00)
Draft PRAP	(11 May 00)
Draft ROD	(22 Nov 00)

SEAD-052, 060 Bldg 612 Complex

Draft RI/FS Work Plan	(19 Jan 96)
Draft RI Submission	(29 Aug 00)
Draft FS Submission	(23 Jan 01)
Draft PRAP	(10 May 01)
Draft ROD	(24 Nov 01)

SEAD-045, and 057 Demo Area/EOD (6)

Draft RI/FS Work Plan	(26 Feb 96)

SEAD-046 Small Arms Range (6)

Draft RI/FS Work Plan	(09 May 96)

SEAD-045, 046, and 057 Demo Area/EOD/Small Arms Range (6)

Draft RI/FS Work Plan	(See above)
Draft RI Submission	(01 Sep 00)
Draft FS Submission	(24 Jan 01)
Draft PRAP	(04 May 01)
Draft ROD	(15 Nov 01)

SEAD-048 Pitch Blend Storage

Draft RI/FS Work Plan	(19 Dec 95)
Draft RI Submission	(05 Nov 00)
Draft FS Submission	(30 Mar 01)
Draft PRAP	(18 Jul 01)
Draft ROD	(29 Jan 02)

SEAD-066 Pesticide Storage Areas

Draft RI/FS Work Plan	(02 Dec 96)
Draft RI Submission	(05 Nov 00)
Draft FS Submission	(30 Mar 01)
Draft PRAP	(18 Jul 01)
Draft ROD	(29 Jan 02)

FOOTNOTES:

(1) Draft and Draft-Final submissions are based on the InterAgency Agreement (IAG) stipulation of 45 days for Army preparation and 30 days for regulatory review. Final dates are based upon the IAG stipulation that all documents become final automatically within 30 days of the Draft-Final submission if no comments are received.

(2) Multiple document submittals will be likely considering the amount of work required and the tight schedules for performance. All schedules assume that regulatory reviews will be conducted concurrently, if required, as is assumed in the IAG.

(3) All schedules for RIs to be performed assume that two phases of fieldwork will be required. If Phase II RI fieldwork is unnecessary for SEADs 25 and 26, SEADs 16 and 17, SEAD 4, SEADs 12, 48, and 63; all draft documents for these operable units shall be submitted to the USEPA and NYSDEC earlier than the deadlines in Attachment 5: Facility Master Schedule. The Army shall submit a revised Attachment 5 to the USEPA and NYSDEC to reflect the new deadlines within 30 days of NYSDEC and USEPA indicating that Phase II RI fieldwork would not be needed for the above-mentioned SEADs.

(4) Operable unit designation will be assigned after project has been funded and consistent with definition, Section 2, paragraph 14.

(5) Years will continue to be designated by their last two digits in the year 2000, e.g. "00", "01", "02", etc.

(6) SEAD-045, and 057 (Demo Area/EOD) have been combined with SEAD-046 (Small Arms Range) for Draft RI Submission.

(7) SEAD 63 EE/CA Notification November 6, 1998. See attached schedule.

(8) SEAD 059, 71 EE/CA Notification November 6, 1998. See attached schedule.

(9) SEAD 011, 64A, 64D EE/CA Notification November 3, 1998. See attached schedule.

(7) SEAD-63 EE/CA Dates

Draft EE/CA Approval Memorandum Document	05 Oct 98
Draft EE/CA Document	23 Oct 99
Draft EE/CA Action Memorandum Document	23 Oct 99
Release for Public Comment	14 Mar 99
Draft Removal Work Plans	25 Apr 99
Removal Action Begins	21 Jul 99
Draft Removal Report	19 Sep 99

(8) SEAD-59, 71 EE/CA Dates

Draft EE/CA Approval Memorandum Document	31 Dec 98
Draft EE/CA Document	14 Aug 00
Draft EE/CA Action Memorandum Document	14 Aug 00
Release for Public Comment	10 Oct 00
Draft Removal Work Plans	24 Nov 00
Draft Removal Report	23 Apr 01

(9) SEAD-11, EE/CA Dates

Draft EE/CA Approval Memorandum Document	11 Dec 98
Draft EE/CA Document	14 Aug 00
Draft EE/CA Action Memorandum Document	14 Aug 00
Release for Public Comment	10 Oct 00
Draft Removal Work Plans	24 Nov 00
Draft Removal Report	23 Apr 01

BCT AGENDA

November 21, 2000
Building 123
1330 - 1630 November 21, 2000

1. **Ash Landfill Reactive Wall**

2. **SEAD-4 Feasibility Considerations**

BCT AGENDA

January 2001

Building 125

1330 – 1630 January 16, 2001
0830 - 1130 January 17, 2001

1. LTTD Treatability Test Status/Update

2. Operable Amount Submittal Status

3. OB Grounds Concerns

   a. Reeder Creek
   b. Clean up levels
   c. Reopening the ROD

4. SEAD-60 Ground Water Concerns

5. DSMOA Requirements for April Submission

6. Funding Concerns → Time Critical Actions

Bimetallic Nanoscale Particles

An Innovative Remediation Technology for Soils and Groundwater

PARS Environmental Inc.

H.S. Gill Ph.D. Tel: 609-890-7277

Introduction

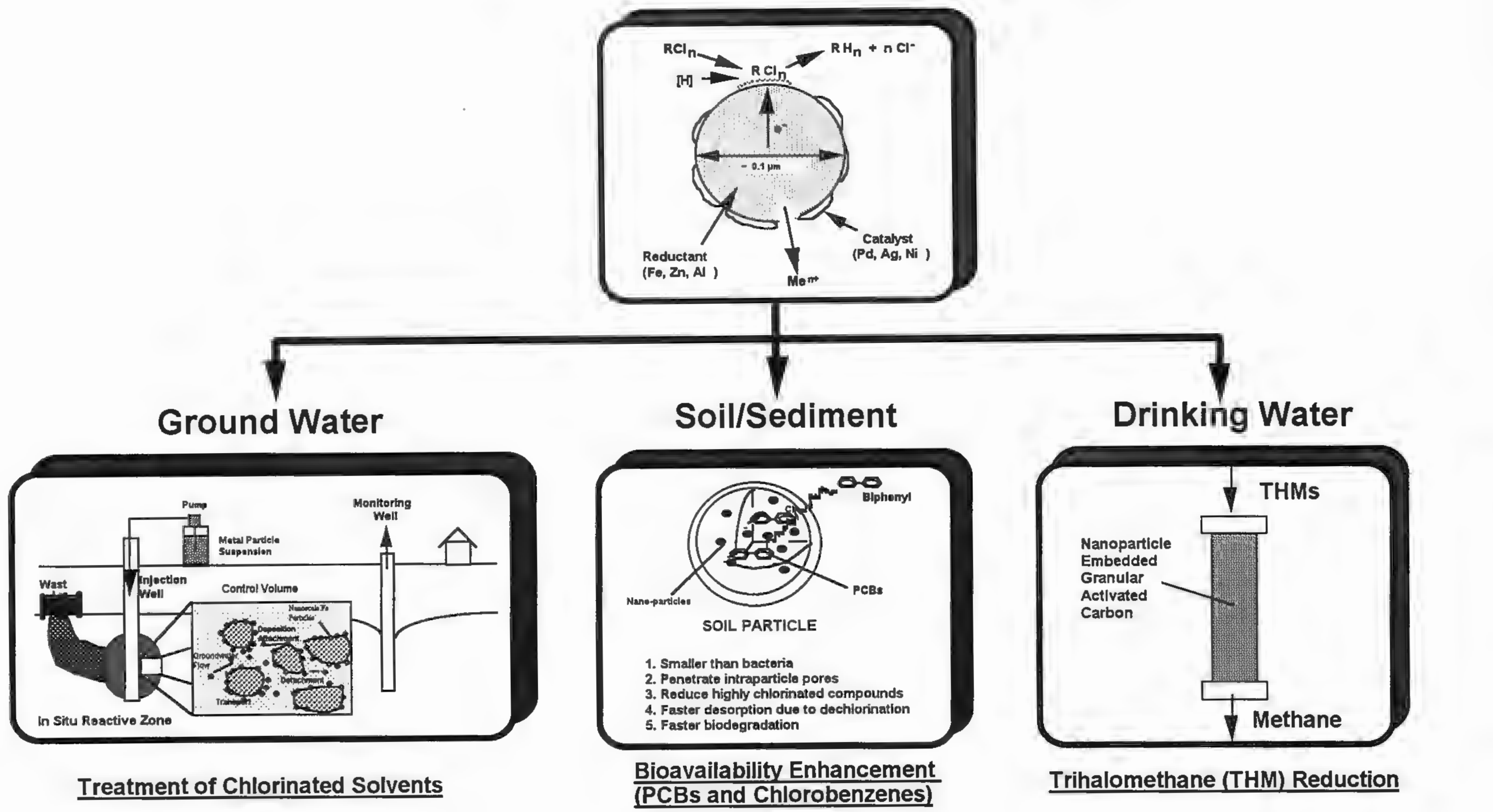
- BNPs remediate recalcitrant contaminants in soils and groundwater
- Sub-micron ($<10^{-6}$m) particles of Fe^0 with a noble metal catalyst
- Based on proven redox processes
- Very flexible and destroys contaminants rapidly in-situ or ex-situ

Treatable by BNP Technology

- Contaminants:
  - Halogenated aliphatics (PCE, TCE, DCEs, VC)
  - Halogenated aromatics
  - PCBs
  - Halogenated herbicides & pesticides
  - Nitroaromatics
  - Metals (e.g. Cr^{+6}, As)
- Geologic Conditions:
  - Sand
  - Silt
  - Fractured rock
  - Landfills
  - Fill materials
  - Sediments

Applications of BNP Technology

Applications of Nanoscale Bimetallic Particles



Technology Overview

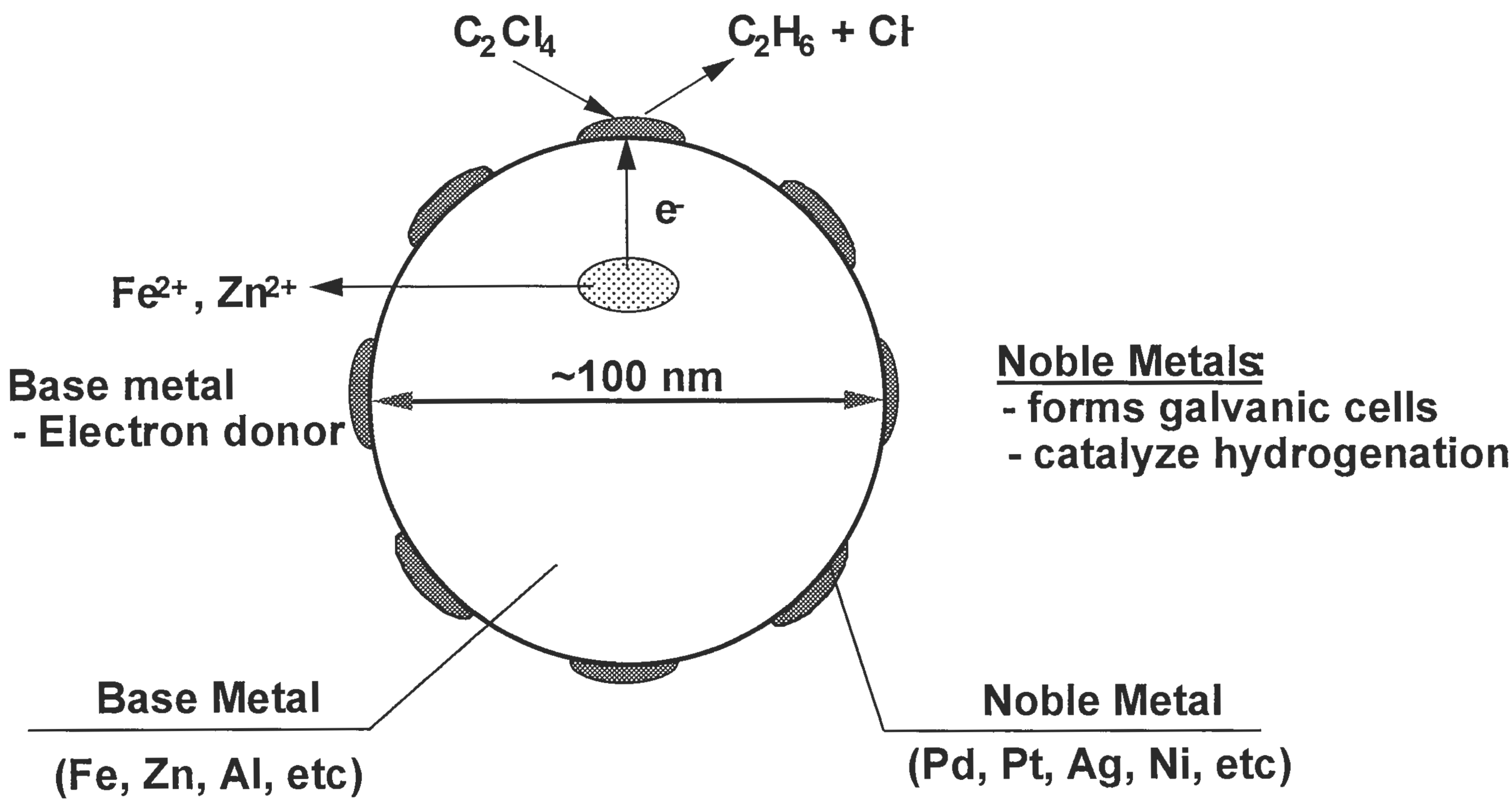
- Iron is an effective reductant
- Based on proven redox process; contaminant serves as the electron acceptor

  $Fe^0 + R\text{-}Cl + H^+ \longrightarrow Fe^{+2} + R\text{-}H + Cl^-$

  $Cr(VI) \longrightarrow Cr(III)$
- Major process variables:
  - Fe^0 surface area (smaller particles are better)
  - Presence of a noble metal catalyst
  - BNPs can be injected by gravity or under pressure

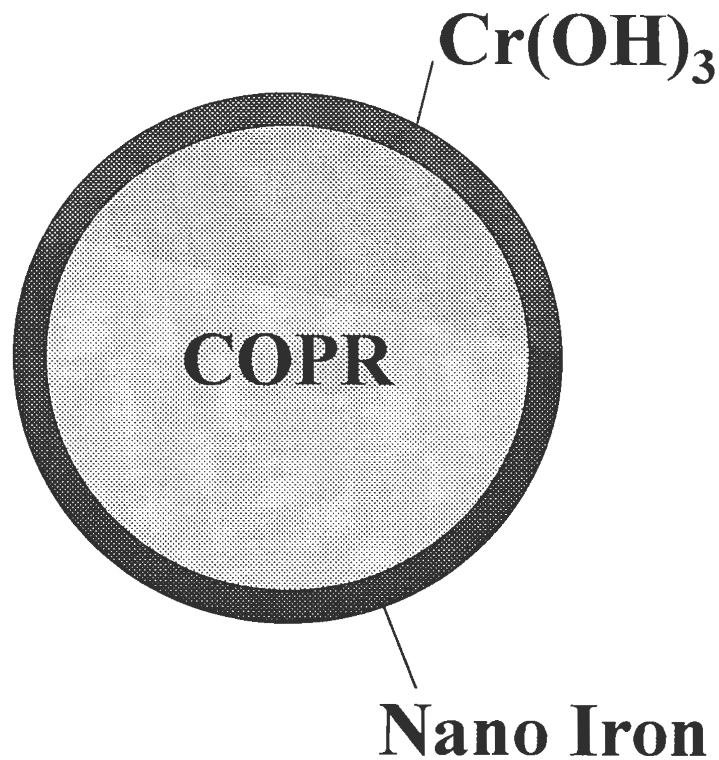
BNP Dehalogenation Schematic

Nanoscale Bimetallic Particles



Treatment of Chromium Ore Processing Residue (COPR)

- Cr(VI) is reduced by nano iron to Cr(III) and immobilized as $Cr(OH)_3$
- Nano iron particles further prevent Cr oxidation and leaching by
  - Forming galvanic cells on the COPR surface, and
  - Consuming oxidant such as oxygen



BNP Production Process

Step I – Preparation of Fe^0 particles

$2FeCl \cdot 6H_2O + 6NaBH_4 \longrightarrow 2Fe^0 + 6B(OH)_3 + 6NaCl$

Step II – Deposit catalytic metal on surface

$2Me^{+n} + nFe^0 \longrightarrow nFe^{+2} + 2Me^0$

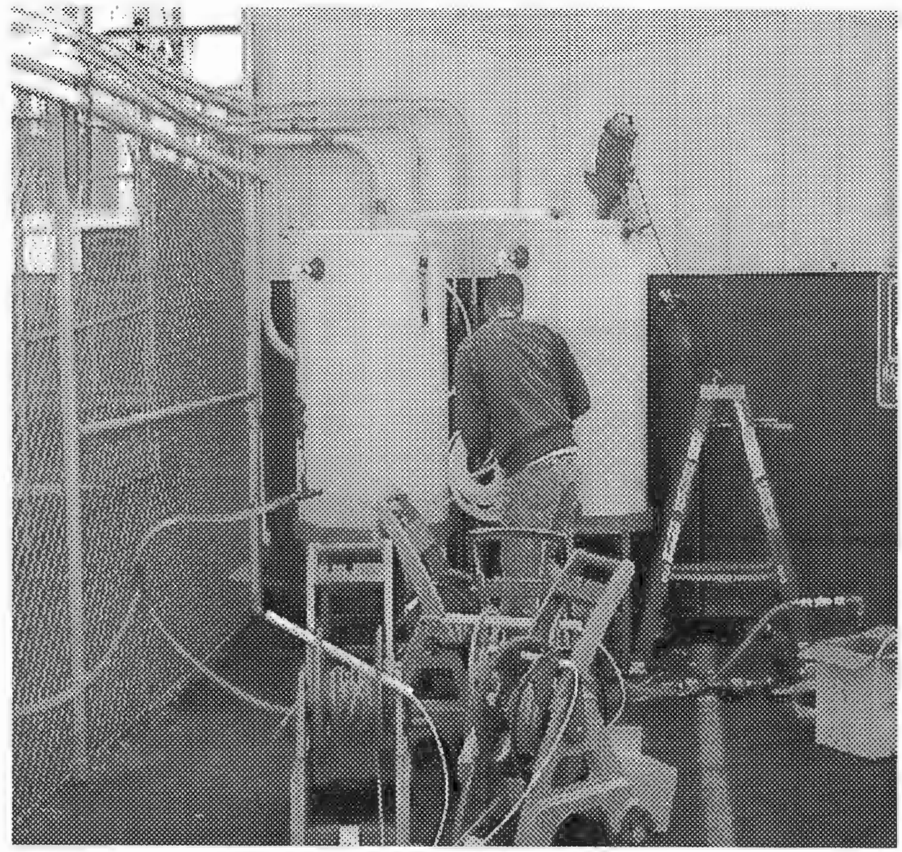
Where Me is generally Pd or Pt

A Case Study

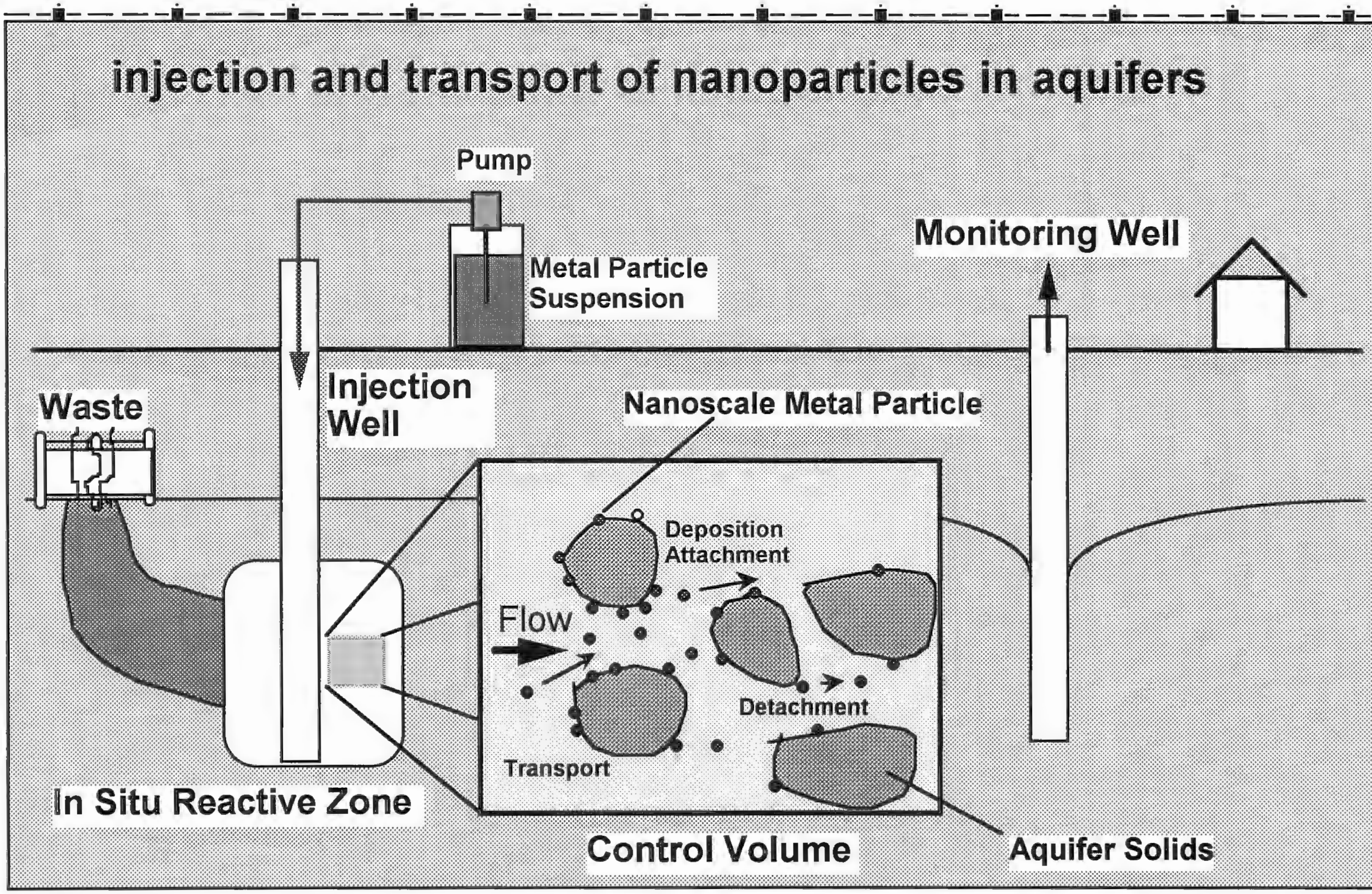
- A 27-acre NJ manufacturing site
- Continuous production since 1930s
- Major soil and groundwater contaminants include TCE, CCl_4, and BTEX
- >$1.0 million has been spent on natural attenuation
- Active remedy required

The Field Test Set Up

- Test area MW-15 and three pairs of nested piezometers 5, 10, & 15 feet downgradient of MW-15.
- Two 165 gal tanks
- Recirculation to storage tank
- Goal = Gravity Feed!

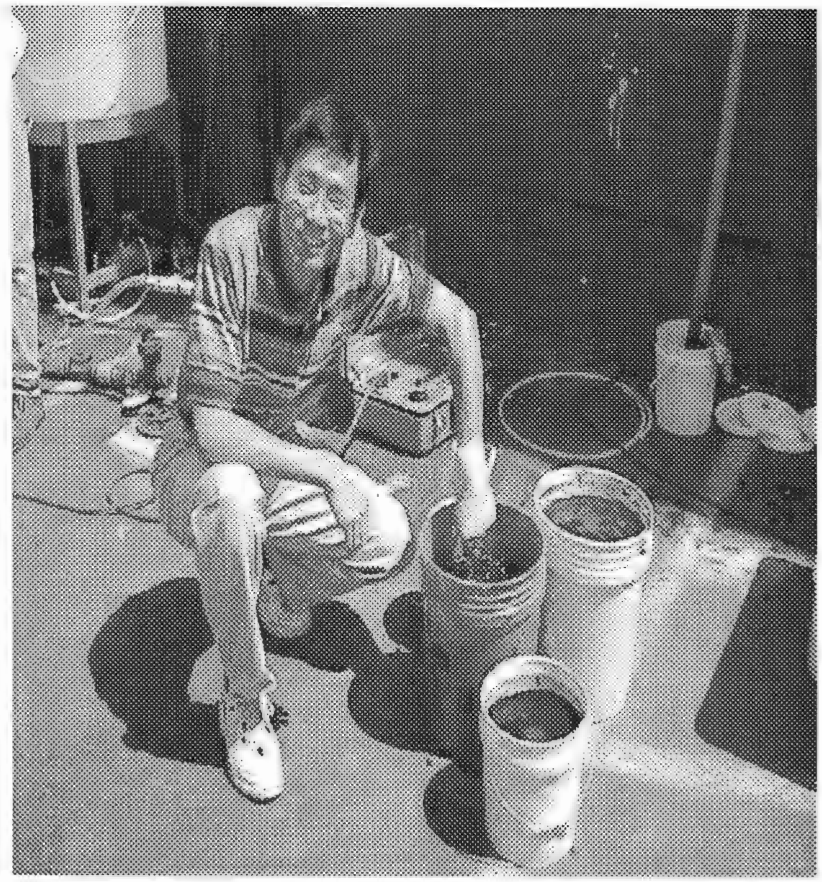


Schematic of Field Test Set-up



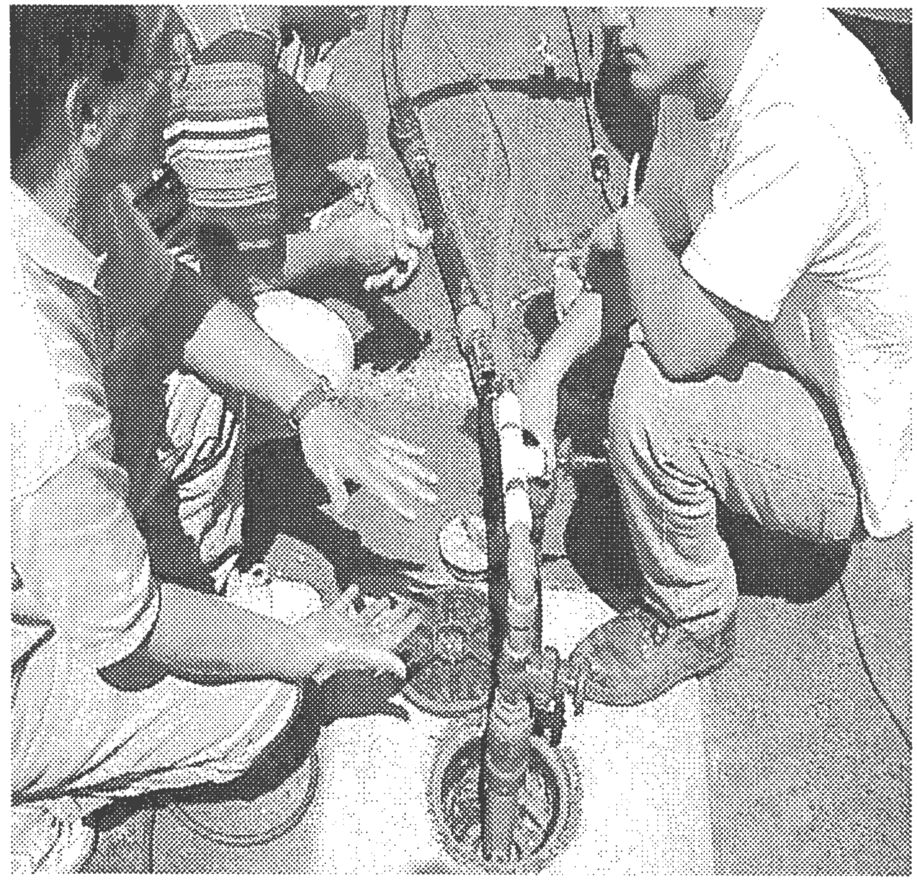
The Secret Weapon…BNP!

- BNP = Fe^0 with a Pd^0 coating (catalyst)
- 1.7 lbs used in Phase I, 3.75 lbs used in Phase II
- Slurried in 130 gal of GW



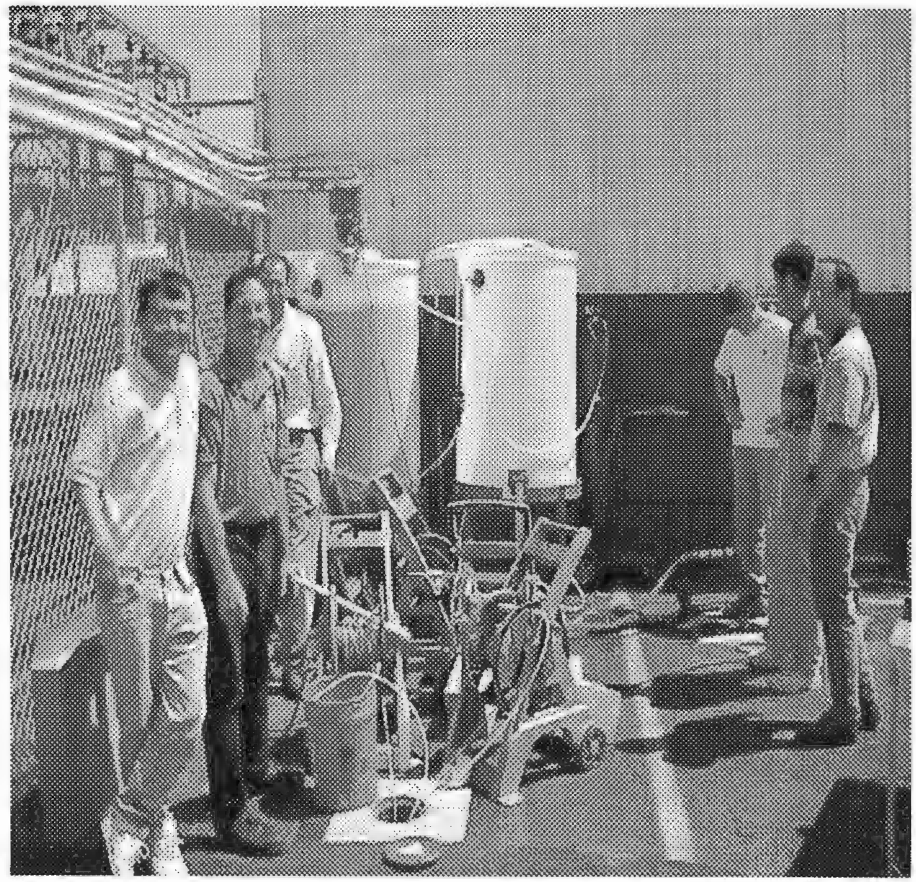
Gravity Injection a Success!

- BNP easily gravity-fed
- A conc. of 1 g/L minimizes plugging
- $K = 2x10^{-1}$ cm/s
- Lower K formations may require pressure



BNP Process a Success !

- A total of 5 lbs BNP injected
- TCE levels reduced up to 95%
- Process is simple, low cost, & portable

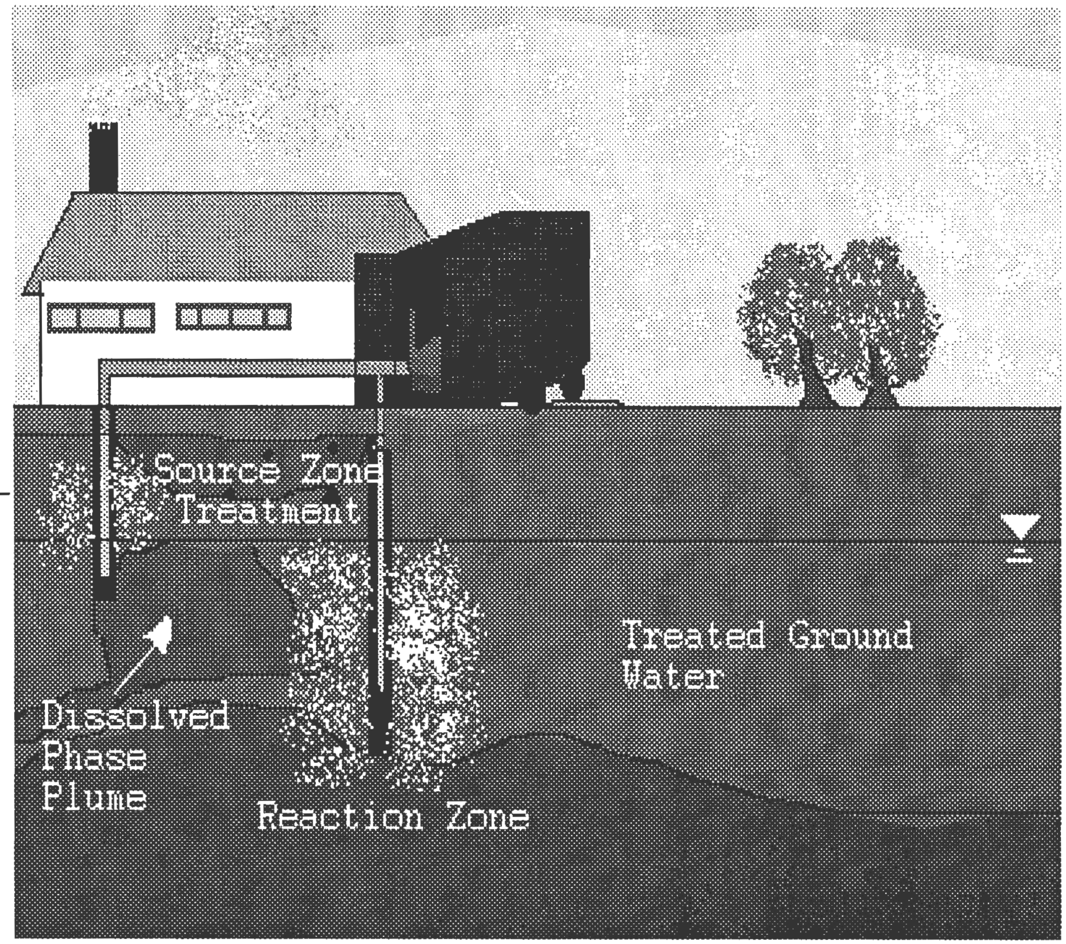


Cost Comparison

Remedial Approach	Estimated Cost
Pump and Treat	$4,160,000
Reactive Barrier	$2,200,000
BNP	$ 450,000

BNP Technology

- Treats dissolved plume and source area(s)
- No depth limitations
- Highly reactive – rapid degradation & no toxic intermediates
- Portable – low capital + O&M costs
- Easily injected, BNPs flow with groundwater
- Low BNP/contaminant ratios required



January 11, 2001

Mr. Julio F. Vazquez, Project Manager
U.S. Environmental Protection Agency, Region II
Superfund, Federal Facilities Section
290 Broadway, 18th Floor
New York, NY 10007-1866

Mr. Jim Quinn
Bureau of Eastern Remedial Action
Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation
50 Wolf Road, Room 208
Albany, NY 12233-7010

Subject: **Additional Sampling in Response to NYSDEC Comment 6 on the Draft-Final Remedial Investigation Report at the Munitions Washout Facility (SEAD-4) at Seneca Army Depot Activity (SEDA)**

Dear Mr. Vazquez and Mr. Quinn:

Parsons Engineering Science, Inc. (Parsons) has been preparing responses to EPA and NYSDEC comments on the Draft-Final Remedial Investigation (RI) Report for the Munitions Washout Facility (SEAD-4). The following comment was submitted by NYSDEC:

> Comment 6: Section 3.0 discusses Buildings T30 and 2084 as being used to prepare packing material for the shipment of the renovated munitions. On page 3-4 the text states A[a]ccording to a current SEDA employee and a former SEDA employee, Building 2084 and T30 were used to paint, stencil, and otherwise prepare the packing material for the shipment of the renovated munitions". Painting booths were also found in Building 2084, along with drying lines.
>
> The log boring for MW4-10 indicates a PID reading of 3.8 ppm at @ 4 feet and 42.5 ppm @ 4.5 feet. The log boring for SB4-14 indicates the same PID readings at the same depths as that of MW4-10. The single subsurface soil sample taken from SB4-14 identifies 1 ug/L ethylbenzene between 2-3 feet below ground surface (BGS). As the data indicates volatiles in the MW4-14 and SB4-14 soil borings, why were samples at varying depths (specifically at the 4 to 4.5 foot level) of the soil boring not taken? As a result of the data presented (or lack thereof), a soil gas survey, or further subsurface soil sampling, in the vicinity of Buildings 2084 and T30 is recommended.

Please note that monitoring well MW4-10 and soil boring SB4-14 are the same location, which is adjacent to the southwest side of Building 2084. A soil sample was not collected from the 4 to 4.5 foot depth because there was little recovery in the split spoon from the weathered shale zone, as indicated on the soil boring log.

The results of the chemical analyses for soil sample SB4-14 (2-3 foot depth) indicate that ethyl benzene (1 J ug/kg), toluene (5 J ug/kg), and xylene (8 J ug/kg) were detected in the soil. These concentrations are below the respective NYSDEC TAGM criteria.

As part of the FS process, Parsons ES proposes to conduct a field investigation consisting of mechanically augering to the weathered shale zone and measuring the headspace of the soil to confirm the presence of any VOCs in the weathered shale zone. Headspace measurements will be conducted using a PID. Since the source of VOCs is likely Building 2084, augering will be conducted at four locations adjacent to SB4-14 and the southwestern side of Building 2084. At locations where the concentrations of VOCs are greater than 10 ppm, a soil sample will be collected and submitted for chemical testing of TCL Volatile Organic Compounds.

Fieldwork for this augering program is scheduled to begin February 12, 2001. The data collected from this investigation will be summarized in an addendum to the RI Report. **Figure 1** shows the locations of the augering holes near Building 2084 at SEAD-4.

The results of the chemical analyses for two rounds of groundwater sampling from MW4-10 indicate that the following VOCs were detected in Round 1:

acetone (8 ug/L),
benzene (2 ug/L),
ethyl benzene (6 ug/L),
toluene (0.4 J ug/L), and
xylene (4 ug/L).

Of these VOCs, benzene and ethyl benzene were detected at concentrations above the respective NYSDEC GA standards of 1 ug/L and 5 ug/L.

This location was not considered to be an area of concern for groundwater because the concentrations of benzene and ethyl benzene were detected in the groundwater at low levels near the GA standards. Furthermore, the presence of these VOCs was not confirmed in Round 2 sampling because no VOCs were detected in the groundwater.

As part of the FS for SEAD-4, one of the proposed remedial action objectives is to monitor the groundwater at the site on a bi-annual basis for a period of one year prior to any remedial actions for soil or sediments. After the completion of any remedial actions for soils and sediments, an additional bi-annual round of groundwater samples will be collected for a period of one year. Monitoring well MW4-14 has been included on the list of monitoring wells to be sampled.

If you wish to audit sampling activities, please notify me at 781-401-2361.

Sincerely,
PARSONS ENGINEERING SCIENCE, INC.

Eliza Schacht, P.E.
Task Order Manager

cc: distributed by email with follow-up mailing
Stephen Absolom, SEDA
Janet Fallo, USACOE
Kevin Healy, USACOE
Keith Hoddinott, USACHPPM

New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Eastern Remedial Action, Room 242
50 Wolf Road, Albany, New York 12233-7010
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Environmental Conservation 30 YEARS
John P. Cahill
Commissioner

January 4, 2001

Mr. Stephen Absolom
Chief, Engineering and Environmental Division
Seneca Army Depot Activity (SEDA)
5786 State Route 96
Romulus, NY 14541-5001

Dear Mr. Absolom,

Re: Seneca Army Depot
NYS Inactive Hazardous Waste Disposal Site No. 8-50-006
September 2000 Draft Final Feasibility Study Report for SEADs 16, 17

During the November 11, 2000 BCT Meeting, the Department of Environmental Conservation mentioned its review of the latest agencies' correspondence out and has revised its position. The Department will table the review of the FS until the Army adequately addresses NYSDEC's concerns on the RI and the FS.

SEDA has not provided satisfactory responses since the Department's first comment letter on the Draft RI of January 28, 1998. The letter stated that "the decision to perform a remedial action should be based upon an evaluation of the technical and economic feasibility of a range of release conditions, with recognition given to the State's goal of returning each contaminated site to pre-release of contaminant conditions." Since then, the Army has submitted a draft final RI and a Final RI, each of which did not address the State's main concern. This was followed by a DEC letter of April 28, 1999 to the Army requesting "further assessment to determine where leeway may be found." SEDA submitted a draft FS on November 21, 1997 with an intervening letter on August 12, 1998 requesting delay on review. But on November 30, 1998, SEDA requested that the USEPA/DEC disregard the draft since major modifications were needed. Instead of releasing a new Draft FS, however, SEDA submitted a Draft Final FS in December 1999. Needless to say, the DEC did not treat this document as a Final Draft, but only as a Draft.

In response to the Draft Final FS, the NYSDEC stated in its March 31, 2000 letter that it would "table review of other documents concerning SEADs 16 and 17 until the issues concerning the RI are resolved and both the RI and FS are finalized." The Army responded by submitting the "Final" FS. The issues with the FS are similar to the RI in that the Army insists on basing both the site risk assessment in the RI and the development of remedial alternatives in the FS only on the intended future use of the properties contrary to State policy to assess the properties on residential use and/or unrestricted use conditions. The State finds this unacceptable.

In your November 6, 2000 letter to Mr. Chen you state that "the FS established the use of lead as the indicator compound and focuses on four different objectives for each alternative," these include the cleanup objectives of 1250 ppm, 1000 ppm, 400 ppm, and 400 ppm with all other metals to TAGM levels; furthermore "the latter alternatives were established to meet the NYSDEC criteria for 'unrestricted use' and the Army's requirement to evaluate the cost of institutional controls." They are referred to either as cleanup objectives that are used for each alternative or alternatives. If they were in fact true remedial action alternatives, then they would be evaluated against the 7 evaluation criteria, not simply a cost comparative analysis. Also, institutional controls were never mentioned, let alone its evaluation in the FS, cost or otherwise. Therefore, you have not included all of the concerns of the NYSDEC as conveyed in your letter.

However, when you do submit a revised FS several points need to be incorporated and/or addressed to meet the State's acceptance. If the Army is intending on leaving residual contamination above acceptable levels for unrestricted use, institutional controls will be necessary to prevent unacceptable human exposures. The comparative analysis of institutional controls, including cost, implementability, and administrative feasibility needs to be addressed in the FS. The detailed analysis of the unrestricted use or residential alternative and the NYSDOH recommended cleanup level of lead to 1000 ppm for industrial reuse alternative needs to be evaluated fully against the 7 evaluation criteria in the detailed analysis of alternatives. A simple cost comparison is not sufficient. Substantial evidence and/or data must be used to verify that potential ARARs such as sediment criteria do not apply to this site. Also, all known contaminants on site must be addressed, including PAHs, pesticides and PCBs.

We have detailed comments from both the NYS Department of Health and our office, but a resolution to the issues stated above it sought. We are hopeful that this will be done before the next BCT meeting on January 16, 2001, and at that time, detailed issues could be addressed.

If you have any questions, please contact me at (518) 457-3976 or by email at ajthorne@gw.dec.state.ny.us.

Sincerely,

Alicia Thorne
Bureau of Eastern Remediation Action
Division of Environmental Remediation

cc: B. Wing, USEPA
J. Vazquez, USEPA
D. Geraghty, NYSDOH
M. Peachey, NYSDEC

bc: S. Ervolina

File Jan BCT

Meeting Minutes Summary
BRAC Clean-up Team (BCT) Meeting, Day 1
Tuesday, January 16, 2001

Attendees:
Stephen Absolom – SEDA Base Environmental Coordinator (BEC)
Thomas Enroth – New York District COE
Janet Fallo – New York District COE
Thomas Battaglia – New York District COE
Randy Battaglia – New York District COE
Robert Scott - NYSDEC – Avon, Region 8
Daniel Gereahty – NY State Department of Health (NYSDOH)
Julio Vasquez – EPA Region 2
James Quinn – NYSDEC – Albany (via phone)
Marsden Chen – NYSDEC
Alicia Thorn – NYSDEC
Michael Duchesneau – Parsons ES
Pat Jones – Industrial Development Agency (IDA)
Tom Graseck – Seneca Army Depot Activity
Mike Kelly – AEC
Clayton Kim – AEC
Chuck Lechner - AEC

The monthly meeting of the BRAC Base Clean-up Team (BCT) was called to order by Mr. Stephen Absolom, the BRAC Environmental Coordinator (BEC), at approximately 13:45 hours in Building 125 at the Seneca Army Depot Activity (SEDA), in Romulus NY. The list of attendees is provided above.

LTTD Treatability Study Status/Update

Mr. Duchesneau provided an update regarding the status of the treatability study. The treatability study involves an evaluation for utilizing the existing Ammunition Peculiar Equipment (APE 1236) deactivation furnace as a Low Temperature Thermal Desorption (LTTD) soil treatment unit. Mr. Duchesneau described the aspects of study. The study involved treatment of soil contaminated with petroleum hydrocarbons from a spill that occurred at SEAD-60. Soil test treatment runs were planned at 2-ton and 5-ton per hour rates. Samples from the test treatment runs were to be collected in triplicate.

Two 2-ton per hr tests were performed on August 30 and completed on September 1, 2000. On September 1, 2000, the deactivation furnace experienced burner malfunction. Completion of the test was postponed until the unit was repaired. The test was restarted on September 20 through September 23, 2000. The exit soil temperatures were measured in the 600°F range, which would be above the boiling point of all VOC compounds, several PAH compounds and the petroleum hydrocarbon fuel oil that was released at the site. Soil samples collected from the inlet and the outlet of the thermal treatment unit showed removals of TPH and several PAH compounds in the range of 70 to 90 % removal. Low levels of dioxin isomers were detected in the treated soil in the range of 0.2 to 114 parts-per-trillion (ppt). The removal rates for TPH and various PAH compounds were similar at the 2 to 5 tons/hr treatment rate. These removals were considered to be good and comparable to what would be attained at commercial LTTD units. Two sample runs of Volatile Organic Sampling Train (VOST) samples were collected from the exhaust stack. Although some volatile organic compounds were detected in the VOST samples similar levels of volatiles were also detected in the blank samples. This suggests that no volatile organic compounds were present in the stack gas. Dioxin stack samples were also collected for all runs. The stack gas sampling team failed to submit stack samples to the laboratory for analysis for total particulates, semi-volatiles, PCBs, metals and HCL. Therefore the data is unavailable for inclusion in the final report. The reason as to why this occurred remains unclear. The Continuous Emission Monitoring (CEM) data was collected during all test runs. The CEM data did not detect the presence of total hydrocarbons (THC), at a detection limit of 2 ppmv, during any treatment test run. Oxygen and carbon dioxide was normal, in the range of 12% to 14 % and 5% to 6%, respectively. Carbon monoxide was not detected in the stack gas at a detection limit of 3 ppmv. Parsons estimated the cost to process a ton of contaminated soil in the furnace to be between $50 to 60 dollars. Compared to the cost to transport and dispose of a ton of soil at an off-site landfill, which is between $26 to $40/ton, Parsons recommends that the deactivation furnace not be used as a soil treatment alternative since it is not a cost effective treatment technology. The cost for off-site landfill disposal was based upon quotations from BFI and the High Acres Landfill. These cost are for the disposal of soil considered to be industrial waste, not hazardous, which would be the case if the soil exceeds the TCLP test. Mr. Absolom pointed out that soil that exceeded the TCLP test would be hazardous waste and, by agreement with the NYSDEC, could not be treated in the deactivation furnace, since this would require a RCRA permit and a full trial burn plan.

SEAD-16/17 Feasibility Study (FS)
Mr. Chen and Mr. Quinn requested that the agenda be modified to include a discussion of the SEAD-16 and 17 FS. NYSDEC has prepared comments dated 1/1/01. These comments have not been provided to the Army yet but were available at the meeting and will be sent to all. Mr. Quinn noted that there remains a handful of overarching issues that have not been fully addressed. The NYSDEC contends that the NYSDEC did not provide comments on the Draft version of the FS. The latest version of the FS was labeled Draft/final. In addition, the NYSDEC has comments on the presence of TPH contamination, the need for additional discussions on the nature of the proposed institutional controls and the nature and extent of metals contamination has not been fully delineated.

Mr. Absolom noted that the Army does not agree with this comment. He noted that during previous discussions with the NYSDEC on this issue, the understood that the Army and NYSDEC had agreement that the Army would do additional limited sampling, prior to the design phase of the project, to help refine the volume of soil to be removed.

The Army was unaware that the NYSDEC felt that the data gaps were so significant that the finalization of the FS would be hampered without completion of the additional sampling. Mr. Duchesneau asked if confirmational sampling be eliminated, if the additional sampling was performed, since the boundaries would be fixed by the pre-excavation sampling. Mr. Chen responded that confirmational sampling, following excavation of soil would still be required.

Mr. Absolom stated that *the Army believes that since the extent of the final area and volume to be excavated will be determined from the confirmational sampling, the additional sampling will not change any of the decisions that will be made. The data will be useful in refining the estimate of the volume of soil to be excavated, which will be determined by the confirmational sampling, not the additional sampling proposed by the NYSDEC. The Army believes that these volumes are within the level of accuracy required to proceed with the decision process. Site characterization has been adequate to identify the nature and extent of contamination. The data gaps are not significant to justify finalization of these reports and proceeding with the PRAP and the ROD. The Army believes that the delays caused by performing the additional sampling will only serve to delay implementation of the remedy.*

Mr. Quinn noted that the NYSDEC remains uncomfortable with moving forward with the PRAP and the ROD decision document because of the current level of uncertainty regarding the existing data gaps. The reason for this concern is related to the soil volume estimates that have been developed to achieve "pre-disposal" conditions, as required by Part 375 of the NYSDEC hazardous waste regulations, may be overestimated. If the volume of soil to be treated to achieve "pre-disposal" conditions is overestimated, then the corresponding cost will also be overestimated. Since cost is a legitimate reason for not achieving the NYSDEC goal of "pre-disposal" conditions, Mr. Quinn felt that attaining "pre-disposal" conditions might have been unjustifiably eliminated. Therefore, the NYSDEC believes that additional sampling should be performed as part of the RI in order for the FS to accurately reflect consideration of attaining "pre-disposal" site conditions. Mr. Quinn felt that the estimated boundary for soil requiring treatment might be much closer to the boundary of source and the boundary that was established that would be protective for industrial use.

Mr. Duchesneau stated that the boundary lines were drawn based upon all available soil data. Professional judgement was used in instances where site data was lacking, however, these instances are limited to a few areas. He stated that there was no intent to intentionally raise the volume of soil for this purpose. He suggested that the drawings be reviewed so that the boundaries could be redrawn and modified as required. Although the drawings from the FS were provided to the group there was no discussion regarding modifying any boundary. Mr. Duchesneau did identify that the concentration of lead in soil was used to establish one set of boundaries. The level of lead in soil considered to be protective for the future intended use of this site, which is industrial, was established by the NYSDOH to be 1000 mg/kg. Another boundary was established for lead in soil at 400 mg/kg, which is the level that is protective for residential purposes. The NYSDEC had previously agreed that "pre-disposal" conditions for lead would be residential. The boundaries for lead at these concentrations were shown in separate drawings. In addition to lead in soil boundaries, an additional drawing was provided that identified the boundary of soil to be excavated in order to achieve "pre-disposal" conditions for other metals such as copper and mercury. For the other metals the boundary for "pre-disposal" was established as the 95th percentile of the Seneca Army Depot Activity soil background data, which is comprised of approximately 52 soil samples collected from areas of the depot considered to be free of contamination. The discussion was tabled until the Army has had an opportunity to review the NYSDEC comment.

Mr. Quinn also noted that the comment letter requires additional details pertaining to the use of institutional controls as a component of the final remedial plan. Mr. Duchesneau noted that industrial controls would include a deed restriction that would identify specific activities that would not be allowed. He noted that, if necessary, a draft deed restriction could be provided in this document to satisfy the NYSDEC requirement for additional details. The NYSDEC did not indicate that this would be an acceptable response. Mr. Quinn indicated that there must be additional discussion regarding details of the proposed institutional control aspects of the remedial plan. Issues such as what agency would be responsible for assuring that future activities at the site are consistent with the deed restriction should be addressed. Further, how long would these activities take place? How would the cost estimate for an alternative involving institutional controls consider the long term, life-cycle, cost if the land use restriction will be placed on the land forever. Most present worth cost estimates consider 30-year costs, whereas the costs should be considered for a longer life-cycle. It was decided to move on with the agenda items and table any further discussion on this matter for the sake of time and to allow all parties to review the NYSDEC comments.

Operable Units Amount Submittal Status

Mr. Absolom provided a summary table on the status of the active projects at SEDA. The following is a summary of the status of these projects.

Ash Landfill. SEAD-3, 6, 8, 14 and 15. The draft-final PRAP was submitted in June 2000. Mr. Vasquez indicated that the draft-final PRAP is being routed through EPA headquarters for concurrence. Mr. Quinn indicated that the NYSDEC has already agreed to the PRAP. He noted that this was an agreement that the previous NYSDEC project manager had been involved with. Mr. Quinn asked how the results and conclusions of the draft Feasibility Memorandum would be included in the decision process. The Feasibility Memorandum provides details of a treatability study that was performed last year to demonstrate the effectiveness of treating TCE and DCE with a permeable reactive wall filled with a 50/50 mixture of zero valence iron and sand. Mr. Quinn noted that if the results of the treatability study were to be included as part of the FS, then the NYSDEC would need to concur with these conclusions before agreeing to a final decision. The NYSDEC has provided comments on the draft Feasibility Memorandum that raised questions on the effectiveness of the reactive permeable wall. Mr. Duchesneau indicated that the Federal Facility Agreement (FFA) considers a treatability study to be a secondary document, therefore the Feasibility Memorandum need not be part of the FS. There was general agreement that the Feasibility Memorandum would not be an addendum to the FS. The intent of the reactive barrier wall treatability study, described in the Feasibility Memorandum, was to obtain essential design data on a technology that was still considered innovative. The outcome of the treatability study was to include an additional reactive wall downgradient of the current. Mr. Quinn asked if the treatability study included the evaluation of vegetable oil injection, which was identified in the recommendations of the Feasibility Memorandum. Mr. Duchesneau indicated that the treatability study did not include an evaluation of a carbon source addition, such as vegetable oil. The recommendation of vegetable oil addition was included in the recommendations to treat the source area, that would be upgradient of the proposed location of the first reactive wall to be installed. The goal of carbon addition is to promote anaerobic conditions to stimulate the biological degradation of TCE/DCE upgradient of the first reactive wall to be installed. This was done to decrease the length of time that the remedy would be required to treat the plume. Mr. Quinn noted that since the vegetable oil addition was not part of the treatability study, this aspect of the remedial approach would need further evaluation before NYSDEC would agree to include it as part of the action. The Army agreed to remove vegetable oil addition from the final remedial plan but did not feel revising the draft Feasibility Memorandum would be necessary. The regulators generally agreed with this since the comments provided on the draft Feasibility Memorandum could be incorporated into the decision process as appropriate. The draft ROD had been previously submitted in 30 Aug 98. *It was generally agreed that the reactive permeable wall technology would be an acceptable technology for remediation of the groundwater at this site.*

Mr. Quinn did not think that the RD and RA documents were going to be submitted and accepted by the regulators in order to get this project done this summer. Mr. Absolom noted that he has received the funding to do this project. He said that if the money is not used, then the funding would be unavailable and would have to be reprogrammed for another year. He hoped that this would not be the case. It was suggested that the remedial action process could be expedited by excavating and disposing of the Debris Piles as a removal action. Removal actions can be performed by the Army without agency approval. Implementation of a portion of the final remedial action could be done before all the documents are finalized by calling the action a removal action. NYSDEC suggested that it would be OK to do Time-Critical Removal Actions to get the work done. NYSDEC indicated that the work, if done as a removal action, would be done by the Army at the Army's risk.

Mr. Randy Battaglia noted that it is BRAC's goal to get clean-up at BRAC sites by 2005. If money not used during this time then it is likely that the money will be unavailable to complete remedial actions. Generally, the funding is available on a first-come-first-serve basis, therefore the closer a project gets to 2005, the less available the funding will be. The Last Remedy In Place (LRIP) may be without adequate funding to complete the program.

SEAD-23, The OB Grounds is in the RA phase. The goal is to remobilize the remedial action and ordnance contractors in June, 2001.

BTEX removal actions at SEADs-38, 39, 40, 41 and 60. Army has prepared a decision document but the document has not submitted to the regulators. Army will revise the decision document and submit to agency for approval.

Metals removal actions at SEADs-24, 50/51 and 67. Army has prepared a decision document but has not submitted the document to the regulators. Army will revise the decision document and submit to agency for approval.

Fire Training Area, SEADs-25 and 26. The draft PRAP has been on-hold pending results of the LTTD study. Since the results of the LTTD study is that the deactivation furnace is not a cost effective option to treat soil, the project will be reactive. The PRAP will be revised to address any remaining issues but will propose bioventing at SEAD-25 and excavation and disposal at SEAD-26 for soils as the proposed remedial action.

Deactivation furnaces, SEAD-16 and 17. SEE previous discussion.

SEAD-12, The former Special Weapons Storage Area. The project is on schedule for resubmittal of the draft-final RI on Jan. 20, 2001.

SEAD-63, The Miscellaneous Components Disposal Area. The Army is awaiting NYSDEC and EPA comments on the draft-final EE/CA. The Army will address and resubmit the EE/CA.

SEAD-59/71, The former Fill Area. The Army has asked for an extension to allow for cost revisions in the EE/CA.

SEAD-4, The former Munitions Washout Facility. The Army has received NYSDEC comments that suggested additional soil augering/sampling be performed at an area adjacent to the soil boring/monitoring well SB/MW4-9, where low levels of BTEX in soil and groundwater were observed. The intent of the additional sampling will be to ensure that a larger plume or source is not present. Mr. Chen indicated that this would be acceptable to the NSYSDEC. The Army will submit a letter describing the proposed limited sampling to be performed.

SEAD-11, The Old Construction Debris Landfill. The Army has proposed to do an EE/CA at this landfill. The NYSDEC delayed agreement on the appropriateness of doing an EE/CA at the site pending the results of additional field sampling. The Army has implemented the additional field sampling. The results detected low levels of TCE and PCE, i.e. 2 ppb, in one of the six downgradient monitoring wells. The additional test pitting performed at this site did not uncover any buried drums but did detect concentrations of TCE as high as 40 ppm. The Army has the data and will provide the additional data to the agencies for review. The EE/CA is due on Feb. 14, 2001 but will probably need to be extended pending validation of the new data.

SEAD-13, The IRFNA Disposal Area. The Army has sent a proposed sampling letter to the regulators for approval. The regulators have not received the letter. The proposed additional sampling includes additional surface soil, groundwater, surface water and sediment sampling.

SEAD-60, The former Oil Spill. Groundwater quality remains a concern; A January 20, 2000 NYSDEC letter described this concern. The Army has not been able to locate this letter. Mr. Quinn indicated that the letter pertained to the Prison site FOST. He will fax the letter to the Army. This issue will be addressed as a separate topic at a later date.

SEAD-48, The Pitchblende Storage Area. The schedule for this project is on hold. The Army has received funding for the RI. The proposed investigation will be performed as described in MARRSIM. The Army has performed decommissioning of these areas. The NYSDEC has raised additional concerns regarding the level of clean-up achieved following this action. The Army has received agreement from the NRC on the close-out of these areas. Issues pertaining to the igloos were raised during the October, 2000 MARRSIM training course. Mr. Chen did not want to discuss NYSDEC comments during the MARRSIM training course. Mr. Chen felt the workshop was excellent he is applying the techniques he learned during the training course to the Range Rule/UXO issues at other sites. The Army will scope the work with the NYSDEC and DOH, then prepare the scope for future investigations.

The meeting ended 16:30.

PREPARED BY :

Michael Duchesneau
01/19/01

Meeting Minutes Summary
BRAC Clean-up Team (BCT) Meeting, Day 2
Tuesday, January 17, 2001

Attendees:
Stephen Absolom – SEDA Base Environmental Coordinator (BEC)
Thomas Enroth – New York District COE
Janet Fallo – New York District COE
Thomas Battaglia – New York District COE
Randy Battaglia – New York District COE
Robert Scott - NYSDEC – Avon, Region 8
Daniel Gereahty – NY State Department of Health (NYSDOH)
Julio Vasquez – EPA Region 2
James Quinn – NYSDEC – Albany (via phone)
Marsden Chen – NYSDEC
Alicia Thorn – NYSDEC
Michael Duchesneau – Parsons ES
Pat Jones – Industrial Development Agency (IDA)
Tom Graseck – Seneca Army Depot Activity
Mike Kelly – AEC
Clayton Kim – AEC
Chuck Lechner - AEC

The monthly meeting of the BRAC Base Clean-up Team (BCT) was called to order by Mr. Stephen Absolom, the BRAC Environmental Coordinator (BEC), at approximately 08:35 hours in Building 125 at the Seneca Army Depot Activity (SEDA), in Romulus NY. The list of attendees is provided above.

Mr. James Quinn of the New York State Department of Environmental Conservation (NYSDEC) was conferenced into the meeting from Albany NY, via telephone.

Mr. Absolom summarized the discussion from the RAB last night. Mr. Duchesneau presented a briefing on the status of the project that involved evaluating the feasibility of using the existing deactivation furnace as a thermal treatment unit for contaminated soil.

Mr. Quinn brought up an issue with SEAD-59/71 and referenced a letter provided to the Army from the previous NYSDEC project manager, Mr. Steve Pasko. The letter stated that NYSDEC requested a response from the Army explaining why the Army continues to propose an EE/CA for these sites, when the NYSDEC had previously objected to the Army performing an EE/CA for these sites. The letter was dated Sept 15, 2000. Mr. Absolom indicated that Army conducted additional sampling to better define the nature and extent of contamination and believes an EE/CA will be appropriate for this site. The Army does not intend on implementing a Part 360 cap at SEAD-59 because the waste materials are in the groundwater. Mr. Absolom noted that the Army will review this letter and prepare a response to the letter.

OB Grounds Concerns

Mr. Absolom asked: What are the issues? Mr. Quinn understands that the Army has stated that the NYSDEC Sediment Criteria cannot be attained due to the concentration of metals in background, therefore he suggests that the ROD be reopened and modified. Mr. Thomas Battaglia stated that the Army has removed the all the sediment in Reeder Creek, therefore the requirements for the ROD has been achieved. He reasoned that if there is no sediment in Reeder Creek the NYSDEC Sediment Criteria have been achieved, since the Sediment Criteria cannot be applied to bedrock or the soil along the creek walls. He noted that NYSDEC has concurred, in writing. Downstream, the Army has halted any additional removal due to the presence OE, which was higher than expected. The NYSDEC will review. Mr. Battaglia noted that the design did not call for upstream sampling, however, the Army has done some upstream sampling and has concluded that the upstream sediment sample concentrations are above the Sediment Criteria, which met the requirements of the ROD. The Army does not believe that additional upstream sediment remediation is necessary, nor is it a requirement of the ROD.

It was suggested that instead of comparing individual sediment concentrations to the Sediment Criteria, the analysis should compare background (upstream) samples to site samples using statistical techniques. Mr. Chen described the NYSDEC requirement that all sites must consider and, where technically and economically feasible, attain "pre-disposal" conditions. The NYSDEC will not agree to adopt a maximum or an average, instead the NYSDEC require point by point comparisons to the Sediment Criteria. If it is difficult or impossible to attain the 16 mg/kg Sediment Criteria for copper in sediment, then the Army should propose an alternative sediment clean-up levels as part of the ROD. The NYSDEC understands that the Sediment Criteria may not be achievable, especially if soil background for copper is between 25 to 30 mg/kg. Mr. Battaglia suggested that the Seneca soil background level be adopted since soil runoff into the Reeder Creek is a likely reason as to why it is difficult to achieve the Sediment Criteria. Mr. Chen indicated that adopting the soil standard for sediment is unacceptable since the NYSDEC expects the allow level of metals in sediment would be less that the allowable level for soil because of the sensitivity of the aquatic species that live in the sediment.

Mr. Quinn asked if post remediation sampling will be performed to ensure that soil runoff to Reeder Creek is not occurring. Mr. Battaglia noted that there is no requirement in the ROD to go back and resample the sediment to assure that copper in sediment remained below the Sediment Criteria. When the remediation of the OB Grounds is complete the Army believes that the remediation of Reeder Creek sediment will be complete. The remediation of OD Grounds will not involve additional sediment clean-up. The Army does not believe that there is a need to reopen the ROD.

Mr. Quinn asked: When will the OB Grounds remediation start-up again? Mr. Absolom indicated that funding requirements remain to be resolved. The goal is to start-up on June 1, 2001. The project is approximately 15% to 20% complete.

SEAD-60 Groundwater Concerns
Mr. Quinn raised a concern regarding groundwater quality at SEAD-60. The Army has proposed a No Further Action (NFA) for SEAD-60. NYSDEC questioned the appropriateness of this action since an elevated benzene concentration was observed at one monitoring well. The Army noted that this well was an upgradient monitoring well and was not related to the oil spill. The NYSDEC requested more information regarding the source of the benzene concentrations since it was upgradient. The benzene concentration at the well was 1 ug/L, which is at the NYSDEC GA limit. This number was changed from the original NSDEC GA value of 0.7 ug/L. Therefore, this is not an issue since the benzene concentration is not above the NYSDEC GA limit. There was a January 20, 2000 NYSDEC letter referenced in an email. The Jan 20, 2000 NYSDEC letter was part of the FOST comments. NYSDEC will provide a copy of the letter in order to have the Army able to respond.

DSMOA Requirements for April Submission
Mr. Absolom provided a schedule for state requirements for upcoming projects. Mr. Chen stated that the NYSDEC has been getting funding from DOD and DOE. The manual states that NYSDEC should provide costs for up to 7 years. Mr. Chen noted that he did not feel this was appropriate since he cannot estimate his future costs without understanding what future projects the Army will be requiring the NYSDEC involvement. Therefore, Mr. Chen gets the costs from the base and submits these costs. Mr. Chen asked: why should the NYSDEC have to go the base to get the information and submit the information back to the Army, when it seems that the Army could get this information directly from the base, without going through the NYSDEC. The Program Objective Memorandum (POM) provides a 7-year outlook, which is not provided to Marsden. Mr. Chen only gives the Army a 2-year projection, not 7, because he does not feel able to project the cost beyond 2 years. Mr. Chen noted that he felt that the FUDs program gets very little money. Last year the FUDs program got $14MM but the NSYDEC got almost no money to do work. Mr. Absolom indicated that he has a POM for the installation, broken down by site, which he could provide to Mr. Chen. However, Mr. Absolom pointed out that this information contains funding information that could be available to contractors thorough a Freedom of Information Act (FOIA) request. This could be a potential violation of the FAR procurement rules, therefore Mr. Absolom does not want to give the info out.

Funding Concerns Time Critical Actions
This was discussed yesterday. The Advantage Group is currently leasing several warehouse buildings and is looking to obtain the lease for numerous other buildings. The Advantage group would like to have the area open to the public in order to foster access to the warehouses. Mr. Absolom indicated that there are some sites of limited concern in areas that Advantage Group is looking to get access to and he would like to do Time

Critical Removal Actions to eliminate these sites. Mr. Quinn described the compromise that the NYSDEC had reached with the Air Force at the Plattsburg Air Force Base. The agreement was that the Air Force could bypass the RI/FS process and remediate sites using removal actions provided 2 requirements are met. These requirements are: 1. The regulatory group must concur with the proposed removal action and 2. a public meeting is held. Mr. Absolom was hesitant to agree with the first comment since the NYSDEC may not agree with the action, which could hold up the action. He noted that clean-up to TAGM levels could be a hold-up for performing a removal action, since the Army will not clean-up to the TAGM levels, which are in many instances site background. He noted that at Seneca the Army has not agreed to clean-up to the TAGM values, instead the clean-up levels have been set by the future intended land use. Mr. Quinn indicated that at Plattsburg, the AF declares their intent to do an excavation, does the removal, then performs confirmatory sampling. If the post excavation levels are above TAGMs then the excavation will remain open until the agencies agree to what the allowable clean-up levels will be. Mr. Absolom highlighted the urgency to resolve the issues remaining at the sites due to the need of the reusers to gain access to the property.

Miscellaneous Issues

Ms. Pat Jones stated that Mr. Absolom is working on a FOSIL for the Phase II reuse of the warehouse area by the Advantage Group. The Advantage Group is currently leasing 18 buildings and would like to lease 28 more buildings. The majority of the buildings are warehouses. The need is immediate, as of January 1, 2001. Advantage Group subleases to other companies. The Advantage Group is providing up to 50 people jobs. The Advantage Group anticipates that this will expand to 300 by the summer. The IDA is looking to lease these buildings within the next few weeks.

The Army is looking to transfer the utilities at the depot to the county. Once FOSIL is done then the IDA can lease. The FOST for the Airfield will be done by June 1, 2001. The IDA has submitted application to the Economic Development Agency (EDA) to transfer the Airfield. The NY State Police will be using the airfield for training. The State Police will likely demolish one building and renovate another building. The IDA needs the funds from EDA to renovate. The problem is that the EDA will not release the funds until the IDA owns or leases the property. The IDA cannot own the property until all the environmental sites are addressed. Mr. Absolom indicated that there are no SWMUs at the Airfield. The EBS did identify some potential sites that might be present due to releases associated with deicing operations at the Airfield, however, limited testing showed no presence of deicing chemicals in the groundwater. The concentrations of PAHs were elevated along the edge of the runway but this did not pose a threat. The small arms firing range at the Airport will be transferred as a firing range and the State Police intend on using the firing range for target practice. Mr. Chen asked if the airfield used to transport for munitions? Mr. Absolom indicated that during Gulf War 11 cargo airplanes were shipped with ammunition during desert storm. Mr. Quinn requested the Army provide a letter describing the sites that are at the Airfield. The NYSDEC has a concern regarding the groundwater sampling and the suite of analytes that were performed during the EBS work. This may be an issue in gaining NYSDEC acceptance.

Mr. Duchesneau indicated that the impact analysis for OE EE/CA will involve land use restrictions that will be passed on to the IDA who will pass the requirements to the land users.

PREPARED BY :

Michael Duchesneau
1/19/01

BCT AGENDA

March 20-21, 2001

1. STATUS CHART

2. UXO PRESENTATION
   "Pre-Brief"

3. FOSL COMMENTS

4. DSMOA STATUS

5. AIRFIELD FOST - status

MEMORANDUM

To: Mr. Steve Absolom, SEDA

Cc: Mr. Tom Enroth, USACOE, NY District
Mr. Kevin Healy, USACOE, Huntsville

From: Jackie Travers, Parsons ES

Re: Building 819, Room 12 (Generator Room) Radiological Survey Status

Date: March 19, 2001

This memo is in reference to the Generator Room in Building 819 within the SEAD-12 boundary. This room was surveyed by Parsons ES as part of the MARSSIM final status survey conducted in most of the buildings within the Former Weapons Storage Area. Building 819 had been classified for survey purposes as a Class 1 building. However, the Generator Room (or Room 12 as referenced in the remainder of this memo and the data reports submitted to date), was surveyed as a Class II room since this room was an addition to the original structure and is not accessible from the remainder of the building. Class II areas, according to MARSSIM, have or had prior to remediation, a potential for radioactive contamination or known contamination, but are not expected to exceed the derived concentration guideline level (DCGL). Although a potential for radioactive contamination was not suspected in this room, since it was adjoined to a Class I building, it was conservatively classified as Class II. Class II survey units were scanned 50% for areas under 2 meters high and 10% for areas above 2 meters high.

Room 12 of Building 819 consists of a large room containing several generators (Room 12A) and three smaller rooms (an office, room 12B; a storage room, room 12C; and a bathroom, room 12 D). Refer to **Figure 1-9** attached. The four parts of this room were treated as one area for survey purposes, since rooms 12B, 12C and 12D were relatively small. Results of the survey of Room 12 were provided in the Draft Building Survey Report (July 2000). The results of the radiological surveys conducted by Parsons ES field staff during November 1999 was divided into data sets by scanning instrument and radiation type. These data sets were statistically compared to the background data sets collected in Building 722 using the Wilcoxon Rank Sum Test. The results of the statistical comparisons indicated that Building 819, Room 12 is statistically equal to or below background for all instruments and radiation types with the exception of alpha radiation detected with the Ludlum model 43-37 large area floor monitor. In the case of alpha radiation measured with the floor monitor, the average of the site data set collected in Building 819, Room 12 was above the average of the background data set collected in Building 722. However, the maximum alpha radiation detection of 17 counts per minute (cpm) detected in Building 819, Room 12D is well below the alpha flag value of 46 cpm. This flag value was conservatively derived using the DCGLw, as described in Table 4-3 of the Draft Building Survey Report.

Summary statistics are provided in **Table 1** attached for Room 12 (including 12A, 12B, 12C, and 12D) of Building 819, Room 12A (the main portion of the room containing the generators) of Building 819, and background.

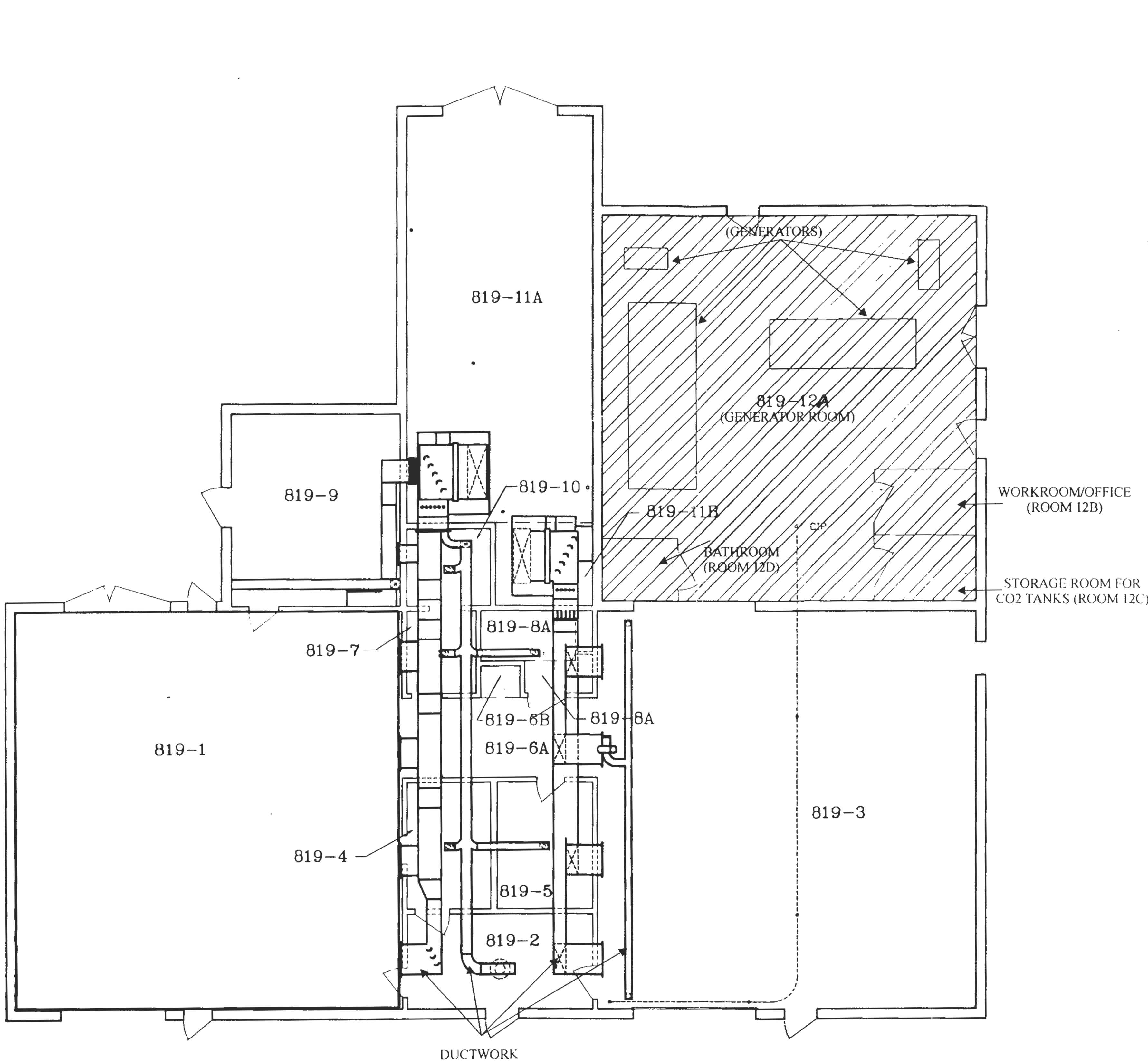
In addition to the radiological scanning and direct measurements, 102 smear samples were collected as a diagnostic tool in an effort to detect areas of removable contamination. The smear samples collected from Room 12 of Building 819 and from the background building were analyzed at the Army counting lab at Redstone Arsenal, Alabama. There were no elevated levels of radioactivity detected above the background set in the smear samples collected from Building 819, Room 12. Alpha readings from the wipes collected ranged from 0 to 1.3 dpm/100cm^2. Background alpha readings were between 0 and 1.8 dpm/100cm^2.

Please do not hesitate to call me if you have any questions or need additional information.

TABLE 1
Summary statistics for Radiological Survey Data in the Generator Room (Building 819) and Background
SEAD-12
Seneca Army Depot Activity

Room	Instrument	Minimum (cpm)	Maximum (cpm)	Mean (cpm)	Instrument Flag Values (cpm) [based on the DCGLw](a)
Bldg 819, rooms 12A, 12B, 12C, 12D	Alpha Handheld Direct Measurement	0	6	2	10
	Alpha Floor Monitor Direct Measurement	0	17	7	46
	Beta Handheld Direct Measurement	71	264	149	296
	Beta Floor Monitor Direct Measurement	406	1029	730	1630
	Gamma Direct Measurement	2531	14211	6600	2x background
	Alpha/Beta Handheld Scanning	120	450	222	306
	Alpha/Beta Floor Monitoring Scanning	600	1200	913	1676
	Gamma Scanning Measurement	2300	14500	6454	2x background
Bldg 819, room 12A	Alpha Handheld Direct Measurement	0	6	2	10
	Alpha Floor Monitor Direct Measurement	1	12	6	46
	Beta Handheld Direct Measurement	71	264	141	296
	Beta Floor Monitor Direct Measurement	406	1007	722	1630
	Gamma Direct Measurement	2531	12931	6239	2x background
	Alpha/Beta Handheld Scanning	60	450	164	306
	Alpha/Beta Floor Monitoring Scanning	200	1200	731	1676
	Gamma Scanning Measurement	2300	13600	6089	2x background
Bldg 722 (Background)	Alpha Handheld Direct Measurement	0	8	3	10
	Alpha Floor Monitor Direct Measurement	0	8	4	46
	Beta Handheld Direct Measurement	86	436	176	296
	Beta Floor Monitor Direct Measurement	498	1435	786	1630
	Gamma Direct Measurement	5267	19762	11265	2x background
	Alpha/Beta Handheld Scanning	80	450	188	306
	Alpha/Beta Floor Monitoring Scanning	400	1800	1041	1676
	Gamma Scanning Measurement	5000	19000	11813	2x background

(a)Taken from Table 4-3 in the Draft Radiological Survey Report-SEAD-12 (July, 2000)



BLDG. 819
APPROX. SCALE: 1" = 6'-0"

NOTE(S):

*THIS DRAWING IS PRESENTED IN 1/2 SIZE. SO YOUR SCALE IS 1/2 OF WHAT IS MARKED. i.e. IF THE SCALE IS MARKED 1" = 4'-0" THAN THE THRUE SCALE OF THE DRAWING IS 1" = 2'-0".

FEET 0 3 6
METERS 0 1 2

0 6' 12' 18'
(APPROX. SCALE FT.)

NOTE(S):

BUILDING INFORMATION REFERENCED FROM BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-621, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58. BLACK & VEATCH CONSULTING ENGINEERS. DRAWING NO. Y2-845, MAY 2, 1955. REVISED RECORD WORK AS-BUILT 6/2/58.

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

SENECA ARMY DEPOT ACTIVITY

ENVIRONMENTAL ENGINEERING

FIGURE 1-9
BUILDING 819

AS NOTED

Presentation to the RAB
March 20, 2001
Parsons Engineering Science, Inc.

Summary of Investigations
and Alternatives Assessment
for
Ordnance and Explosives (OE)

Introduction

- James Lowerre, OE Task Order Manager
- Michael Duchesneau P.E., Seneca Program Manager

eca Army Depot Activity (SEDA)
CA

sons Engineering Science

Agenda

Definition of OE

- nce and Explosives (OE)
  - munition, ammunition components, chemical iological warfare materiel or explosives that e been abandoned, expelled from demolition or burning pads, lost, discharged, buried or ."
  - losive Soil refers to mixtures of explosives in sand, clay, or other solid media at centrations such that the mixture itself is osive."

Definition of UXO

- Unexploded Ordnance (UXO)
  - "Military items that have been primed, fuzed, armed or otherwise prepared for action and have been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material and remain unexploded either by malfunction, design or any other cause."

Previous Next

Implications of De...

- UXO is a Subset of OE
- Both OE and UXO are of Concern and Targets for Investigation
- UXO has Higher Potential to Cause Harm since these items are "primed, fuzed, armed or otherwise prepared for action"

Previous Next

Scope of Work

- Authorized as Task Order 52 of Contract DACA87-95-D-0018 between Corps of Engineers, Huntsville and Parsons
- Scope of Work
  - Characterize Nature, Location and Concentration of Ordnance
  - Describe OE Related Problems
  - Identify Risk Management Alternatives

Archive Search Report

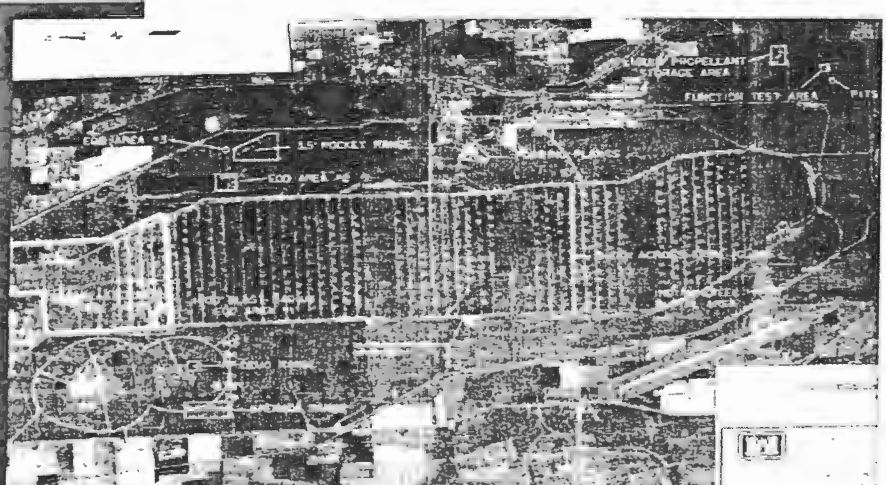
- Completed in 1998 by St. Louis District
- Assessed Depot for Presence of OE Residuals
- Identified 12 Areas for OE Investigation
- Basis of Scope of Work for Task Order 52

Areas Of Investigation [illegible]

- Indian Creek
  - Suspected Burial Area
- SEAD [illegible]
  - Igloo Area, Ditches in D Row
- Demolition Range -
- EOD Area #3
- EOD Area #2
- SEAD 44A
  - QA Function Test Area
- SEAD 46
  - 3.5" Rocket Range
- Grenade Range
- SEAD 57
  - Former EOD Range
- SEAD 45
  - Open Detonation Area

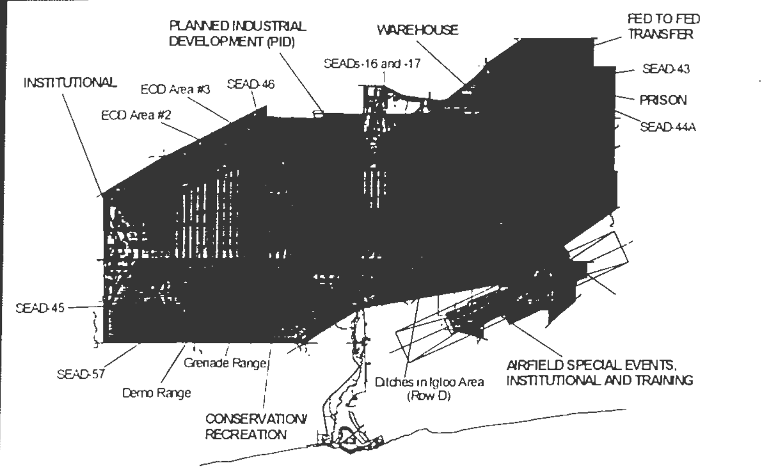
Previous | Next

Location Map of Sites



Previous | Next

Proposed Future



Summary

- Establish Number of Grids Required for Coverage
- Layout Grids
- Conduct EM-61 and Magnetometer Geophysical Survey
- Identify Geophysical Anomalies
- Prepare "Dig Sheets" for Likely Targets
- Reacquire Geophysical Anomalies
- Excavate and Identify Items as False Positive, Non-OE Scrap, OE Scrap, OE or UXO

Summary of Results for Individual Sites

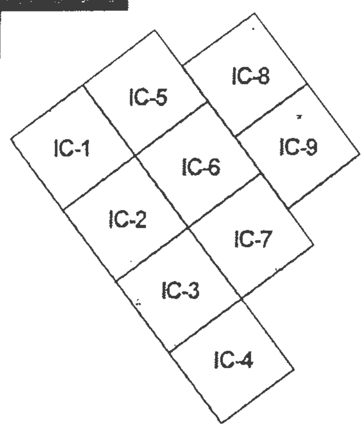
- Geophysical Survey Results
- OE Items Recovered
- UXO Items Recovered

Summary of Site Conditions

Areas [illegible]

- Indian Creek "Burial Area"
  - Rumored Ordnance Disposal Area
  - Within Conservation Area
  - Not a CERCLA site
- [illegible] 53: Igloo Area
  - Two ditches within the Igloo Area
  - Surveyed due to Anomalies Identified during the ASR Visit
  - Not a CERCLA Site
- Rumored Demolition Range
  - Identified in ASR as Demo. Range
  - Within Conservation Area
  - Not a CERCLA Site

Indian Creek Rumored Burial Ground Geophysical Map

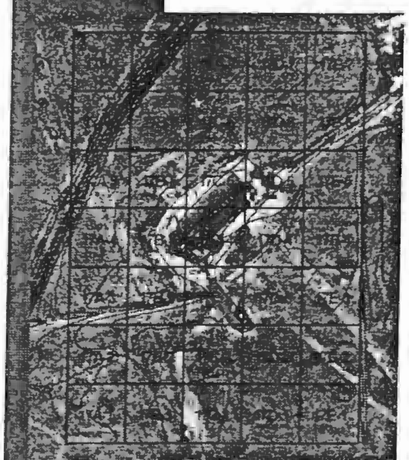


- Entire site investigated with geophysical equipment
- All geophysical anomalies investigated
- No UXO or OE encountered

Summary of Si

- SEAD 17: Deactivation Furnace
  - Industrial Reuse Area (Not Transferred)
  - CERCLA Site
  - RCRA Permitted Unit (To be Closed)
  - Demilitarized Small Arms

SEAD 17 – OE Recovered



- 8.1 acres total
- 2.3 acres investigated with geophysics
- 93% of geophysical anomalies investigated
- OE Recovered:
  - 2 - 20mm rounds and one fuze
- No UXO Found

Previous Next

Summary of Site Conditions

- EOD Area #3
  - Adjacent to SEAD-46; 3.5" Rocket Range
  - Rumored EOD Area
  - Within Conservation Area
  - Not a CERCLA Site

Previous Next

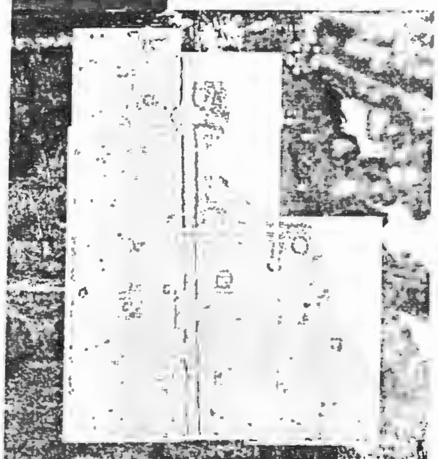
EOD Area #3

- 5 acre total
- 80% investigated with geophysics
- All geophysical anomalies investigated
- OE Recovered:
  - rifle grenades (2), slap flare, fuze lighter
- NO UXO items encountered

Summary of Site

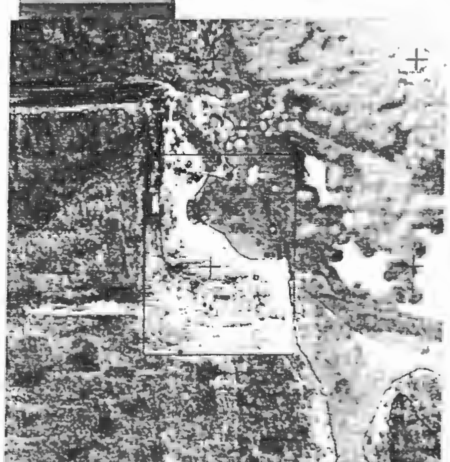
- EOD Area #2
  - Rumored EOD Area
  - Within Conservation Area
  - Not a CERCLA Site

EOD Area #2 - EM-61 Geophysical Data



- 5 acre total
- 46% investigated with geophysics
- All geophysical anomalies investigated
- Small targets are locations of metal scrap
- Large targets are UXO/OE locations

EOD Area #2 – UXO/OE R



- OE Recovered:
  - slap flares (3)
- UXO Recovered:
  - fuze with booster

Summary of Site

- SEAD 46: 3.5" Rocket Range
  - Within Conservation Area
  - CERCLA Site

Previous Next

SEAD 46 – UXO

- 40 acres total
- 43.1% investigated with geophysics
- 1155 geophysical anomalies investigated
- OE Recovered (100+ Items):
  - 40mm rifle-fired, chemical smoke, and hand grenades; various fuzes; slap flares
- UXO Recovered
  - M83 fragmentation bomb, slap flares (2), fuzes (3), chemical smoke charges (4)

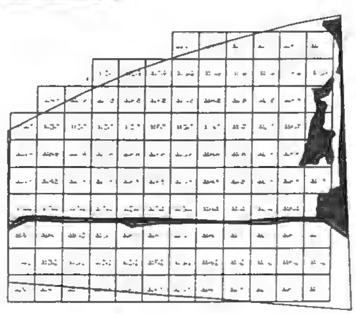
Previous Next

Summary of Site Conditi

- SEAD 44A: Function Test Area
  - Part of QA Laboratory Complex
  - Firing Range for 40mm Rifle-Fired Grenades
  - Included in Prison Transfer
  - RCRA SWMU
  - CERCLA Site

Previous | Next

SEAD 44A – UXO Recov

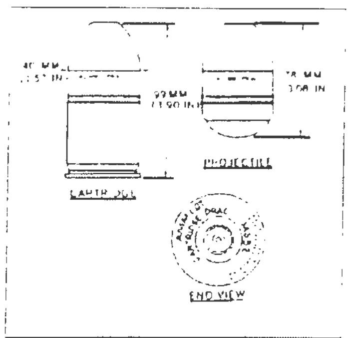


- Confirmation Sampling
- 25 acres total
- 55% investigated
- 1783 geophysical anomalies investigated
- OE Recovered:
  - 40mm rifle-fired grenades (225+), CS grenades, and slap flares
- UXO Recovered
  - 40mm rifle-fired grenades w/ 6g spotting charge (4), slap flare

Previous | Next

Munition Information: Description

U.S. CARTRIDGE, 40-MM, PRACTICE, M382 & M407A1



External View

Country of Origin	United States
Diameter/Width	40.00 mm
Length	78.00 mm
Weight	227.00 g
Explosive Type	RDX
Net Explosive Weight	6.00 g

Do not transport.

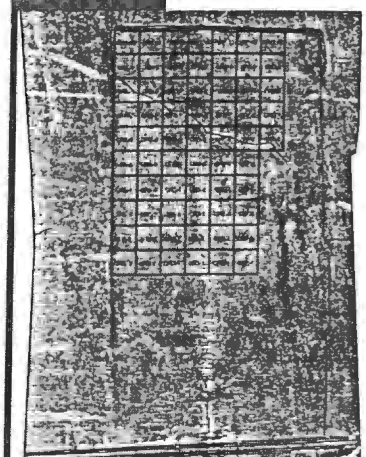
Disposal by detonation.

These are practice rounds with smoke spotting charges. The fuzes are point-detonating (PD) and graze-sensitive. The M551 is setback and centrifugally armed; the M552 is centrifugally armed. Figure shows the appearance, dimensions, and general arrangement of the cartridges. The M382 uses the M552 fuze; the M407A1 uses the M551 fuze. The M382 cartridge case and projectile are chemically finished to obtain an olive drab color. The ogive is gray. Identification markings are yellow. The M407A1 cartridge case is olive drab; the projectile is blue. Markings are white. The cartridge cases and projectiles are aluminum.

Summary of Site

- ...nade Range
- ...ractice Range
  - 40 mm Rifle-Fired Grenades
  - 35mm Subcaliber LAW Rockets
- ...ithin Conservation Area
- ...ot a CERCLA Site

Grenade Range – UXO Re

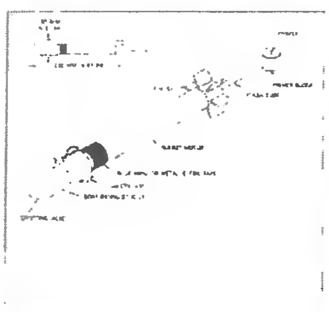


- 25 acres total
  - 15 in target area (grids) 100% investigated
  - 10 in meandering path 20% investigated
- 834 geophysical anomalies investigated (69% of total)
- OE Recovered (~600 items):
  - 40mm rifle-fired grenades, M73 35mm LAW rockets
- UXO Recovered:
  - 40mm rifle-fired grenade w/ 6g spotting charge, M73 35mm LAW rockets (105)

Previous Next

Munition Information: Description

U.S. ROCKET, 35-MM, SUBCALIBER, PRACTICE, M73



External View

Country of Origin	United States
Diameter/Width	35 00 mm
Length	225 00 mm
Weight	145 00 g
Explosive Type	Propellant, Rocket Double-Base
Net Explosive Weight	10 00 g

Special instructions required for transportation.

Disposal by detonation.

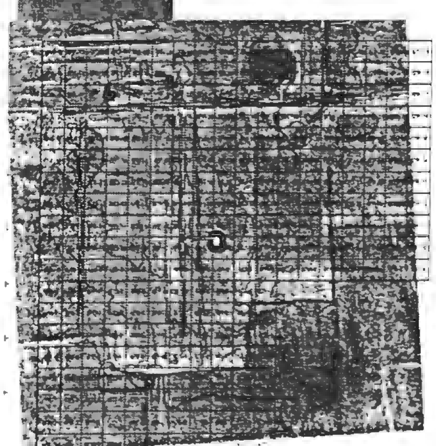
This is a subcaliber practice rocket incorporating an integral impact-inertia fuze It is used for training and simulates the rocket for the light antitank weapon (LAW) system The rocket is fired from a practice M190 launcher (a modified M72A1 LAW launcher) The figure shows the appearance and dimensions of the M73 practice rocket and M190 launcher The spotting head and fins are painted black the remainder of the rocket is olive drab A blue band appears on the forward end of the rocket motor On later production rockets the spotting head is painted blue and the fins are painted brown The rocket motor section is olive drab with white markings A metallic foil covered tape is attached around the forward end of the rocket motor for weight adjustment The spotting head and fins are plastic flash tube and primer block are a white semitranslucent plastic The rocket motor is steel The rocket weighs 145 grams (5 1 ounces) before firing and approximately 136 grams (4 8 ounces) after firing

Summary of Site Conditions

- SEAD 57: EOD Area
  - EOD Training and Demolition Operations
  - Within Conservation Area
  - CERCLA Site

Previous Next

SEAD 57 – UXO Recovery



- 60 acres total
- 23.3% investigated with geophysics
- 2117 geophysical anomalies investigated (63% of total)
- OE Recovered:
  - 20mm,30mm, and 105mm projectiles; 2.36" rockets (5); fuzes (3); slap flares (2), CS grenade, bomblet trainer
- UXO Recovered
  - 20mm projectiles (2)
  - MK II Grenade (similar)

Previous Next

Munition Information: Description

U.S. GRENADE HAND FRAG MK 2

Diameter Width

Length

Weight

Explosive Type

Net Explosive Weight

Do not transport

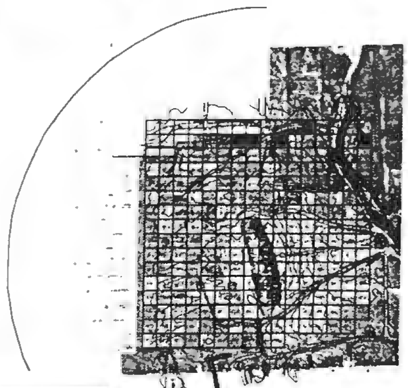
Disposal by detonation

External View

Summary of Site Conditions

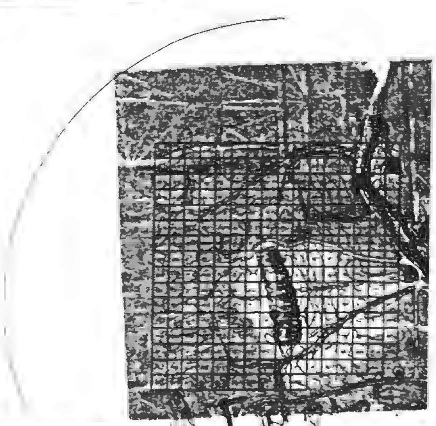
- SEAD 45 : Open Detonation Area
  - Used to Demilitarize Projectiles
  - Adjacent to Open Burning Area
  - Within Conservation Area
  - RCRA Permitted Unit
  - CERCLA Site

SEAD 45 - Open



- 234 acres total
  (1800' radius from center of berm)
- 24.2% of 60-acre gridded section, 2.0% of remainder investigated
- Area saturated with buried metal
- Only 20 anomalies investigated in majority of grids
- 2345 anomalies investigated

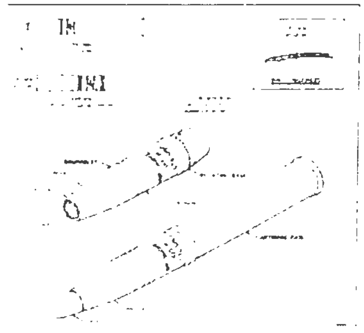
SEAD-45 – UXO Re



- 800+ OE Items recovered
- 70+ UXO Items recovered
- OE and UXO types
  - 20mm to 155mm projectiles (WP and HE)
  - 81mm mortar rounds
  - Rockets, 2.36" and 3.5"
  - Various Fuzes
  - Grenades (fragmentation, 40mm rifle-fired, CS)
  - Flares

Munition Information: Description

U.S CARTRIDGE, 105-MM, SMOKE, WP, M60 SERIES



External Views

Country of Origin	United States
Diameter/Width	105.[illegible] mm
Length	[illegible] mm
Weight	[illegible] kg
Explosive Type	Tetryl
Net Explosive Weight	1.90 kg

Do not transport.

Disposal by detonation

These are Army spin-stabilized bursting smoke projectiles fired from howitzers to produce screening smoke. The WP also has a limited incendiary effect. The projectile is painted light green with a yellow band and light red markings. Older manufactured rounds were painted gray with yellow markings. The [illegible] is steel with a gilded metal rotating band.

Introduction to Cleanup Alternatives

- Risk Assessment
- Cleanup Alternatives
  - Institutional Analysis
- [illegible]er for Remediation Alternatives
  - Implementability
  - Effectiveness
  - Cost
- Proposed Recommendations

Institutional Analysis

- Always Potential for OE Exposure
- Key Component of Overall OE Strategy
- Analysis Includes:
  - Identification of and Education of Stakeholders to Potential Risks
  - Implementation of Institutional Controls to Limit Future Uses to Minimize OE Exposure

Previous Next

Identification of Stakeholders

- **Identifies persons or groups that have the ability to impact future activities at the Depot**
  - US Army – controls Depot at present, responsible for any OE discovered in the future and recurring reviews of selected institutional controls and effectiveness of cleanup action
  - Industrial Development Authority (IDA) – Finds future landowners for Depot property
  - Town of Romulus – Town land use ordnance provides for deed restrictions on certain former SEDA land, based on environmental concerns
  - EPA/NYSDEC – Oversees cleanup of hazardous waste sites

Previous Next

Institutional Controls

- Possible Institutional Controls for Reducing OE Exposure
  - Printed media
  - Classroom Education
  - Visual Media
  - Exhibits/Displays
  - Web Site
  - Ad Hoc Committee
  - Access Controls
  - Land Use Restrictions
  - Permitting

Cleanup Alternatives

- Alternative 1: No DOD Action Indicated (NDAI)
- Alternative 2: Institutional Controls
- Alternative 3: Clearance of OE to Depth of 6 Inches
- Alternative 4: Clearance to Depth of Instrument Detection (Geophysical Mapping)
- Alternative 5: Excavation and Sifting

Alternative 1

No DOD Action Indicated

- No OE related item found onsite therefore no hazard exists

Alternative 2

Institutional Controls

- Fencing
- Signage
- Notice (during property transfer)
- Printed Media
- Classroom Education
- Visual Media
- Exhibits/Display
- Web Site
- Ad Hoc Committee

Alternative 3

- Clearance of OE to Depth of 6 Inches
  - UXO contractor performs visual inspection of surface
  - Geophysical instrumentation used to aid sweep team
  - Any items visible on the surface will be cleared
  - Targets removed or destroyed immediately
  - Area is clear when sweep team is complete
  - Used on areas of low OE density and shallow OE occurrence

Alternative 4

- Clearance to Depth of Instrument Detection
  - Surface sweep
  - Establish survey coordinate system
  - Collect geophysical data across area
  - Process data to detect anomalies
  - Reacquire geophysical anomalies
  - Investigate targets
  - Perform 10% QC to verify removal action

Alternative S...

- Removal of OE to Depth by means of Excavation and Mechanical Sorting
  - Excavate soil saturated with buried metal
  - Sort OE items out of excavated soil using a mechanical sifter
  - Perform geophysical investigation over excavated area to verify removal of all OE
  - Stabilize removed soils
  - Restore area

Comparison of A...

- Initial screening to drop consideration of alternatives that are unnecessary at certain sites (ex. excavation and sorting at AOIs with few anomalies)
- Remaining alternatives at each area compared to each other as far as effectiveness, implementability, and cost

Alternative Comparison C

- Effectiveness
  - Protection of Public Safety and Environment
  - Compliance with ARARs
  - Long-term Effectiveness
  - Short-term Effectiveness
- Implementability
  - Technical Feasibility
  - Compliance with ARARs
  - Long-term Effectiveness
  - Short-term Effectiveness
- Cost
  - Estimated lifetime cost

Previous Next

Effectiveness

SEAD-45 (Open Detonation Area)
Response Action Effectiveness

ALTERNATIVE	Protection of Public Safety & Environment	Compliance with ARARs	Long-Term Effectiveness	Short-Term Effectiveness	SCORE	RANK
Institutional Controls	4	1	4	1	10	3
Clearance to 6"	3	1	[illegible]	2	9	[illegible]
Clearance to Depth w geophysical mapping	2	1	2	3	8	1
Clearance of OE to Depth by means of Mechanical Sorting	1	2	1	4	8	1

Implementability

SEAD-45 (Open Detonation Area)
Response Action Implementability

Alternative	Technical Feasibility	Administrative Feasibility	Availability of Services and Materials	Stakeholder Acceptance	SCORE	RANK
Institutional Controls	1	[illegible]	1	[illegible]	[illegible]	[illegible]
Clearance to [illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]
Clearance to depth w/ geophysical mapping	[illegible]	1	1	[illegible]	[illegible]	[illegible]
Clearance of HE to Depth by means of Mechanical Sorting	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Note: Ranking from best to worst, best=1, worst=4

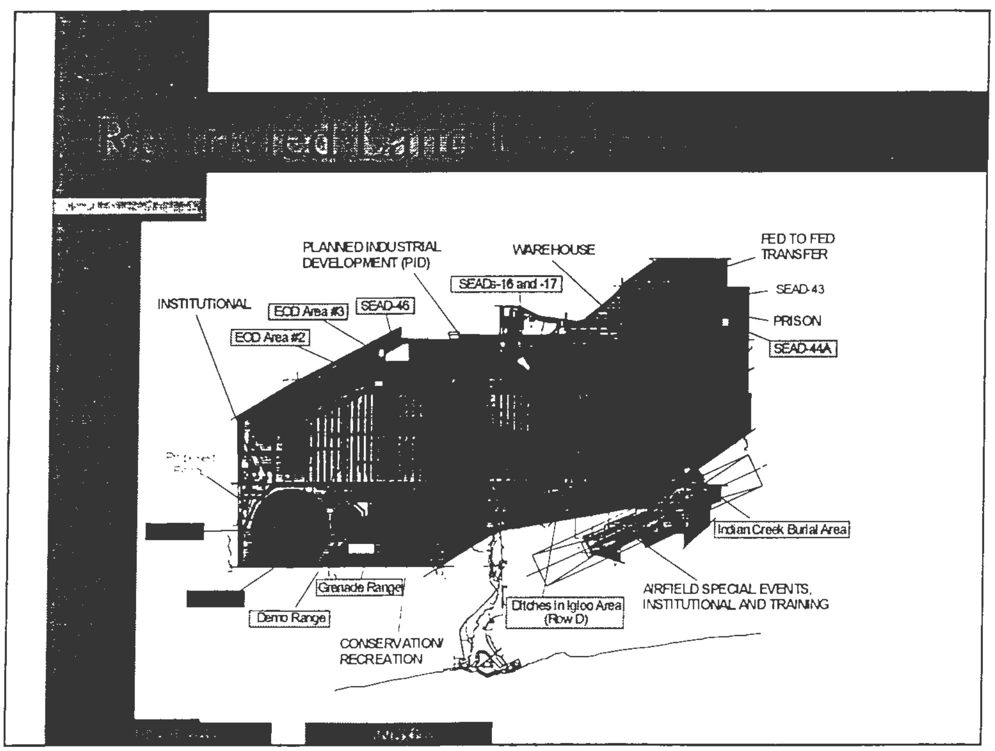
Implementability: Effe[illegible] Cost Summary

SEAD-45 (Open Detonation Area)
Cost Comparison

Alternative	Effectiveness	Implementability	Cost
Institutional Controls	[illegible]	1	[illegible]
Clearance to [illegible]	2	3	$2,092,[illegible]
Clearance to Depth w/ geophysical mapping	[illegible]	2	[illegible]
Clearance of HE to Depth by means of Mechanical Sorting	[illegible]	[illegible]	[illegible]

Costs for Unrestricted Land Use

COSTS FOR UNRESTRICTED LAND USE				
AOI	Recommended Alternative	Cost - Initial	Cost - Life Cycle (25 yrs)	Total Cost
Indian Creek Burial Area	Alternative 2 - Institutional Controls (Depot Wide)			$0 00
SEAD-53 (Igloo Area)	Alternative 2 - Institutional Controls (Depot Wide)			$0 00
Demo Range	Alternative 2 - Institutional Controls (Depot Wide)			$0 00
SEAD-17 (Deactivation Furnace)	Alternative 3 - Clearance to 6'	$48 783 00		$48 783 00
EOD Area #3	Alternative 4 - Clearance to Depth	$40 632 00		$40 632 00
EOD Area #2	Alternative 3 - Clearance to 6"	$16 560 00		$16 560 00
SEAD-44A (Function Test Range)	Alternative 5 - Excavate and Sort	$2,632,650 00		$2,632,650 00
SEAD-46 (3 5" Rocket Range)	Alternative 4 - Clearance to Depth	$788 153 00		$788 153 00
Grenade Range	Alternative 4 - Clearance to Depth	$595 045 00		$595 045 00
SEAD-57 (Former EOD Range)	Alternative 5 - Excavate and Sort	$1 754 984 00		$1 754,984 00
SEAD-45 (Open Detonation Area)	Alternative 5 - Excavate and Sort	$23 007,064 00		$23 007 064 00
Depot	Alternative 2 - Institutional Controls	$89 250 00	$296,630 00	$385,880 00
Recurring Review			$113 944 00	$113 944 00
	TOTAL COST:	**$28,973,121.00**	**$410,574.00**	**$29,383,695.00**



Costs for Restricted Land Use

COSTS FOR RESTRICTED LAND USE				
AOI	Recommended Alternative	Cost - Initial	Cost - Life Cycle (25 yrs)	Total
Indian Creek Burial Area	Alternative 2 - Institutional Controls Depot Wide)			$0 00
SEAD-53 (Igloo Area)	Alternative 2 - Institutional Controls (Depot Wide)			$0 00
Demo Range	Alternative 2 - Institutional Controls (Depot Wide)			$0 00
SEAD-17 (Deactivation Furnace)	Alternative 3 - Clearance to 6"	$48 783 00		$48.783 00
EOD Area #3	Alternative 4 - Clearance to Depth	$40 632 00		$40 632 00
EOD Area #2	Alternative 3 - Clearance to 6"	$16.560 00		$16 560 00
SEAD-44A (Function Test Range)	Alternative 5 - Excavate and Sort	$2,632,650 00		$2,632,650.00
SEAD-46 (3 5" Rocket Range)	Alternative 4 - Clearance to Depth	$788 153 00		$788 153 00
Grenade Range	Alternative 4 - Clearance to Depth	$595 045 00		$595 045 00
SEAD-57 (Former EOD Range)	Alternative 2 - Institutional Controls	$138 831 00	$717 600 00	$856 431 00
SEAD-45 (Open Detonation Area)	Alternative 2 - Institutional Controls	Same IC as SEAD-57	Same IC as SEAD-57	$0 00
Depot	Alternative 2 - Institutional Controls	$89 250 00	$296 630 00	$385 880 00
Recurring Review			$113 944 00	$113 944 00
	TOTAL COST:	$4,349,904.00	1,128,174.00	$5,478,078.00

Proposed Re...

ry Two Years

To check on effectiveness of proposed cleanup alternatives

To maintain effectiveness of Institutional Controls

Provide landowner with support

ner if OE or UXO is encountered r cleanup

CHARACTERIZTION LARGELY COMPLETE

OPTIONS BEING 9DEVELOPED

QUESTIONS AND ANSWERS

BCT AGENDA

May 15-16, 2001

1. AIRFIELD FOST

2. AOC/CERFA MAP UPDATE

3. SEAD-4 UPDATE

4. ASH LANDFILL PRAP UPDATE

5. REMOVAL ACTION UPDATE

BCT AGENDA

July 17-18, 2001

1. PERSONNEL CHANGES
   A. PARSONS
   B. STATE

2. SCHEDULE REVIEW – ATTACHMENT 5

3. SEAD-12 INDOOR SAMPLING CHANGE REQUEST

4. RAILROAD LEASE

5. SMALL ARMS RANGE TESTING REQUIREMENTS

6. REMOVAL ACTIONS PROPOSED BY THE ARMY

ATTACHMENT 5
SCHEDULES

The schedule of IRP work completed to date and planned through completion of all restoration work at SEDA is as follows:

RELEVANT MILESTONES (1)(2)

ASH LANDFILL (SEAD-003, 006, 008, 014, and 015) OU1

Draft Work Plan	(04 Dec 90)
Draft RI	(20 Oct 93)
Draft FS	(19 Sep 94)
Draft PRAP	(07 Mar 97)
Draft ROD	(30 Aug 98)

OPEN BURNING GROUNDS (SEAD-023) OU2

Draft Work Plan	(29 Aug 91)
Draft RI	(28 Jan 94)
Draft FS	(09 Mar 94)
Draft PRAP	(04 Jul 96)
Draft ROD	(14 Nov 97)

REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES (3)(4)
FIRE TRAINING AREAS (SEAD-025, 026) OU3

Draft RI/FS Work Plan	(29 Mar 95)
Draft RI Submission	(27 Jun 96)
Draft FS Submission	(05 Dec 97)
Draft PRAP	On Hold*
Draft ROD	On Hold

DEACTIVATION FURNACES (SEAD-016, 017) OU4

Draft RI/FS Work Plan	(29 Mar 95)
Draft RI Submission	(08 May 97)
Draft FS Submission	(21 Nov 97)
Draft PRAP	On Hold
Draft ROD	On Hold

*Requested extension on 01 Nov 00.

RAD SITES (SEAD-012) OU5

Draft RI/FS Work Plan	(19 Dec 95)
Draft RI Submission	(22 May 00)
Draft FS Submission	(26 May 01)
Draft PRAP	(13 Sep 01)
Draft ROD	(27 Mar 02)

SEAD-059, 071 Fill Area/Paint Disposal

Draft RI/FS Work Plan		(30 Jan 96)
Draft RI Submission	See Footnote #8	(16 Jul 98)
Draft FS Submission		On Hold
Draft PRAP		On Hold
Draft ROD		On Hold

SEAD-004 Munitions Washout Facility

Draft RI/FS Work Plan	(25 Oct 95)
Draft RI Submission	(15 Nov 99)
Draft FS Submission	(31 Jul 01)
Draft PRAP	(18 Nov 01)
Draft ROD	(01 Jun 02)

SEAD-011, Old Construction Debris Landfills (5)

Draft RI/FS Work Plan		(15 Jun 95)
Draft RI Submission	See Footnote #9	(06 Nov 98)
Draft FS Submission		On Hold
Draft PRAP		On Hold
Draft ROD		On Hold

SEAD-013 IRFNA Disposal Site

Draft RI/FS Work Plan	(14 Nov 95)
Draft RI Submission (See Footnote #10)	(29 Aug 99)
Draft FS Submission	(22 Jan 00)
Draft PRAP	(11 May 00)
Draft ROD	(22 Nov 00)

SEAD-052, 060 Bldg 612 Complex	
Draft RI/FS Work Plan	(19 Jan 96)
Draft RI Submission	On Hold
Draft FS Submission	On Hold
Draft PRAP	On Hold
Draft ROD	On Hold
SEAD-045, and 057 Demo Area/EOD (6)	
Draft RI/FS Work Plan	(26 Feb 96)
SEAD-046 Small Arms Range (6)	
Draft RI/FS Work Plan	(09 May 96)
SEAD-045, 046, and 057 Demo Area/EOD/Small Arms Range (6)	
Draft RI/FS Work Plan	(See above)
Draft RI Submission	(01 Mar 01)
Draft FS Submission	(25 Jul 01)
Draft PRAP	(22 Nov 01)
Draft ROD	(06 Jun 02)
SEAD-048 Pitchblende Storage Area	
Draft RI/FS Work Plan	(19 Dec 95)
Draft RI Submission - on hold (See Footnote #11)	(05 Nov 00)
Draft FS Submission	(30 Mar 01)
Draft PRAP	(18 Jul 01)
Draft ROD	(29 Jan 02)
SEAD-066 Pesticide Storage Areas	
Draft RI/FS Work Plan	(02 Dec 96)
Draft RI Submission	(05 Nov 00)
Draft FS Submission	(30 Mar 01)
Draft PRAP	(18 Jul 01)
Draft ROD	(29 Jan 02)

FOOTNOTES:

(1) Draft and Draft-Final submissions are based on the InterAgency Agreement (IAG) stipulation of 45 days for Army preparation and 30 days for regulatory review. Final dates are based upon the IAG stipulation that all documents become final automatically within 30 days of the Draft-Final submission if no comments are received.

(2) Multiple document submittals will be likely considering the amount of work required and the tight schedules for performance. All schedules assume that regulatory reviews will be conducted concurrently, if required, as is assumed in the IAG.

(3) All schedules for RIs to be performed assume that two phases of fieldwork will be required. If Phase II RI fieldwork is unnecessary for SEADs 25 and 26, SEADs 16 and 17, SEAD 4, SEADs 12, 48, and 63; all draft documents for these operable units shall be submitted to the USEPA and NYSDEC earlier than the deadlines in Attachment 5: Facility Master Schedule. The Army shall submit a revised Attachment 5 to the USEPA and NYSDEC to reflect the new deadlines within 30 days of NYSDEC and USEPA indicating that Phase II RI fieldwork would not be needed for the above-mentioned SEADs.

(4) Operable unit designation will be assigned after project has been funded and consistent with definition, Section 2, paragraph 14.

(5) Years will continue to be designated by their last two digits in the year 2000, e.g. "00", "01", "02", etc.

(6) SEAD-045, and 057 (Demo Area/EOD) have been combined with SEAD-046 (Small Arms Range) for Draft RI Submission.

(7) SEAD 63 EE/CA Notification November 6, 1998. See attached schedule.

(8) SEAD 059, 71 EE/CA Notification November 6, 1998. See attached schedule.

(9) SEAD 011, EE/CA Notification November 3, 1998. See attached schedule.

(10) SEAD-13 Notification of Decision Document, August 31, 1999.

(11) SEAD-48 Project status notification November 7, 2000.

(7) SEAD-63 EE/CA Dates

Draft EE/CA Approval Memorandum Document	05 Oct 98
Draft EE/CA Document	23 Oct 99
Draft EE/CA Action Memorandum Document	23 Oct 99
Release for Public Comment	14 Mar 99
Draft Removal Work Plans	25 Apr 99
Removal Action Begins	21 Jul 99
Draft Removal Report	19 Sep 99

(8) SEAD-59, 71 EE/CA Dates

Draft EE/CA Approval Memorandum Document	31 Dec 98
Draft EE/CA Document	On Hold
Draft EE/CA Action Memorandum Document	On Hold
Release for Public Comment	On Hold
Draft Removal Work Plans	On Hold
Draft Removal Report	On Hold

(9) SEAD-11, EE/CA Dates

Draft EE/CA Approval Memorandum Document	11 Dec 98
Draft EE/CA Document	On Hold
Draft EE/CA Action Memorandum Document	On Hold
Release for Public Comment	On Hold
Draft Removal Work Plans	On Hold
Draft Removal Report	On Hold

DRAFT
SMALL ARMS RANGE (SEAD-122B)
SENECA ARMY DEPOT
ROMULUS, NEW YORK

BACKGROUND

SEAD-122B has been used as a small arms firing range since the early 1960s. The site is located at the Airfield parcel east of Building 2302. This area was identified in a visual inspection and interview during the 1995 Environmental Baseline Survey (EBS). SEAD-122B was included in a group of priority Non-Evaluated EBS sites, where additional sampling and analyses were necessary to determine their environmental condition. As a non-evaluated EBS site, SEAD-122B is a Category 7 site (category descriptions are provided in DoD's BRAC Cleanup Guidebook), and it is not suitable for transfer by deed until the required investigations or remedial actions have been completed and the property has been reclassified.

SEAD-122B is comprised of two adjacent small arms ranges (Range 1 and Range 2). Range 1 has a concrete platform with 22 numbered shooting stations and a roof. A 3-sided soil berm encompasses the downrange area, which has rows of target mounting frames. The sides of the berm extend to the front edge of the shooting platform. Range 2 has only two shooting stations and it is smaller than Range 1. Its downrange area is enclosed by a 3-sided berm. Concrete piping is used in the shooting lanes for Range 2 to prevent shooting above the berm. The area enclosed by the berms for Range 1 and 2 and their respective shooting stations is approximately 2.5 acres. The Army Corps of Engineers has determined that unexploded ordnance is not an issue at this site.

As part of the Investigation of Priority Environmental Baseline Survey, Non-Evaluated Sites at Seneca Army Depot Activity (Draft Report, Parsons, 1998), a total of five surface soil samples were collected at downrange locations at the small arms range. One sample was collected from the range floor, two feet in front of concrete platform for shooting lanes. Two samples were collected from the berm at Range 1, and two samples were collected from the berm at Range 2. Samples from the berms were collected in locations believed to be impact points for the shots (Parsons, 1998).

The release of metals (e.g., lead) to site soils is the principle concern at SEAD-122B. Maximum lead concentrations were detected in soils at the berm from Range 1 (30,700 mg/kg and 42,900 mg/kg). The results from the laboratory testing were compared to NYSDEC TAGMs, and in addition to lead concentrations exceeding TAGMs, there were other metals that exceed their respective TAGM values. The Draft Investigation Report (Parsons, 1998) recommended that additional surface soil sampling be performed to determine the extent of the impacts from copper, lead, antimony, and arsenic. The report concluded that there are an insufficient number of data points to perform a Mini Risk Assessment.

REQUIREMENTS FOR ADDITIONAL INVESTIGATION

The Local Reuse Authority (LRA) has identified SEAD-122B as a parcel that could be transferred to the New York State Police for continued use as a Small Arms Range.

Although the intended reuse will not change, the Army Materiel Command asked the Army Environmental Center (AEC) to provide input on the following questions:

1. Why does the Army need to conduct additional investigations before transferring the parcel?
2. What investigations are required to support the transfer of the parcel?

The requirements for conducting additional investigations are found in the following sources:

- CERCLA Section 120(h)

- DoD Guidance on the Environmental Review Process to Reach A Finding Of Suitability to Transfer (FOST) for Property Where Release Or Disposal Has Occurred

CERCLA Section 120(h)

Section 120(h) of CERCLA requires Federal agencies to give public notice of the intended transfer of real property and provide a covenant warranting that (1) all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer; and (2) any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States.

Without an acceptable risk assessment, the covenant regarding protectiveness of human health and the environment cannot be provided.

DoD FOST Guidance

Based on the environmental review process described in the DoD FOST guidance, the environmental condition of the property proposed for transfer must be in Category 1 to 4 as outlined in DoD's BRAC Cleanup Guidebook before transfer by deed can occur. The Army may transfer BRAC properties before a remedy is in place as long as the deferral of requirements under CERCLA Section 120(h)(3) is obtained.

The covenant required by CERCLA Section 120(h)(3) regarding hazardous substances must be based on either (1) a determination that no remedial action is required or (2) a determination that all remedial action necessary to protect human health and the environment has been taken. The environmental sampling conducted to date demonstrates that a release of hazardous substances (i.e., lead and possibly other metals) has occurred at SEAD-122B. To accelerate the transfer of this parcel, appropriate documentation must be developed to reclassify the site to Category 3, which is an area where release, disposal, and/or migration of hazardous substances have occurred, but at concentrations that do not require a removal or remedial response. Category 3 sites can be transferred once the notification requirements and covenant and access clauses prescribed by CERCLA Section 120(h)(3) are addressed.

As outlined in the DoD guidance, the head of the DoD Component with accountability over the property, or his/her designated representative, shall assess, determine and document when properties where release or disposal of hazardous substances or petroleum products has occurred are suitable for transfer by deed. This assessment and determination will be based on an Environmental Baseline Survey (EBS) and will be documented in a Finding of Suitability to Transfer (FOST)

Before the signing of a FOST, an analysis of the intended use of the property, if known, will be conducted and will include:

- An evaluation of the environmental suitability of the property for transfer by deed for the intended purpose, if known, including the rationale for the determination of such suitability.

- A listing of specific recommended restrictions on use of the property, if any, to protect human health and the environment or the environmental restoration process.

The analysis of the intended use is a component of a FOST for property on which release or disposal has occurred and serves two purposes. First and foremost, the analysis of the intended use provides the basis for giving the covenant required by CERCLA Section 120(h)(3) regarding hazardous substances. Second, the analysis of intended use allows the identification of deed restrictions on future use of the property that may have been adopted in remedial decision documents. Such restrictions may also be required due to other non-CERCLA environmental concerns. The BCT, by reviewing existing documents, analyzes the suitability of the property for the intended reuse by (1) comparing the type of intended use, if known, with the environmental condition of the property and (2) documenting the rationale for determining that the property is suitable for the intended use, if known. It is important to note that the analysis of intended use is based on a review of existing information; it does not involve the development of a risk assessment. Property may be determined suitable for a particular reuse or for general types of reuse.

After completion and review of the EBS, the intended use analysis, and any available local community reuse plan, the DoD Component will sign a FOST once a determination has been made that the property is suitable for transfer by deed for the intended purpose, if known, because the requirements of CERCLA Section 120(h)(3) have been met for the property, taking into account the potential risk of future liability.

To meet the requirements of CERCLA Section 120(h)(3), it is AEC's position that additional sampling is required before an acceptable EBS could be developed. When evaluating the continued use of SEAD-122B by the State Police as a Small Arms Range, the question would be whether land use restrictions could adequately protect human health and the environment. If there is a concurrence from the BCT on this approach, proposed additional investigations for SEAD-122B are presented in the following section.

PROPOSED INVESTIGATION APPROACH

The objective of this proposed scope of work is to assist in the determination of whether residual lead in soil at the Small Arms Range has significantly impacted the environment. Additionally, the data obtained would be evaluated with regard to potential human health effects (i.e., human health risk assessment).

This proposed scope of work is divided into four sections including: 1) soil sampling; 2) groundwater sampling; 3) laboratory analysis; and 4) cost estimate. Each is described in detail below.

Soil Sampling

To supplement the previously obtained soil data, a sampling grid across the impact berm directly north of the firing platform would be established at both the small arm range and machine gun range. The sampling grid would be a maximum of 10 feet by 10 feet. In the areas surrounding the targets a finer grid system (i.e., 5 feet by 5 feet) should be considered. Due to the installation of the baffle system it is estimated that the north-south transects would be only 30 feet in length. This grid system would create an estimated 45 nodes at the small arms range and 21 nodes at the machine gun range.

For this investigation, it is proposed that 20 percent of the sampling nodes be selected for soil sampling. Sampling nodes would be selected using a simple random number generator. Additionally, two surface soil samples from the floor of each range (at randomly selected locations) be collected. Only three surface soil samples are proposed from the range floors since each has a system to prevent errant rounds. At the small arms is a series of wooden baffles were constructed, while at the machine gun range two roughly 72-inch diameter concrete pipes have been installed. For each sample node location, two samples will be collected: a grab sample from the 0-2 inch interval and a composite sample from the 0-2 foot interval. The two-foot depth is assumed due to estimated penetration depth of a typical round. A total of 22 samples would be collected from the small arms range while 12 samples would be obtained from the machine gun range.

Soil samples from the impact berm would be collected using a decontaminated bucket auger or other suitable tool (e.g., shovel). Surface soil samples collected from the floor of each range would be obtained from a depth of two inches consistent with the New York State Department of Health guidelines for evaluating human health effects.

Groundwater Sampling

A series of four groundwater samples are proposed for this investigation. One sample would be collected in the apparent upgradient location (assumed to be west-southwest of the range) while three samples would be collected downgradient of the ranges. It is anticipated that two groundwater samples would be collected directly downgradient of the small arms range and one sample taken downgradient of the machine gun range.

Groundwater samples would be obtained from the uppermost water-bearing zone via direct push technology (GeoProbe). Each boring would be advanced a minimum of five feet into the water table prior to sampling. Due the expected shallow depth to groundwater (less than 10 feet), samples can be collected using a peristaltic pump and tubing. It is proposed that samples be collected on a total constituent basis as well as on a dissolved basis. The dissolved sample would be collected after fixing a 45-micron in-line filter to the discharge tubing.

Laboratory Analysis

Soil samples (including a minimum of one duplicate) would be analyzed for total lead via SW846 Method 7421. At five co-located sample locations, addition soil will be collected for lead analysis via the Synthetic Precipitation Leachate Procedure (SPLP) via Method 1312.

Groundwater samples would be analyzed be analyzed on total and dissolved constituent basis for lead via Method 7470/7471. It is anticipated that a minimum of one equipment rinsate blank (from the soil sampling) would also be analyzed for lead.

An alternative plan would be to analyze the environmental samples (excluding the SPLP samples) for the Target Analyte List (TAL) via Method 6010B/7000 in order to complement the inorganic analyses previously conducted.

It is assumed that data validation by a third-party validator will not be performed.

Cost Estimate

It is assumed that Parsons ES would conduct the above scope of work under their existing contract with the Corp of Engineers. The cost estimate presented here is based on an average hourly rate for the contractor of $60/hour. To produce a site-specific work plan, conduct the field sampling (assumed two days) and prepare short report including tables and figures is estimated at $7,000. Costs associated with the use of direct push rig for a one-day period is estimated at $2,000. Laboratory analytical costs for the soil and aqueous samples are estimated to be approximately $1,800.

Based on the above, it is expected that this scope of work would be performed for an estimated cost of $10,800. Should it be decided to analyze for the optional TAL inorganics the project cost would increase by approximately $4,200 for a total of $15,000.

SENECA ARMY DEPOT

OU	Name	Document	Army Last Action	EPA Last Action	Next Action Date	Next Action Comment
01	*Ash Landfill*	Reactive Wall Treatability Stu	30-Aug-00	02-Nov-00		
	SEAD-03, 06,	Draft PRAP	06-Jul-00	12-Feb-01	27-Mar-01	
	08, 14 & 15	Draft ROD				
		Draft RD WP				Submit schedule 21 days after Final ROD
		Pre-/Final RD Report				Submit schedule 21 days after Final ROD
		Draft RA WP				Submit schedule 21 days after Final ROD
		Draft Project Closeout Report				Submit schedule 21 days after Final ROD
		ROD issued			14-Jun-99	Final
02	*OB Grounds*	Draft RD WP			05-Jul-99	Army did not submit schedule as required by FFA
	SEAD-23	Pre-/Final RD Report			05-Jul-99	Army did not submit schedule as required by FFA
		Draft RA WP			05-Jul-99	Army did not submit schedule as required by FFA
		Draft Project Closeout Report			05-Jul-99	Army did not submit schedule as required by FFA
03	*Fire Training Areas*	Draft PRAP	30-May-00	On Hold		
	SEAD-25 &26	Final Bioventing WP		14-May-01	29-Jun-01	Army now intents to do time-critical removal
		Draft Action Memorandum				
		Draft PRAP				
		Draft ROD				
04	*Deactivation Furnaces*	Final RI				
	SEAD-16 & 17	LTTD Trial Burns Report				
		Final FS	30-Sep-00	11-Apr-01	10-Jul-01	
		Draft PRAP				
		Draft ROD				
		Draft RD WP				Submit schedule 21 days after Final ROD
		Pre-/Final RD Report				Submit schedule 21 days after Final ROD
		Draft RA WP				Submit schedule 21 days after Final ROD
		Draft Project Closeout Report				Submit schedule 21 days after Final ROD
05	*Radiation Sites*	Final Building Survey Report		23-Mar-01		
	SEAD-12	Final Draft RI	02-Feb-01	22-Jun-01	02-Aug-01	
		Draft FS			26-May-01	Per Attachment 5
		Draft PRAP			13-Sep-01	Per Attachment 5
		Draft ROD			27-Mar-02	Per Attachment 5
		Draft RD WP				Submit schedule 21 days after Final ROD
		Pre-/Final RD Report				Submit schedule 21 days after Final ROD
		Draft RA WP				Submit schedule 21 days after Final ROD
		Draft Project Closeout Report				Submit schedule 21 days after Final ROD

	SEAD-63	Draft EE/CA (SEAD-63)	31-Jul-00	01-Mar-01	16-Apr-01	
		Draft PRAP				
		Draft ROD				
06	*Fill Area/Paint Disposal*	Draft RI		16-Apr-99	31-May-99	Army intents to do non-time critical removal
	SEAD-59 & 71	Draft EE/CA			31-Dec-98	
		Darft 'Action Memorandum	02-Jul-01			
		Draft PRAP				
		Draft ROD				
07	*Munitions Washout Facility*	Draft Final RI	27-Jun-00	13-Oct-00	25-Jan-01	
	SEAD-04	Draft FS			16-Apr-01	
		Draft PRAP			03-Oct-01	Per Attachment 5
		Draft ROD			16-Apr-02	Per Attachment 5
		Draft RD WP				Submit schedule 21 days after Final ROD
		Pre-/Final RD Report				Submit schedule 21 days after Final ROD
		Draft RA WP				Submit schedule 21 days after Final ROD
		Draft Project Closeout Report				Submit schedule 21 days after Final ROD
08	*Old Construction Debris*					
	SEAD-64A, 64D	Draft EE/CA			14-Apr-01	
	SEAD-11	Draft Action Memorandum			11-Dec-98	
		Draft PRAP				
		Draft ROD				
09	*IRFNA Disposal Site*	Draft Decision Document	28-Apr-00	14-Jul-00	29-Aug-00	NYSDEC requested additional sampling
	SEAD-13	Draft Sampling WP				
		Draft PRAP				
		Draft ROD			22-Nov-00	
10	*Ammunition Breakdown*	Darft Decision Document	30-Nov-99	17-May-01	02-Jul-01	
	SEAD-52 & 60	Draft PRAP				
		Draft ROD				
11	*Demo/EOD/SAR*	Draft RI			01-Mar-01	Per Attachment 5
	SEAD-45, 46 & 57	Draft FS			25-Jul-01	Per Attachment 5
		Draft PRAP			22-Nov-01	Per Attachment 5
		Draft ROD			06-Jun-02	Per Attachment 5
		Draft RD WP				Submit schedule 21 days after Final ROD
		Pre-/Final RD Report				Submit schedule 21 days after Final ROD
		Draft RA WP				Submit schedule 21 days after Final ROD
		Draft Project Closeout Report				Submit schedule 21 days after Final ROD
12	*Pesticides Storage*	Draft Final Decision Document		28-Feb-01	15-Apr-01	
	SEAD-66	Draft RI			05-Nov-00	Per Attachment 5

	Draft FS	30-Mar-01	Per Attachment 5
	Draft PRAP	18-Jul-01	Per Attachment 5
	Draft ROD	29-Jan-02	Per Attachment 5
	Draft RD WP		Submit schedule 21 days after Final ROD
	Pre-/Final RD Report		Submit schedule 21 days after Final ROD
	Draft RA WP		Submit schedule 21 days after Final ROD
	Draft Project Closeout Report		Submit schedule 21 days after Final ROD
13 *Pitchblende Igloos*	Draft RI	05-Nov-00	Per Attachment 5
SEAD-48	Draft FS	30-Mar-01	Per Attachment 5
	Draft PRAP	18-Jul-01	Per Attachment 5
	Draft ROD	29-Jan-02	Per Attachment 5
	Draft RD WP		Submit schedule 21 days after Final ROD
	Pre-/Final RD Report		Submit schedule 21 days after Final ROD
	Draft RA WP		Submit schedule 21 days after Final ROD
	Draft Project Closeout Report		Submit schedule 21 days after Final ROD

BCT AGENDA

October 16-17, 2001

1. REMOVAL ACTION COMMENTS
   - Clarification of intent
   - SEAD 11
   - SEAD 59/71
   - SEAD 38-40
   - SEAD 4

2. AIRFIELD SMALL ARMS RANGE
   - Lead Soil

3. RAILROAD TRANSFER – Adjacent Sites

4. ATTACHMENT 5 UPDATE
   (attached to agenda)

5. SEAD 46/57
   Approach for O/E Removals

ATTACHMENT 5
SCHEDULES

The schedule of IRP work at SEDA is as follows:

RELEVANT MILESTONES

<u>ASH LANDFILL (SEAD-003, 006, 008, 014, and 015)</u> OU1

Draft Work Plan	(04 Dec 90)
Draft RI	(20 Oct 93)
Draft FS	(19 Sep 94)
Draft PRAP	(07 Mar 97)
Draft Treatability Study Work Plan	(04 Nov 98)
Treatability Study Start	(07 Dec 00)
Draft Treatability Memorandum Report	01 Nov 01
Draft ROD	(30 Aug 98)
Draft RD/RA Schedule	21 days after ROD
Draft Remedial Design	21 days after ROD
Remedial Action Completion Report	21 days after ROD

<u>Ash Landfill Status</u>: Draft Final PRAP submitted July 10, 2001. Regulatory Review comments were due August 10, 2001. NYSDEC comments were received 09 August 2001. As of 02 Oct 2001, Comments from EPA have not been received. The results have been received from ETI regarding column studies for the Treatability Study, and are under review by the Army. Draft ROD submitted 30 Aug 1998 and held pending completion of the PRAP..

<u>OPEN BURNING GROUNDS (SEAD-023)</u> OU2

Draft Work Plan	(29 Aug 91)
Draft RI	(28 Jan 94)
Draft FS	(09 Mar 94)
Draft PRAP	(04 Jul 96)
Draft ROD	(14 Nov 97)
Final ROD	(14 Jun 99)
Draft Rd/RA Schedule	
Draft Remedial Design	
Remedial Action Completion Report	15 Jul 02

<u>OB Grounds Status</u>: Technical specs, RA Workplan submitted 5 Jul 99. Comments

Draft RI/FS Work Plan	(19 Jan 96)

Bldg 612 Complex Status: Final Completion Report for the Prison Parcel was submitted on 4 May 01. Comments from EPA and NYSDEC are pending.

SEAD-046 and 057 EOD/Small Arms Range

Draft RI/FS Work Plan SEAD-046, 057	(26 Feb 96)
Draft RI/FS Work Plan SEAD-046	(09 May 96)
Draft RI Submission	01 Nov 01
Draft FS Submission	25 Jul 01
Draft PRAP	22 Nov 01
Draft ROD	06 Jun 02

EOD/Small Arms Range Status: Fieldwork for Phase I RI underway. Draft RI Report to be submitted 01 Nov 01. The Army plans to perform OE removal activities at these sites, and address contaminants of concert under CERCLA incidental to the OE removal.

SEAD-048 Pitchblende Storage Area

Draft RI/FS Work Plan	(19 Dec 95)

Pitchblende Storage Area Status: Army reviewing additional site information. A revised scope of work for the RI will be submitted for regulatory review **1 Nov 01**.

SEAD-063 Miscellaneous Components Burial Site

Miscellaneous Components Burial Site Status: Army submitted revised Final Action Memorandum/ EE/CA comments on 16 Jul 01. EPA and NYSDEC response to comments due **16 Aug 01**.

SEAD-066 Pesticide Storage Areas

Draft RI/FS Work Plan	(02 Dec 96)

Pesticide Storage Areas Status:

BCT AGENDA

November 20, 2001
1330-1630

1. CLEAN-UP OBJECTIVES
   - a Proposed Path Forward

2. RAILROAD TRANSFER – Adjacent Sites

DEPARTMENT OF THE ARMY
SENECA ARMY DEPOT ACTIVITY
5786 STATE RTE 96
ROMULUS, NEW YORK 14541-5001

November 14, 2001

REPLY TO
ATTENTION OF

Engineering and
Environmental Office

Mr. Julio Vazquez
U.S. Environmental Protection Agency
Emergency and Remedial Response Division
290 Broadway
18th Floor, E-3
New York, New York 10007-1866

Mr. Alicia Thorne
NYS Department of Environmental Conservation
Division of Hazardous Waste Remediation
Bureau of Eastern Remedial Action
625 Broadway, 11th Floor
Albany, New York 12233-7015

Dear Mr. Vazquez/Ms. Thorne:

This is a reminder that the next BRAC Cleanup Team Meeting will be held on November 20,2001, in Building 125. An agenda is enclosed.

Should you have any questions, please contact Mr. Stephen Absolom at (607) 869-1309.

Sincerely,

Stephen M. Absolom
Commander's Representative

Copies Furnished:

Ms. Todd Heino, Parsons Engineering Science, Inc., 30 Dan Road, Canton, MA 02021

Commander, U.S. Army Corps of Engineers, Huntsville Division, ATTN: CEHND-ED-CS (Kevin Healy)(MAJ D. Sheets), P.O. Box 1600, Huntsville, Alabama 35807

Commander, U.S. Army Corps of Engineers, Seneca Army Depot Activity, ATTN: CENAN-PP-E, SEDA Office for Project Management, Romulus, New York 14541-5001

Commander, U.S. Army Corps of Engineers, Seneca Army Depot Activity, ATTN: CENAN-CO-W (T. Battaglia), SEDA Resident Office, Building 101, Romulus, New York 14541-5001

Commander, U.S. Army Operations Support Command (OSC)(PROV), ATTN: AMSOS-EQE (B. Wright), Rock Island, IL 61299-6000

Ms. Charlotte Bethany, New York State Department of Health, Bureau of Environmental Exposure Investigation, 547 River Street, Troy, New York 12180-2216

Commander, USACHPPM, 5158 Blackhawk Road, ATTN: Keith Hoddinott, Aberdeen Proving Ground, Maryland 21010-5422

Mr. Robert K. Scott, NYSDEC, Region 8, 6274 East Avon-Lima Road, Avon, New York 14414-9519

Commander, U.S. Army Environmental Center, ATTN: SFIM-AEC-IRP (Clayton Kim), Aberdeen Proving Ground, Maryland 21010-5410

Ms. Patricia Jones, Seneca County Industrial Development Agency, 1 DiPronio Drive, Waterloo, New York 13165

Mr. John Cleary, BTC, SEDA

Roy F. Weston, Inc.
1 Wall Street
Manchester, NH 03101-1501
603-656-5400 • Fax 603-656-5401
www.rfweston.com

04 April 2000

U.S. Army Corps of Engineers
Seneca Area Office
5786 State Rte. 96
Romulus, NY 14541-5001

Work Order No. 03886-118-013

Attention: Mr. Tom Battaglia

Re: Contract No. DACW-33-95-D0004
Seneca Army Depot Remediation Project
Romulus, New York
Preliminary Excavation Drawings
DCN: SEDA-040400-AAVU

Dear Mr. Battaglia:

Roy F. Weston, Inc. (WESTON®) is submitting preliminary Open Burning (OB) Grounds excavation drawings per your request. The OB Grounds burn pad and berm areas that were excavated by EODT during summer and fall 1999 were surveyed by Popli Engineers and Surveyors and plotted by WESTON. Drawings include the initial projected extents of contamination for Case I, II, and III soils from Parson's Section C – Technical Specifications, actual extents of excavations, and confirmation sample location, identification, and concentration information. Based on survey data, approximately 6 additional samples will be collected at the locations noted (hollow circle symbols) in Areas C, G, J, and SW-220. In addition, two samples in Area C which contain concentrations of total lead greater than 500 mg/kg will be reexcavated and resampled. Drawings were not generated for Areas E, F, and H since these areas require additional excavation at multiple locations.

Table 1 summarizes the excavation sidewall and bottom confirmation samples that contain concentrations ≥60 mg/kg total lead (excluding OB Grounds Areas E, F, and H). As shown, a total of 94 excavation confirmation sample locations contain concentrations of total lead ≥60 mg/kg, excluding the two sample locations in Area C with total lead >500 mg/kg that will be reexcavated. These locations with ≥60 mg/kg total lead will require either additional excavation and confirmatory sampling or will require the application of 1 ft. of cover material (8 in. fill and 4 in. topsoil).

Table 1
Excavation Confirmation Samples in OB Grounds with Total Lead ≥60 mg/kg

OB Grounds Burn Area	Number of Excavation Confirmation Sample Locations with Total Lead Concentrations ≥ 60 mg/kg		
	External Sidewall Samples	Internal Sidewall Samples	Bottom Samples
A	1	2	0
B	2	3	3
C[1]	10	6	8
D	0	0	3
G	4	16	3
J	3	14	9
LLH	0	0	2
SW-220	3	0	1
GB-19/34	1	0	0

[1] Excludes two confirmation samples with total lead concentrations greater than 500 mg/kg

Please call me at (603) 656-5428 if you have any questions regarding the attached drawings.

Sincerely,
ROY F. WESTON, Inc.

Christopher Kane
Project Manager

Enclosures

cc: M. McCarley (WESTON)
A. Nash (WESTON DCN)

LEGEND

- ● FINAL CONFIRMATION SOIL SAMPLE LOCATION
- PARSONS PROJECTED EXTENT OF CONTAMINATED AREA
- ACTUAL EXTENTS OF EXCAVATION
- INTERNAL EXCAVATION SIDEWALL
- CASE 1 LEAD > 800 ppm
- CASE 2 LEAD > 500 ppm
  < 800 ppm
- CASE 3 LEAD < 500 ppm

CE-ORG1-B02	630.9	38
SAMPLE ID.	ELEVATION (FT.)	LEAD CONCENTRATION (mg/kg)

ND NON-DETECT LEAD CONCENTRATION

NS NOT SURVEYED

REFERENCES:

1. PROJECTED EXTENT OF CONTAMINATED AREAS AND CASE TYPES FROM PARSONS ENGINEERING SCIENCE, INC. (PARSONS) SECTION C-FINAL TECHNICAL SPECIFICATIONS, 1998.
2. SOIL SAMPLE LOCATIONS AND EXCAVATION EXTENDS SURVEYED BY POPLI CONSULTING ENGINEERS AND SURVEYS. 7/99-?/00

SENECA ARMY DEPOT ACTIVITY OPEN BURNING GROUNDS ROMULUS, NEW YORK	DEPARTMENT OF THE ARMY NEW YORK DISTRICT CORPS OF ENGINEERS FORT DRUM, NEW YORK	
SITE PLAN LEGEND	WESTON MANAGERS DESIGNERS/CONSULTANTS MANCHESTER NEW HAMPSHIRE	DRAWN T.A.C. DATE JAN. 2000 FIGURE NO. ?

FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC. DWG (PLOT 1 = 1)

BCT AGENDA

April 18-19, 2000
NCO CLUB
1330 – 1630 April 18, 2000
0830 – 1130 April 19, 2000

⇒SEAD 4
- **FS**
- **PRAP**

⇒ASH LANDFILL PRAP
- **SCHEDULE**

⇒OB GROUND SITE RESTORATION
- **DECISIONS**

⇒INVESTIGATIVE DERIVED WASTE
- **RECAP FROM LAST MEETING**

⇒ATTACHMENT 5 SCHEDIULE
- **"A REALITY CHECK"**

⇒LRA RESUE PRIORITY
- **CHANGE**

ATTACHMENT 5
SCHEDULES

The schedule of IRP work completed to date and planned through completion of all restoration work at SEDA is as follows:

RELEVANT MILESTONES (1)(2)

ASH LANDFILL (SEAD-003, 006, 008, 014, and 015) OU1

Draft Work Plan	(04 Dec 90)
Draft RI	(20 Oct 93)
Draft FS	(19 Sep 94)
Draft PRAP	(07 Mar 97)
Draft ROD	(~~30 Aug 98~~) 16 JUN 00

OPEN BURNING GROUNDS (SEAD-023) OU2

Draft Work Plan	(29 Aug 91)
Draft RI	(28 Jan 94)
Draft FS	(09 Mar 94)
Draft PRAP	(04 Jul 96)
Draft ROD	(14 Nov 97)

REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES (3)(4)
FIRE TRAINING AREAS (SEAD-025, 026) OU3

Draft RI/FS Work Plan	(29 Mar 95)
Draft RI Submission	(27 Jun 96)
Draft FS Submission	(05 Dec 97)
Draft PRAP	(21 May 00)
Draft ROD	(02 Nov 00)

DEACTIVATION FURNACES (SEAD-016, 017) OU4

Draft RI/FS Work Plan	(29 Mar 95)
Draft RI Submission	(08 May 97)
Draft FS Submission	(21 Nov 97)
Draft PRAP	(03 Jan 00) → ?
Draft ROD	(16 Jul 00)

SEAD-052, 060 Bldg 612 Complex

Draft RI/FS Work Plan	(19 Jan 96)
Draft RI Submission	(29 Aug 00)
Draft FS Submission	(23 Jan 01)
Draft PRAP	(10 May 01)
Draft ROD	(24 Nov 01)

SEAD-045, and 057 Demo Area/EOD (6)

Draft RI/FS Work Plan	(26 Feb 96)

SEAD-046 Small Arms Range (6)

Draft RI/FS Work Plan	(09 May 96)

SEAD-045, 046, and 057 Demo Area/EOD/Small Arms Range (6)

Huntsville

Draft RI/FS Work Plan	(See above)
Draft RI Submission → Need RI completion	(01 Jun 00)
Draft FS Submission	(24 Oct 00)
Draft PRAP	(11 Feb 01)
Draft ROD	(25 Aug 01)

SEAD-048 Pitch Blend Storage

Draft RI/FS Work Plan	(19 Dec 95)
Draft RI Submission	(05 Nov 00)
Draft FS Submission	(30 Mar 01)
Draft PRAP	(18 Jul 01)
Draft ROD	(29 Jan 02)

SEAD-066 Pesticide Storage Areas

Draft RI/FS Work Plan	(02 Dec 96)
Draft RI Submission	(05 Nov 00)
Draft FS Submission	(30 Mar 01)
Draft PRAP	(18 Jul 01)
Draft ROD	(29 Jan 02)

FOOTNOTES:

(1) Draft and Draft-Final submissions are based on the InterAgency Agreement (IAG) stipulation of 45 days for Army preparation and 30 days for regulatory review. Final dates are based upon the IAG stipulation that all documents become final automatically within 30 days of the Draft-Final submission if no comments are received.

(2) Multiple document submittals will be likely considering the amount of work required and the tight schedules for performance. All schedules assume that regulatory reviews will be conducted concurrently, if required, as is assumed in the IAG.

(3) All schedules for RIs to be performed assume that two phases of fieldwork will be required. If Phase II RI fieldwork is unnecessary for SEADs 25 and 26, SEADs 16 and 17, SEAD 4, SEADs 12, 48, and 63; all draft documents for these operable units shall be submitted to the USEPA and NYSDEC earlier than the deadlines in Attachment 5: Facility Master Schedule. The Army shall submit a revised Attachment 5 to the USEPA and NYSDEC to reflect the new deadlines within 30 days of NYSDEC and USEPA indicating that Phase II RI fieldwork would not be needed for the above-mentioned SEADs.

(4) Operable unit designation will be assigned after project has been funded and consistent with definition, Section 2, paragraph 14.

(5) Years will continue to be designated by their last two digits in the year 2000, e.g. "00", "01", "02", etc.

(6) SEAD-045, and 057 (Demo Area/EOD) have been combined with SEAD-046 (Small Arms Range) for Draft RI Submission.

(7) SEAD 63 EE/CA Notification November 6, 1998. See attached schedule.

(8) SEAD 059, 71 EE/CA Notification November 6, 1998. See attached schedule.

(9) SEAD 011, 64A, 64D EE/CA Notification November 3, 1998. See attached schedule.

(7) SEAD-63 EE/CA Dates

Draft EE/CA Approval Memorandum Document	05 Oct 98
Draft EE/CA Document	23 Oct 99
Draft EE/CA Action Memorandum Document	23 Oct 99
Release for Public Comment	14 Mar 99
Draft Removal Work Plans	25 Apr 99
Removal Action Begins	21 Jul 99
Draft Removal Report	19 Sep 99

UPDATE comments

(8) SEAD-59, 71 EE/CA Dates

Draft EE/CA Approval Memorandum Document	31 Dec 98
Draft EE/CA Document	14 Aug 00
Draft EE/CA Action Memorandum Document	14 Aug 00
Release for Public Comment	10 Oct 00
Draft Removal Work Plans	24 Nov 00
Draft Removal Report	23 Apr 01

(9) SEAD-11, EE/CA Dates

Draft EE/CA Approval Memorandum Document	11 Dec 98
Draft EE/CA Document	14 Aug 00
Draft EE/CA Action Memorandum Document	14 Aug 00
Release for Public Comment	10 Oct 00
Draft Removal Work Plans	24 Nov 00
Draft Removal Report	23 Apr 01

RAD SITES (SEAD-012, 063) OU5

Draft RI/FS Work Plan			(19 Dec 95)
Draft RI Submission -	See Footnote #7		(14 May 00) -
Draft FS Submission			(06 Oct 00)
Draft PRAP			(24 Jan 01)
Draft ROD			(07 Aug 01)

SEAD-059, 071 Fill Area/Paint Disposal

Draft RI/FS Work Plan		(30 Jan 96)
Draft RI Submission	See Footnote #8	(16 Jul 98)
Draft FS Submission	(On Hold)	(10 Nov 98)
Draft PRAP	(On Hold)	(28 Feb 99)
Draft ROD	(On Hold)	(11 Sep 99)

SEAD-004 Munitions Washout Facility

Draft RI/FS Work Plan	(25 Oct 95)
Draft RI Submission	(15 Nov 99)
Draft FS Submission	(17 Nov 00)
Draft PRAP	(07 Mar 01)
Draft ROD	(18 Sep 01)

SEAD-011, 64A, 64D Old Construction Debris Landfills (5)

Draft RI/FS Work Plan		(15 Jun 95)
Draft RI Submission	See Footnote #9	(06 Nov 98)
Draft FS Submission	(On Hold)	(31 Mar 99)
Draft PRAP	(On Hold)	(19 Jul 99)
Draft ROD	(On Hold)	(30 Jan 00)

SEAD-013 IRFNA Disposal Site

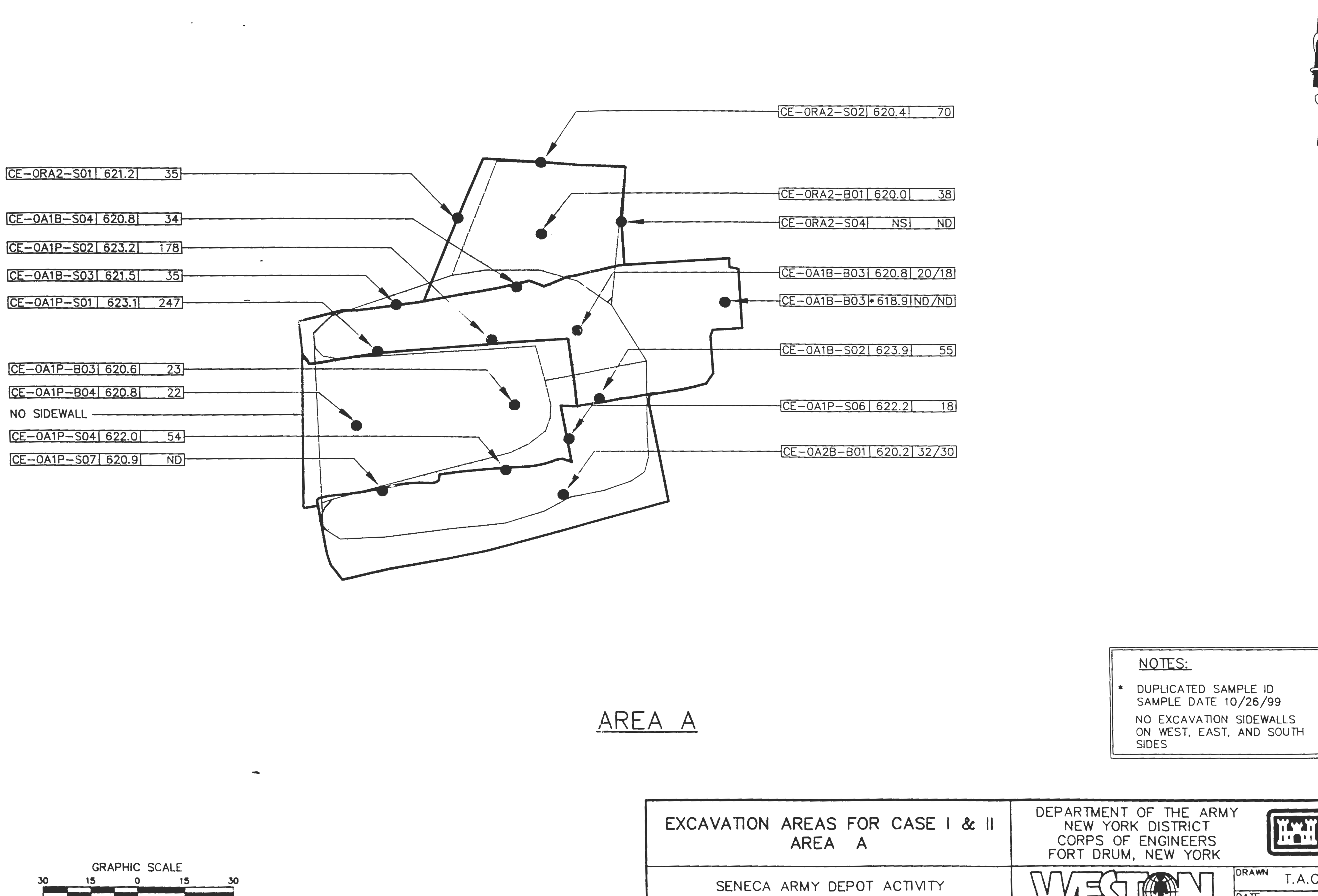
Draft RI/FS Work Plan	No Action	(14 Nov 95)
Draft RI Submission	Need Foot	(29 Aug 99)
Draft FS Submission		(22 Jan 00)
Draft PRAP		(11 May 00)
Draft ROD		(22 Nov 00)

Document

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy outlined in this ROD addresses potential exposure to elevated levels of metals, such as lead, in the on-site soils and sediment in Reeder Creek. The following describes the significant aspects of the remedy:

- The OB Grounds was used for surface burning of explosive trash and propellants. The concern for OE below the surface, at depth, at this site is small. Although OE is not expected to be found at depth at this site, through a combination geophysics, excavation, sifting, removal and soil cover, the Army will nevertheless remediate OE to meet the Department of Defense Explosive Safety Board (DDESB) requirements for unrestricted use or put into place land use restrictions as may be required by the DDESB.
- Excavation of soils with lead concentrations above 500 mg/kg and sediments from Reeder Creek with concentrations of copper and lead above the NYSDEC criteria of the 16 mg/kg and 31 mg/kg, respectively.
- Treatment of soils exceeding the Toxicity Characteristic Leaching Procedure (TCLP), estimated to be approximately 3,800 CY of the excavated soil, via solidification /stabilization will be performed to remove the RCRA characteristic of toxicity. This will allow the soil to be landfilled, in accordance with the requirements of the Land Disposal Restrictions (LDR) of RCRA.
- Disposal of the excavated and solidified soil in an off-site Subtitle D landfill. The total quantity of soil to be disposed of is estimated to be 17,900 CY, including the 3,800 CY of solidified soil.
- Construction of a soil cover of at least 9 inches of compacted soils in the areas of the OB Grounds with soils remaining on the site with lead concentrations above 60 ppm. The area to be covered is estimated to be approximately 27.5 acres, which encompasses most of the area of the OB Grounds. The PRAP incorrectly identified the area to be covered as 43.8 acres. The cap will be vegetated with indigenous grasses to prevent erosion and to prevent direct contact and incidental soil ingestion by terrestrial wildlife. The monitoring program will ensure that the 9-inch soil/vegetative cover is maintained after the remedy is complete.
- Control of surface water runoff, as necessary, to prevent erosion of the vegetative cover and solids loading to the creek. This will be accomplished with vegetation, regrading of site topography and drainage swales.
- Conducting a monitoring program for site groundwater and sediment in Reeder Creek. This program will monitor metals. For groundwater, the level of detection will be to below 15 ug/L, the federal action level for lead in groundwater. For sediment, the detection limit for



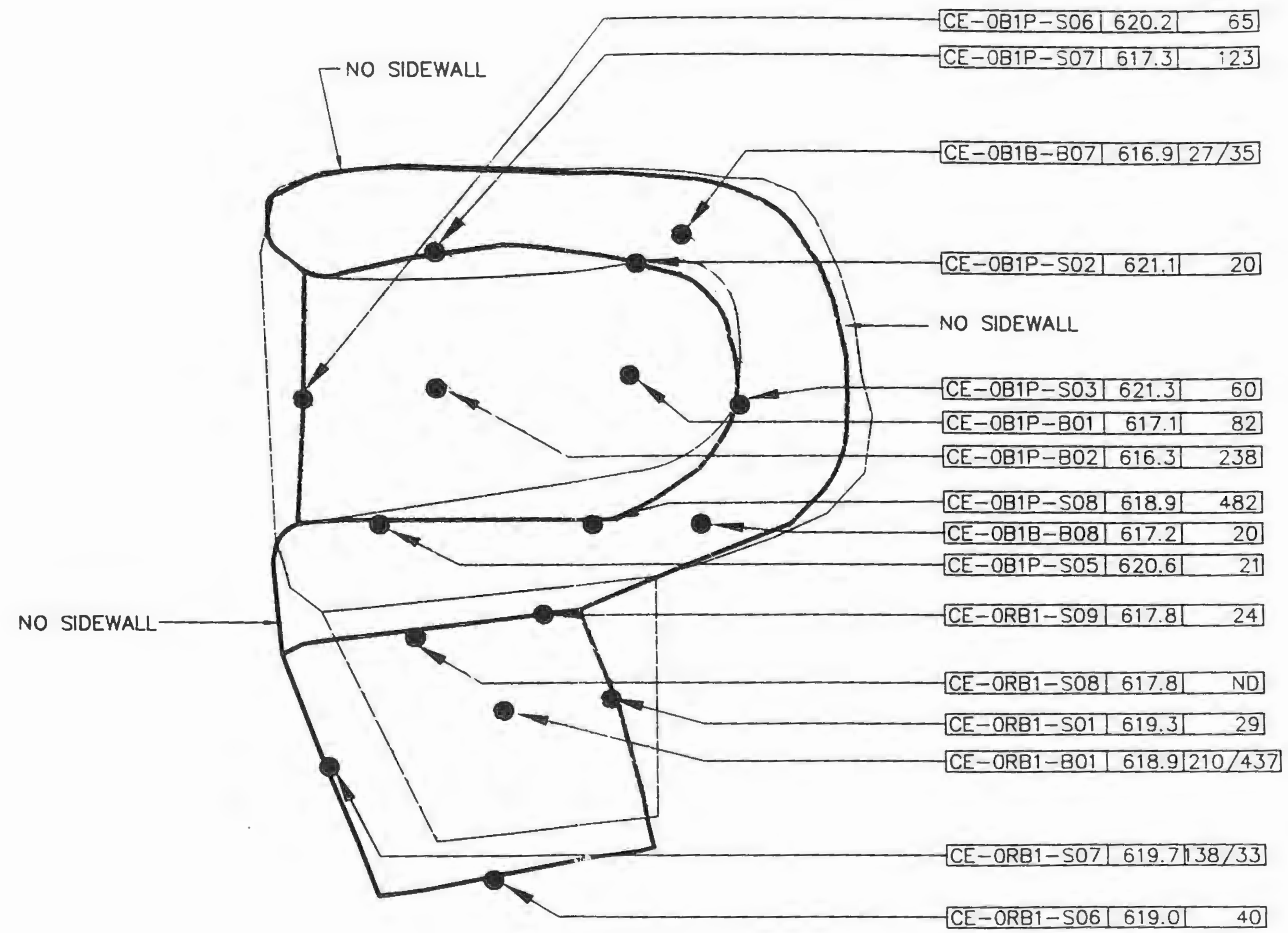
NOTES:

* DUPLICATED SAMPLE ID SAMPLE DATE 10/26/99

NO EXCAVATION SIDEWALLS ON WEST, EAST, AND SOUTH SIDES

EXCAVATION AREAS FOR CASE I & II AREA A	DEPARTMENT OF THE ARMY NEW YORK DISTRICT CORPS OF ENGINEERS FORT DRUM, NEW YORK
SENECA ARMY DEPOT ACTIVITY OPEN BURNING GROUNDS ROMULUS, NEW YORK	WESTON MANAGERS DESIGNERS/CONSULTANTS MANCHESTER NEW HAMPSHIRE DRAWN T.A.C. DATE JAN. 2000 FIGURE NO. ?

FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC. DWG (PLOT 1 = 1)

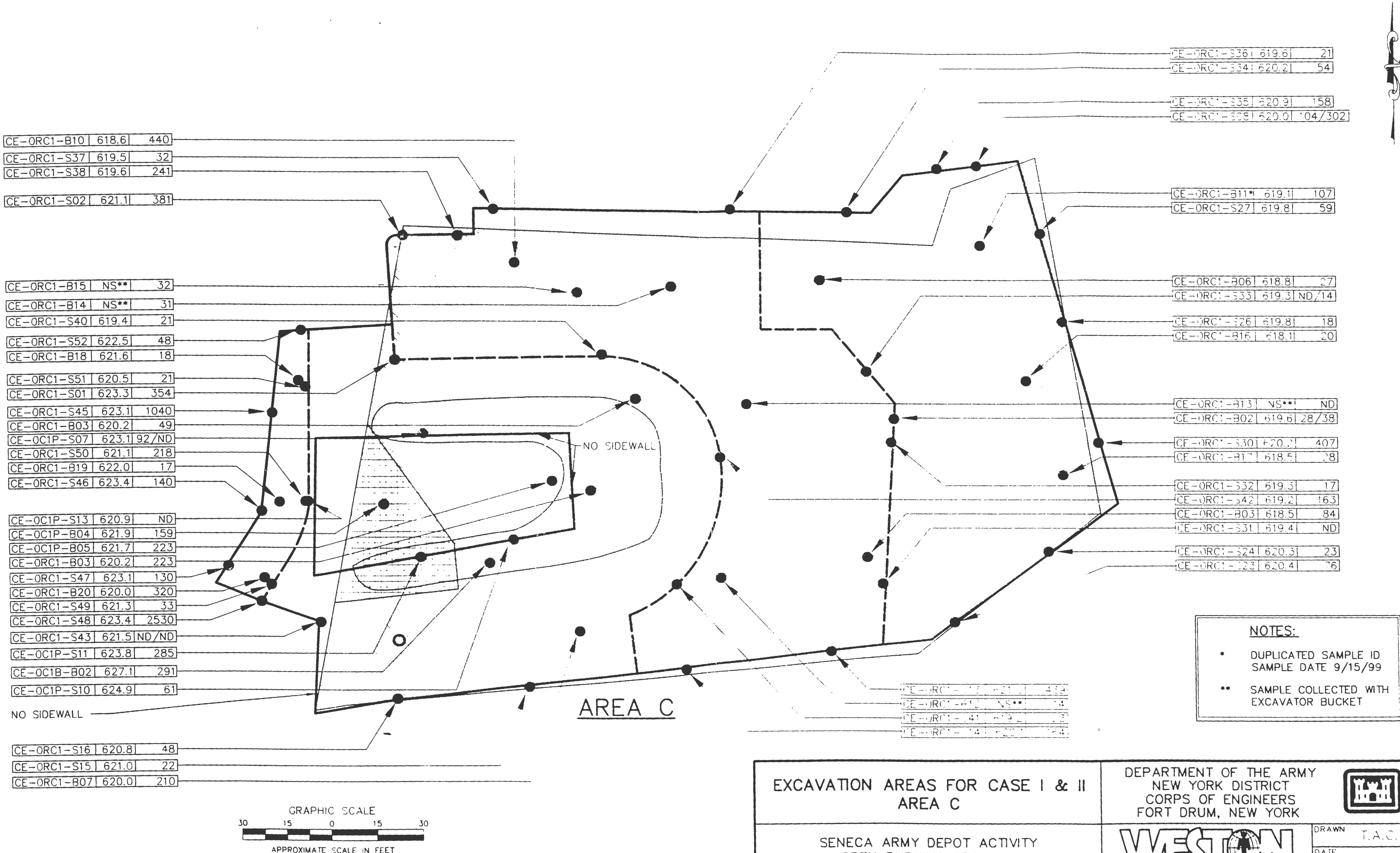


AREA B

GRAPHIC SCALE
30 15 0 15 30
APPROXIMATE SCALE IN FEET

EXCAVATION AREAS FOR CASE I & II AREA B	DEPARTMENT OF THE ARMY NEW YORK DISTRICT CORPS OF ENGINEERS FORT DRUM, NEW YORK	
SENECA ARMY DEPOT ACTIVITY OPEN BURNING GROUNDS ROMULUS, NEW YORK	WESTON MANAGERS DESIGNERS/CONSULTANTS MANCHESTER NEW HAMPSHIRE	DRAWN T.A.C. DATE JAN. 2000 FIGURE NO. ?

FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC. DWG (PLOT 1 = 1)



EXCAVATION AREAS FOR CASE I & II
AREA C

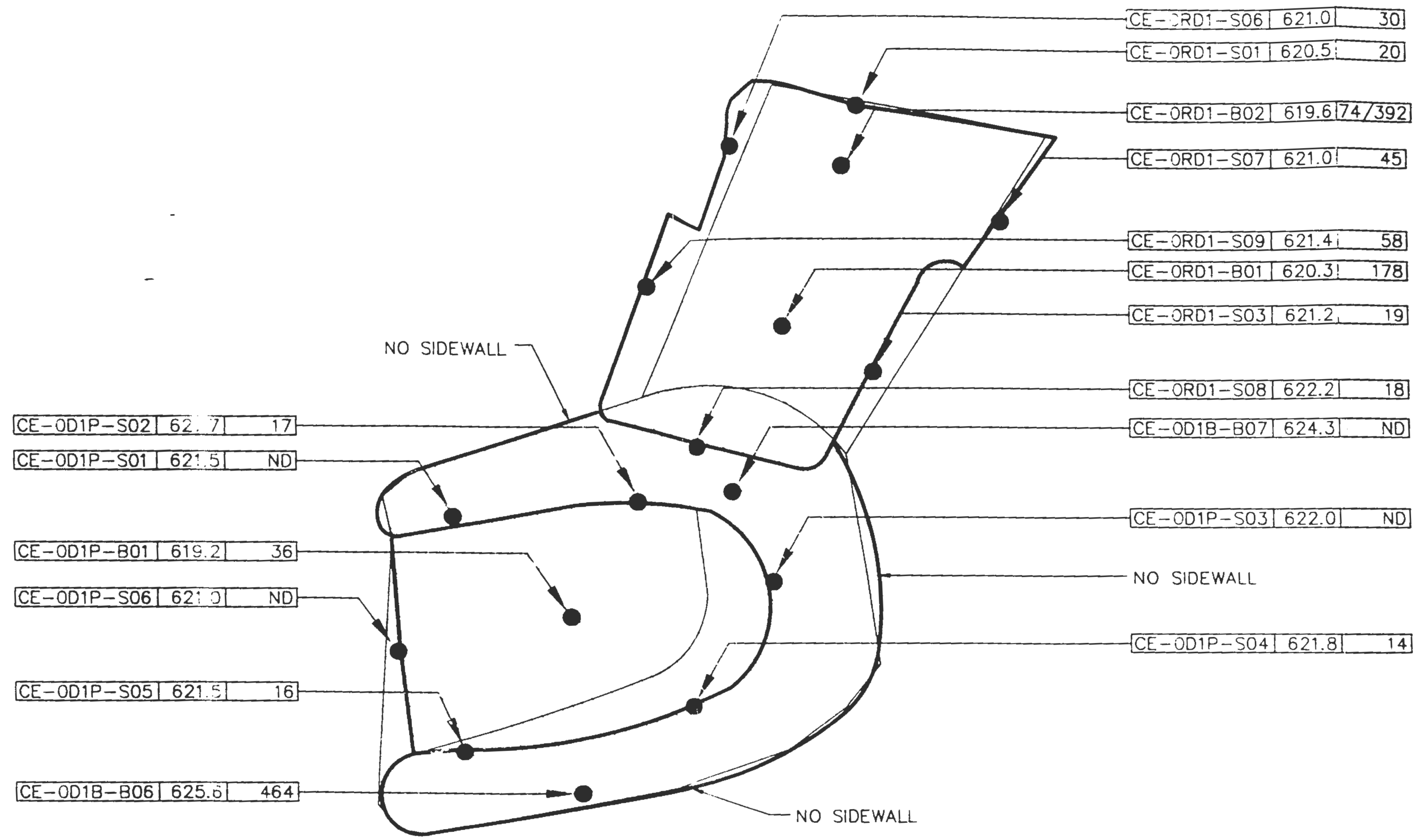
SENECA ARMY DEPOT ACTIVITY
OPEN BURNING GROUNDS
ROMULUS, NEW YORK

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT
CORPS OF ENGINEERS
FORT DRUM, NEW YORK

WESTON
MANAGERS DESIGNERS CONSULTANTS
MANCHESTER NEW HAMPSHIRE

DRAWN T.A.C.
DATE JAN. 2000
FIGURE NO.

FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC.DWG (PLOT 1 = 1)



AREA D

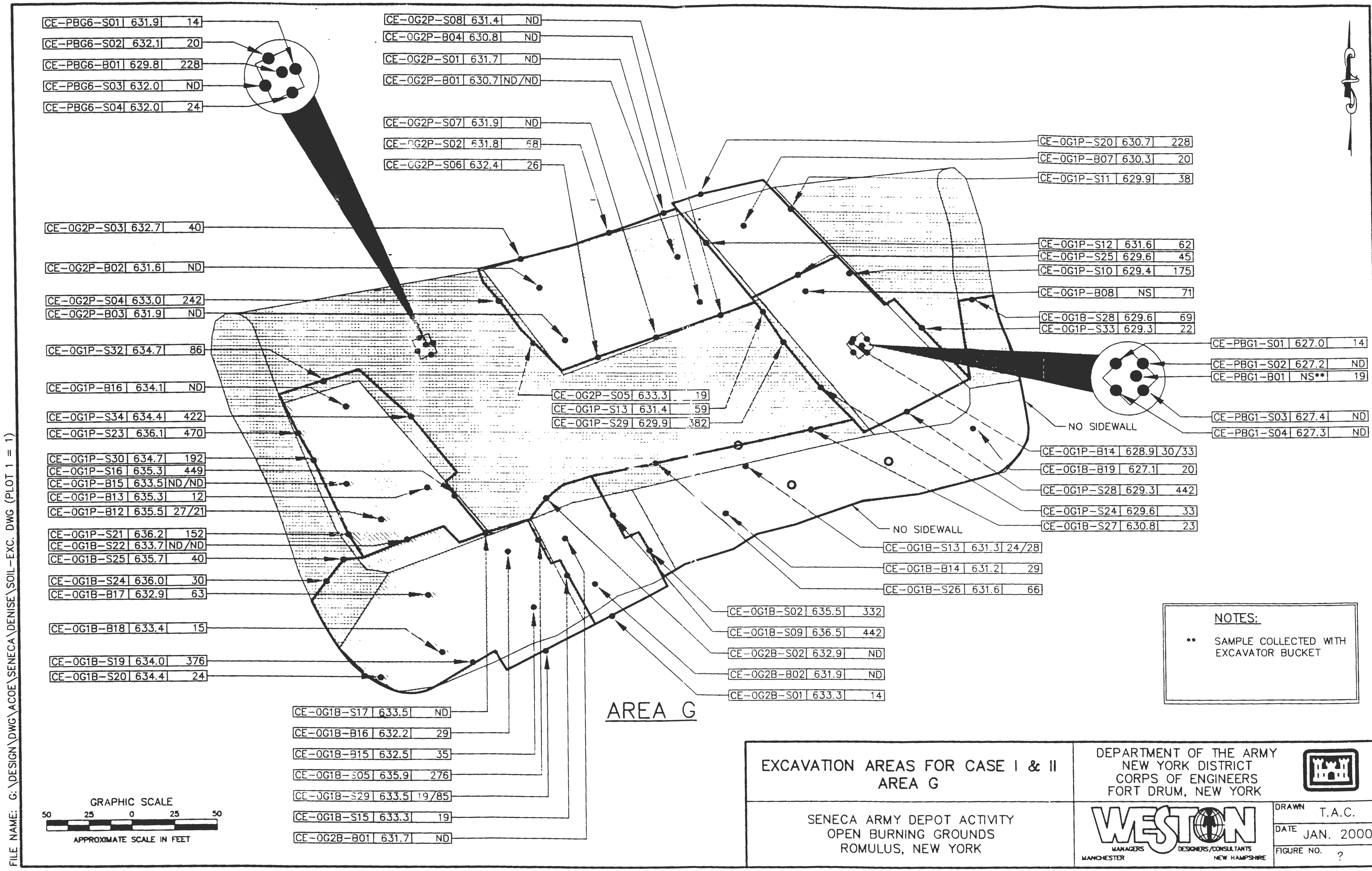
GRAPHIC SCALE

30 15 0 15 30

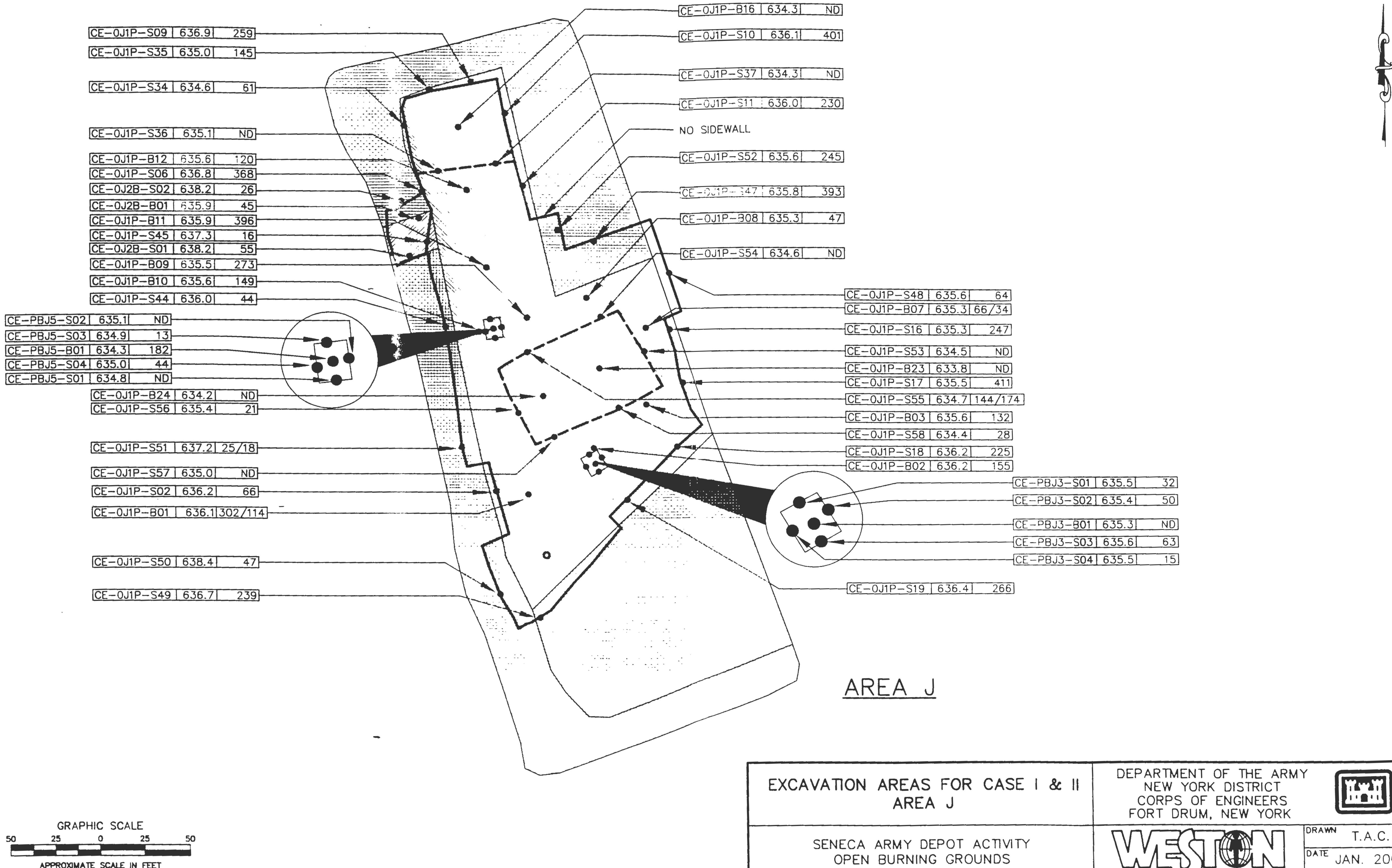
APPROXIMATE SCALE IN FEET

EXCAVATION AREAS FOR CASE I & II	DEPARTMENT OF THE ARMY NEW YORK DISTRICT CORPS OF ENGINEERS FORT DRUM, NEW YORK
SENECA ARMY DEPOT ACTIVITY OPEN BURNING GROUNDS ROMULUS, NEW YORK	WESTON — MANAGERS DESIGNERS/CONSULTANTS — MANCHESTER NEW HAMPSHIRE DRAWN T.A.C. DATE JAN. 2000 FIGURE NO. 2

FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC. DWG (PLOT 1 = 1)



CE-PBG6-S01 631.9 14
CE-PBG6-S02 632.1 20
CE-PBG6-B01 629.8 228
CE-PBG6-S03 632.0 ND
CE-PBG6-S04 632.0 24
CE-0G2P-S08 631.4 ND
CE-0G2P-B04 630.8 ND
CE-0G2P-S01 631.7 ND
CE-0G2P-B01 630.7 ND/ND
CE-0G2P-S07 631.9 ND
CE-0G2P-S02 631.8 68
CE-0G2P-S06 632.4 26
CE-0G1P-S20 630.7 228
CE-0G1P-B07 630.3 20
CE-0G1P-S11 629.9 38
CE-0G2P-S03 632.7 40
CE-0G2P-B02 631.6 ND
CE-0G2P-S04 633.0 242
CE-0G2P-B03 631.9 ND
CE-0G1P-S12 631.6 62
CE-0G1P-S25 629.6 45
CE-0G1P-S10 629.4 175
CE-0G1P-B08 NS 71
CE-0G1B-S28 629.6 69
CE-0G1P-S33 629.3 22
CE-0G1P-S32 634.7 86
CE-PBG1-S01 627.0 14
CE-PBG1-S02 627.2 ND
CE-PBG1-B01 NS** 19
CE-0G1P-B16 634.1 ND
CE-0G2P-S05 633.3 19
CE-0G1P-S13 631.4 59
CE-0G1P-S29 629.9 382
CE-0G1P-S34 634.4 422
CE-0G1P-S23 636.1 470
CE-PBG1-S03 627.4 ND
CE-PBG1-S04 627.3 ND
NO SIDEWALL
CE-0G1P-B14 628.9 30/33
CE-0G1P-S30 634.7 192
CE-0G1P-S16 635.3 449
CE-0G1P-B15 633.5 ND/ND
CE-0G1P-B13 635.3 12
CE-0G1P-B12 635.5 27/21
CE-0G1B-B19 627.1 20
CE-0G1P-S28 629.3 442
CE-0G1P-S24 629.6 33
CE-0G1B-S27 630.8 23
NO SIDEWALL
CE-0G1P-S21 636.2 152
CE-0G1B-S22 633.7 ND/ND
CE-0G1B-S25 635.7 40
CE-0G1B-S13 631.3 24/28
CE-0G1B-B14 631.2 29
CE-0G1B-S26 631.6 66
CE-0G1B-S24 636.0 30
CE-0G1B-B17 632.9 63
CE-0G1B-S02 635.5 332
CE-0G1B-S09 636.5 442
CE-0G2B-S02 632.9 ND
CE-0G2B-B02 631.9 ND
CE-0G2B-S01 633.3 14
CE-0G1B-B18 633.4 15
CE-0G1B-S19 634.0 376
CE-0G1B-S20 634.4 24
NOTES:
** SAMPLE COLLECTED WITH EXCAVATOR BUCKET
AREA G
CE-0G1B-S17 633.5 ND
CE-0G1B-B16 632.2 29
CE-0G1B-B15 632.5 35
CE-0G1B-S05 635.9 276
CE-0G1B-S29 633.5 19/85
CE-0G1B-S15 633.3 19
CE-0G2B-B01 631.7 ND
GRAPHIC SCALE
50 25 0 25 50
APPROXIMATE SCALE IN FEET
FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC. DWG (PLOT 1 = 1)
EXCAVATION AREAS FOR CASE I & II
AREA G
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT
CORPS OF ENGINEERS
FORT DRUM, NEW YORK
SENECA ARMY DEPOT ACTIVITY
OPEN BURNING GROUNDS
ROMULUS, NEW YORK
WESTON
MANAGERS DESIGNERS/CONSULTANTS
MANCHESTER NEW HAMPSHIRE
DRAWN T.A.C.
DATE JAN. 2000
FIGURE NO. ?



EXCAVATION AREAS FOR CASE I & II
AREA J

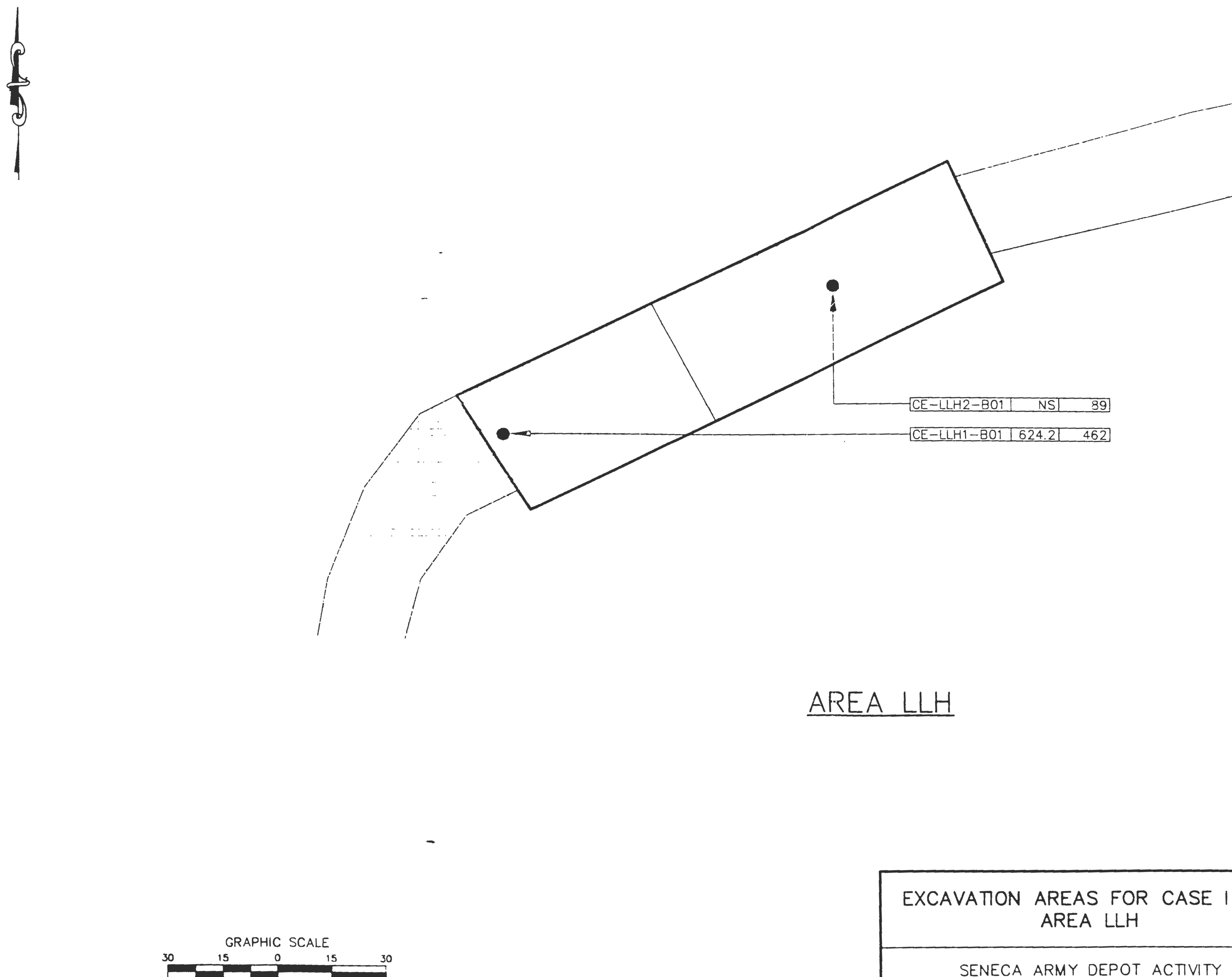
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT
CORPS OF ENGINEERS
FORT DRUM, NEW YORK

SENECA ARMY DEPOT ACTIVITY
OPEN BURNING GROUNDS
ROMULUS, NEW YORK

WESTON
MANAGERS DESIGNERS/CONSULTANTS
MANCHESTER NEW HAMPSHIRE

DRAWN T.A.C.
DATE JAN. 2000
FIGURE NO. ?

FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC. DWG (PLOT 1 = 1)



NOTES:

NO SIDEWALLS FOR CASE 1 AND CASE 2 EXCAVATIONS

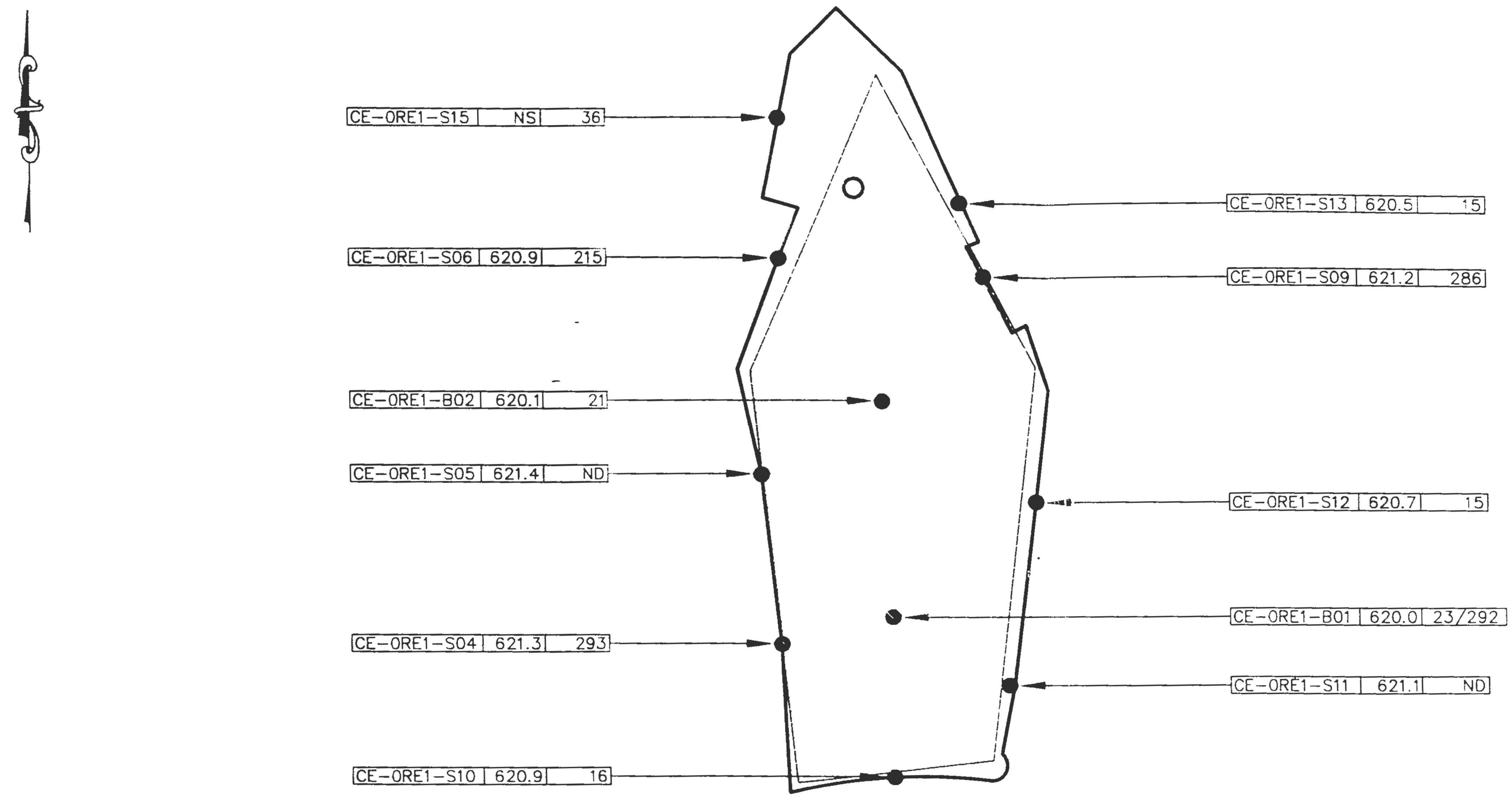
EXCAVATION AREAS FOR CASE I & II AREA LLH	DEPARTMENT OF THE ARMY NEW YORK DISTRICT CORPS OF ENGINEERS FORT DRUM, NEW YORK
SENECA ARMY DEPOT ACTIVITY OPEN BURNING GROUNDS ROMULUS, NEW YORK	WESTON MANAGERS DESIGNERS/CONSULTANTS MANCHESTER NEW HAMPSHIRE

DRAWN T.A.C.

DATE JAN. 2000

FIGURE NO. 2

FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC. DWG (PLOT 1 = 1)



AREA SW-220

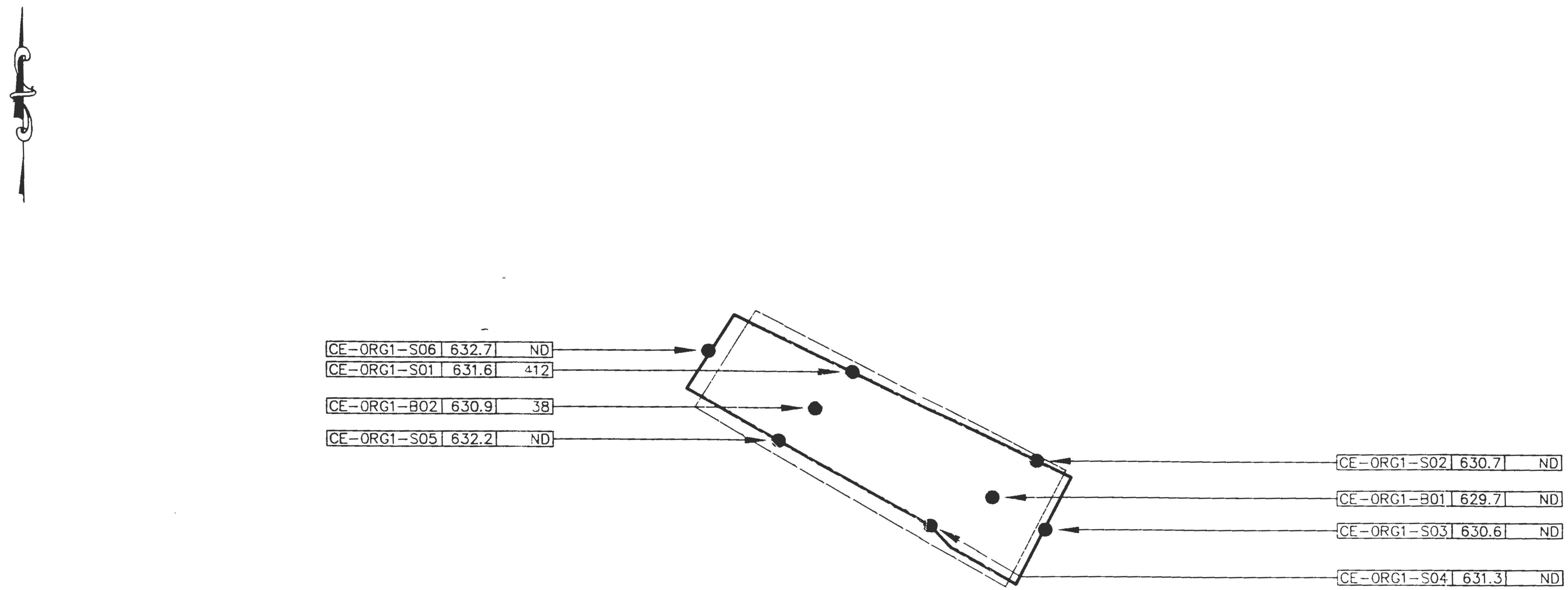
GRAPHIC SCALE

30 15 0 15 30

APPROXIMATE SCALE IN FEET

EXCAVATION AREAS FOR CASE I & II AREA SW-220	DEPARTMENT OF THE ARMY NEW YORK DISTRICT CORPS OF ENGINEERS FORT DRUM, NEW YORK	
SENECA ARMY DEPOT ACTIVITY OPEN BURNING GROUNDS ROMULUS, NEW YORK	WESTON MANAGERS DESIGNERS/CONSULTANTS MANCHESTER NEW HAMPSHIRE	DRAWN T.A.C. DATE JAN. 2000 FIGURE NO. ?

FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC. DWG (PLOT 1 = 1)



AREA GB-19/34

GRAPHIC SCALE

30 15 0 15 30

APPROXIMATE SCALE IN FEET

EXCAVATION AREAS FOR CASE I & II AREA GB-19/34	DEPARTMENT OF THE ARMY NEW YORK DISTRICT CORPS OF ENGINEERS FORT DRUM, NEW YORK	
SENECA ARMY DEPOT ACTIVITY OPEN BURNING GROUNDS ROMULUS, NEW YORK	WESTON MANAGERS DESIGNERS/CONSULTANTS MANCHESTER NEW HAMPSHIRE	DRAWN T.A.C. DATE JAN. 2000 FIGURE NO. ?

FILE NAME: G:\DESIGN\DWG\ACOE\SENECA\DENISE\SOIL-EXC. DWG (PLOT 1 = 1)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

Laura File

APR - 7 2000

EXPRESS MAIL

Stephen M. Absolom
BRAC Environmental Coordinator
Directorate of Engineering and Housing
Seneca Army Depot Activity (SEDA)
Romulus, New York 14541-5001

Re: *Draft Final Low Temperature Thermal Desorption (LTTD) Demonstration Study Workplan Seneca Army Depot, Romulus, New York*

Dear Steve:

This is in reference to the above subject document dated February 2000. EPA reviewed the subject document together with the Draft Workplan dated July 1999, and offer the following comments for your consideration.

General Comments:
The Work Plan details a plan for using an apparently effective incinerator. The unit being discussed (1) is direct fired and (2) has an afterburner. These two issues make this a unit that must meet the regulatory requirements of 40 CFR Part 264 Subpart O incinerator regulations. If a thermal desorber (TD) is desired to meet the regulatory requirements in Subpart X, some equipment modification is required. The primary-chamber burner needs to be backed out of the chamber until it is determined that the flame is "indirect." And the afterburner needs to be converted to a collector/condenser unit. All affected systems will also need to be reviewed for this new configuration.

More detailed schematics are needed to show the solid, liquid, and gas streams so the design can be fully evaluated. Just one example is the baghouse bypass valve. I can not find it on a drawing, so I don't know where the valve is, and consequently, I don't know where the gas stream goes when the valve is activated.

Specific Comments:

1) For Bullet 4 on page 1-3, "excess fugitive emissions" needs to be quantified.

2) Are the "sonic horns" used in the High Temperature (HT) gas cooler and the Low Temperature (LT) gas cooler likely to be hearing hazards? If so, this needs to be taken into account in operations design and the health and safety plan.

3) The gas-cooling equipment includes the HT gas cooler, the LT gas cooler, the cyclone, and the baghouse. If chlorine will be present in any of the wastes or contaminated soil to be processed, the potential formation of dioxins must be considered. The gas-cooling equipment as configured may not cool quickly enough to prevent/minimize the *de novo* formation of dioxin. A fast-cooling quench is generally effective in that effort. The temperatures of the gas-cooling units also need to be controlled carefully to avoid the *de novo* dioxin-formation temperature range – 180 to 400°C – for the particulate that is captured in the gas coolers, the cyclones, and the baghouse. The baghouse upset temperature is 600° F, right in the dioxin *de novo*-formation range. The residues from the gas coolers, the cyclones, and the baghouse need to be checked for contamination.

Similar design considerations need to be given to metals as contaminants of concern and as co-contaminants. The work plan needs to address how metals (e.g., lead, mercury, cadmium) will be managed in the gas stream and in solid residues. Design and testing should focus on the worst case feed material and should account for the additional gas stream concern if the material contains both metals and chlorinated compounds.

4) Where does the gas stream go when the baghouse bypass valve is activated? (2.1.7) It is important to capture the gas stream if the valve is activated for a high-temperature condition during a processing run.

5) The temperature *range* for the ID fan should be provided in the work plan, not just the nominal 300° F. (2.1.8)

6) When the automatic waste feed shut off (AWFSO) system is activated, the feed stops and the conveyer continues operation. The work plan also needs to indicate what happens to the ID fan during automatic shut off. Tables 2-2 and 2-3 are not fully consistent or complete. For example, there is a "low alarm" on the HT Gas Cooler (table 2-2), but no low value at which it activates the AWFSO (table 2-3). The soil exit temperature is a better indicator of the target kiln temperature and should be considered an AWFSO item rather than the "Kiln Temperature." Other AWFSO parameters that should be considered for addition to the list are: Soil Feed Rate, Baghouse Temperature, and Stack Gas O_2 Concentration. Time dependencies are given for two operating conditions that activate the AWFSO. Table 2-3 should indicate that the other activating conditions are instantaneous, or list the time dependencies.

7) Is the test soil representative of the soil that is to be remediated? Trial Burns or Proof of Performance Tests are generally conducted on worst-case scenarios, i.e., the most contaminated material with the most difficult-to-remediate compounds and the most interferences (volatile metals, chlorine-containing compounds, etc.). The trial burn or proof-of-performance tests are generally used to set upper limits on feed material parameters. If potentially worse materials are considered for processing later, additional testing is often required.

8) The sampling locations for feed soil and kiln residues need to be identified. (5 and 5.4.1)

9) If this unit remains an incinerator, the Trial-Burn requirements will need to address the attendant requirements. One of which requirements is demonstration of the Destruction and Removal Efficiencies (DREs) for the contaminants of concern. Stack-gas sampling, such as using EPA SW-846 Methods 0010 and 0030 (semivolatiles and volatiles, respectively) and possibly Method 0023 for dioxins/furans, will need to be added to the test protocol. Analysis for stack-gas concentrations of critical contaminants is usually performed for thermal desorbers also. Determination of stack gas emissions would likely be a State or EPA requirement.

10) A project specific Health and Safety Plan needs to be developed. See comment number two above.

A facsimile of this letter will be sent to you today. If you have any questions, please call me at (212) 637-4323.

Sincerely yours,

Julio F. Vazquez

Julio F. Vazquez, RPM
Federal Facilities Section

cc: S. Spaszko, NYSDEC
D. Geraghty, NYSDOH
R. Scott, NYSDEC-Avon
T. Enroth, USACE-NY
K. Healy, USACE-HD
M. Duchesneau, Parsons ES

PARSONS ENGINEERING SCIENCE, INC.

30 Dan Road • Canton, Massachusetts 02021-2809 • (781) 401-3200 • Fax: (781) 401-2575

April 13, 2000
7736677-01000

Mr. Julio Vazquez, Project Manager
U.S. Environmental Protection Agency, Region II
Emergency & Remedial Response Division
290 Broadway, 18th Floor, E-3
New York, NY 1007-1866

Mr. Marsden Chen
Bureau of Eastern Remedial Action
Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation
50 Wolf Road, Room 208
Albany, NY 12233-7010

SUBJECT: **Management Plan for Investigation Derived Waste (IDW) from the SEAD-4 Remedial Investigation, Investigation of Environmental Baseline Survey , Ash Landfill Treatability Study, and the Ash Landfill Remedial Design Project**

Dear Mr. Vazquez and Mr. Chen,

As part of the close-out of the Remedial Investigation (RI) field activities conducted at SEAD-4 (December 1998 to July 1999), the Non-Evaluated Baseline Study (March 1998), and recent field activities at the Ash Landfill (December 1999 to January 2000), Parsons Engineering Science, Inc. (Parsons) is submitting the following plan for the management of Investigation Derived Wastes (IDW). This plan follows the criteria discussed and agreed upon at the Base Clean-up Team (BCT) Meeting conducted at Seneca Army Depot (SEDA) on March 21, 2000.
Attendees included:
Steve Absolom – SEDA Base Environmental Coordinator
Tom Grasek – SEDA
Michelle Brock – New England District COE
Janet Fallo – New York District COE
Thomas Enroth – New York District COE
Thomas Battaglia – New York District COE
Robert Scott - NYSDEC – Avon, Region 8
Marsden Chen – NYSDEC – Albany, Section Chief
Julio Vasquez – EPA Region 2
Steven Paszko – NYSDEC – Albany
Michael Duchesneau – Parsons ES

Minutes taken at the BCT Meeting by Michael Duchesneau documents the following general agreement: **"unless the soil is visually contaminated with separate phase liquids or other overt signs of contamination, there was (is) no reason to drum the soils or water."** This criteria has been adapted to determine disposal of drummed IDW generated prior to this meeting.

An exception to the IDW disposal criteria used in this plan is the rationale used to determine the disposal of:

- decontamination (decon) waters mixed with solvents and calibration waste,
- decon steam condensate
- decon pads
- Personnel Protective Equipment (PPE).

Specific rationale for the disposal of these items are included in this text.

All IDW generated during this program were placed in drums for storage at or near the source. Drum contents consist of the following items: soil cuttings from test borings and well installations, surface soils from well pad installation, ground water from monitoring well sampling operations, Personnel Protective Equipment (PPE), steam condensate, and decontamination and calibration fluids. Each drum was labeled as hazardous waste including appropriate identification numbers, start dates, and a description of contents. This information was logged in field books, activity worksheets, and recorded on a regular basis in a drum inventory logbook. Upon completion of field operations this inventory was checked to insure information on the drums was consistent with the inventory logbook. The data recorded in the logbook was used as the basis for **Table 3A (EBS), Table 3B (SEAD-4), and Table 3C (Ash)** presented in this IDW management plan.

The following describes and summarizes the proposed IDW disposal alternative for each type of IDW.

Ground Water & Soil Cuttings –
Laboratory (validated data summaries attached) and field data were reviewed to determine if contamination was high enough to present an additional threat if returned to the source area for disposal. Field data included field geologist boring log descriptions and organic vapor screening. If the review did not show a presence of overtly contaminated soil or water, the contents of the drum will be deposited on the ground in the vicinity of the source. Care will be taken to insure the drum contents will not enter drainage ditches or other means of transport from the area of the source. If field records or analytical data depicted the presence of overt contamination or disposal at the source could increase the area of influence, then the drum will be disposed of off-site as a hazardous waste.

Decontamination Fluids - Two types of decontamination fluids have been stored in drums at the site. The first type is water from the steam cleaning of equipment. Drums identified in the attached tables as steam condensate were classified as non-hazardous waste. These drums only contain the water collected from steam cleaning operations. Steam was used to clean drilling equipment prior to reuse at another location. Soil was removed from the drilling equipment using brushes and placed in soil drums at the boring location prior to steam cleaning, therefore, no soil would have been present on the drilling equipment prior to the steam cleaning process. These drums have been classified as non-hazardous and will be discharged to the ground in the immediate vicinity of the drum. The second type of decontamination fluid is the equipment decontamination fluids including principally rinse water with small amounts of other decontamination fluids including methanol and/or isopropanol and nitric acid. Water quality instrumentation calibration solution waste is also included in this waste stream. These solutions include ionic salts, buffers, and quinhydrone. These drums were classified as hazardous waste and will be disposed of off-site as hazardous waste.

Personnel Protection Equipment - All the disposable personnel protection equipment, (i.e. poly aprons, tyvek, and latex or nitrile gloves) have minimal contact to contaminated materials, were classified as non-hazardous and will be bagged and disposed of at the local municipal landfill.

Decon Pad Materials - Plastic Sheeting from the steam cleaning decontamination process are cleaned prior to disassembly and will be bagged and disposed of at the local municipal landfill.

All hazardous wastes will be transported and disposed of in a licensed, commercial, hazardous waste TSD facility, operating in full compliance with regulatory agencies. These arrangements will be by SEDA.

In summary, Parsons believes that the management plan is conservative, reasonable and in full compliance with the established criteria. If you have any questions regarding the classification of any drum, please do not hesitate to call me at (401) 781-2492. If necessary, I can arrange a phone conference call to discuss the issue at your convenience.

Sincerely,
PARSONS ENGINEERING SCIENCE, INC.

Michael Duchesneau, P.E.
Project Manager

cc: Mr. Kevin Healy, USACOE
Mr. Stephen Absolom, SEDA
Mr. Randall Battaglia, CENAN
Ms. Dorothy Richards, USACOE
Mr. Keith Hoddinott, CHPPM (Prov.)
Mr. Harry Kliesier, USAEC
Mr. Don Williams, CEMRD

EBS IDW Plan: Table 3A

Attachments (Data Tables)

Table 3A
Non-Evaluated Baseline Study
Drum Inventory/Disposal Rational
Seneca Army Depot Activity

Drum Number	Drum Location	MATRIX				Source/Start Date i.e.(MW, Boring, Decon. water, Condensate[1], PPE)	RCRA Hazardous/ Non-Hazardous	Contaminated/ Noncontaminated	*Chemical Of Concern (Exceeding TAGM Levels)	Rationale	Disposal Option (Offsite Hazardous) (Offsite Non-Hazardous) (Onsite)
		Soil	Water	PPE	Other						
EBS-1W	Near Building 340		X			Decon Water (Steam Condensate)	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
EBS2-2W	Near Building 340		X			Decon Water (Steam Condensate) 3/4/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
EBS2-3W	Near Building 340		X			Decon Water (Steam Condensate) 3/8/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
EBS2-4	Near Building 340				X	Sheet Plastic Decon Pad 3/18/1998	RCRA Non-Hazardous	Noncontaminated	None	Soils were cleaned from plastic sheeting prior to disassembly of decon pad Minimum Soil-No Threat	Onsite Non-Hazardous
EBS3-1W	Near Building 340		X			Decon Water (Steam Condensate) 3/9/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
EBS3-2W	Near Building 340		X			Decon Water (Steam Condensate)	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
EBS3-3	Near Building 340				X	Sheet Plastic Decon Pad 3/18/1998	RCRA Non-Hazardous	Noncontaminated	None	Soils were cleaned from plastic sheeting prior to disassembly of decon pad Minimum Soil-No Threat	Onsite Non-Hazardous
EBS3-4	Near Building 340				X	Sheet Plastic Decon Pad at 122D/E 3/18/1998	RCRA Non-Hazardous	Noncontaminated	None	Soils were cleaned from plastic sheeting prior to disassembly of decon pad Minimum Soil-No Threat	Onsite Non-Hazardous
121-1S	Near Building 340	X				Drill Cuttings Soil Boring 121B-1 3/7/1998	RCRA Non-Hazardous	Contaminated	SVOC's	<10x TAGM Limits	Onsite Non-Hazardous
121-2S	Near Building 340	X				Drill Cuttings Soil Borings at 121C-1,2,3,&4 3/9/1998	**RCRA Hazardous**	**Contaminated**	SVOC's Metals: Sb,Ba,Cd,Cr,Cu,Pb, Ni,&Zn	>20x RCRA Limits Lead (52.8x) >10x TAGM Limits Zinc	**Offsite Hazardous** Location is a Parking Lot
121-4S	Near Building 340	X				PVC Pipe From Temp. Wells MW121C-1 & 2	RCRA Non-Hazardous	Noncontaminated	None	Minimum Soil-No Threat	Onsite Non-Hazardous
121C-4S	Near Building 340	X				Drill Cuttings Soil Borings at 121C-1,2,3,&4 3/9/1998	**RCRA Hazardous**	**Contaminated**	SVOC's Metals: Sb,Ba,Cd,Cr,Cu,Pb, Ni,&Zn	>20x RCRA Limits Lead (52.8x) >10x TAGM Limits Zinc	**Offsite Hazardous** Location is a Parking Lot
122D-1S	Near Building 340	X				Drill Cuttings Soil Borings122D-1 &2 3/5/1998	RCRA Non-Hazardous	Contaminated	None	<TAGM Limits	Onsite Non-Hazardous
120E-1S	Near Building 340	X				Drill Cuttings Soil Borings at 120E-1 3/17/1998	RCRA Non-Hazardous	Noncontaminated	None	<TAGM Limits	Onsite Non-Hazardous

Table 3A
Non-Evaluated Baseline Study
Drum Inventory/Disposal Rational
Seneca Army Depot Activity

Drum Number	Drum Location	MATRIX				Source/Start Date i.e.(MW, Boring, Decon. water, Condensate¹, PPE)	RCRA Hazardous/ Non-Hazardous	Contaminated/ Noncontaminated	*Chemical Of Concern (Exceeding TAGM Levels)	Rationale	Disposal Option (Offsite Hazardous) (Offsite Non-Hazardous) (Onsite)
		Soil	Water	PPE	Other						
123B-1S	Near Building 340	X				Drill Cuttings Soil Borings 123B-1,2,&3 3/11/1998	RCRA Non-Hazardous	Noncontaminated	None	<TAGM Limits	Onsite Non-Hazardous
120D-1S	Near Building 340	X				Drill Cuttings Soil borings 120D-1 3/17/1998	RCRA Non-Hazardous	Contaminated	SVOC's	<10x TAGM Limits	Onsite Non-Hazardous No threat of contamination migration
122E-1S	Near Building 340	X				Drill Cuttings Soil Borings 122E-1,2&3 3/6/1998	RCRA Non-Hazardous	Contaminated	SVOC's	>10x TAGM	Onsite Non-Hazardous
122E-1W	Near Building 340		X			Well Dev/Purge Groundwater MW122E -1 3/5/1998	RCRA Non-Hazardous	Noncontaminated	None	<GA Limits	Onsite Non-Hazardous
122E-2W	Near Building 340		X			Well Dev/Purge Groundwater MW122E -2 3/8/1998	RCRA Non-Hazardous	Noncontaminated	SVOC: Hexachlorobutadiene 2.0 times DW Std.	<GA Limits	Onsite Non-Hazardous
122E-3W	Near Building 340		X			Well Dev/Purge Groundwater MW122E -3 3/8/1998	RCRA Non-Hazardous	Noncontaminated	None	<GA Limits	Onsite Non-Hazardous

Attachment EBS-121B
SEAD 121B Soil Analysis Summary - Detects Only
IDW Plan - Non-Evaluated Baseline Study
Seneca Army Depot

SITE:				SEAD-121B		SEAD-121B	
				Bldg. 325		Bldg. 325	
DESCRIPTION:				PCB Oil Spill		PCB Oil Spill	
LOC ID:				SB121B-1		SB121B-1	
DRUM #				**121-1S**		**121-1S**	
SAMP_ID:				EB212		EB213	
QC CODE:				SA		SA	
SAMP. DETH TOP:				0		4	
SAMP. DEPTH BOT:				0.2		4.5	
MATRIX:				SOIL		SOIL	
SAMP. DATE:				7-Mar-98		7-Mar-98	
PARAMETER	UNIT	NY TAGM	PRG-IND	VALUE	Q	VALUE	Q
Toluene	UG/KG	1500	105120000	6	J	7	J
Acenaphthene	UG/KG	50000		59	J	120	J
Anthracene	UG/KG	50000	157680000	83	J	160	J
Benzo[a]anthracene	UG/KG	224	7840	390		420	
Benzo[a]pyrene	UG/KG	61	784	390		390	
Benzo[b]fluoranthene	UG/KG	1100	7840	460		410	
Benzo[ghi]perylene	UG/KG	50000		260		230	
Benzo[k]fluoranthene	UG/KG	1100	78400	410		440	
Carbazole	UG/KG		286160	130	J	200	J
Chrysene	UG/KG	400	784000	450		450	
Dibenz[a,h]anthracene	UG/KG	14	784	110	J	78	J
Dibenzofuran	UG/KG	6200	2102400	16	J	42	J
Diethyl phthalate	UG/KG	7100	420480000	12	J	220	U
Fluoranthene	UG/KG	50000	21024000	1100		1200	
Fluorene	UG/KG	50000	21024000	44	J	88	J
Indeno[1,2,3-cd]pyrene	UG/KG	3200	7840	240		210	J
Phenanthrene	UG/KG	50000		620		940	
Pyrene	UG/KG	50000	15768000	940		1100	

Attachment EBS-121C
S121C - Soil Boring Data Summary - Detects Only
IDW Plan - Non-Evaluated Baseline Study
Seneca Army Depot

SITE:			SEAD-121C		SEAD-121C		SEAD-121C		SEAD-121C		SEAD-121C	
DESCRIPTION:			DRMO Yard		DRMO Yard		DRMO Yard		DRMO Yard		DRMO Yard	
LOC ID:			SB121C-2		SB121C-1		SB121C-1		SB121C-2		SB121C-2	
DRUM #			121-2 & 4S		121-2 & 4S		121-2 & 4S		121-2 & 4S		121-2 & 4S	
SAMP_ID:			EB228		EB231		EB232		EB014		EB228	
QC CODE:			SA		SA		SA		DU		SA	
SAMP. DETH TOP:			0		0		2.5		0		2	
SAMP. DEPTH BOT:			0.2		0.2		3		0.2		2.5	
MATRIX:			SOIL		SOIL		SOIL		SOIL		SOIL	
SAMP. DATE:			9-Mar-98		9-Mar-98		9-Mar-98		9-Mar-98		9-Mar-98	
PARAMETER	UNIT	NYSDEC TAGM	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Volatiles												
Acetone	UG/KG	200	12	U	12	U	14		12	J	11	U
Chloroform	UG/KG	300	12	U	12	U	12	U	12	U	4	J
Toluene	UG/KG	1500	3	J	2	J	7	J	5	J	5	J
Semivolatiles												
2,4-Dinitrotoluene	UG/KG		45	J	78	U	77	U	73	U	75	U
2-Methylnaphthalene	UG/KG	36400	8.8	J	78	U	77	U	4.3	J	7	J
Acenaphthene	UG/KG	50000	32	J	78	U	77	U	8.8	J	20	J
Anthracene	UG/KG	50000	52	J	78	U	77	U	15	J	41	J
Benzo[a]anthracene	UG/KG	224	180		78	U	4.6	J	76		140	
Benzo[a]pyrene	UG/KG	61	[redacted]		78	U	6.3	J	57	J	[redacted]	
Benzo[b]fluorenthene	UG/KG	1100	200		78	U	6.8	J	95		110	
Benzo[ghi]perylene	UG/KG	50000	98		78	U	12	J	42	J	65	J
Benzo[k]fluoranthene	UG/KG	1100	150		78	U	5.7	J	67	J	120	
Bis(2-Ethylhexyl)phthalate	UG/KG	50000	8.6	JB	13	J	10	J	15	JB	21	J
Butylbenzylphthalate	UG/KG	50000	73	U	78	U	77	U	73	U	6.4	J
Carbazole	UG/KG		73	J	78	U	77	U	17	J	56	J
Chrysene	UG/KG	400	210		78	U	5.5	J	90		160	
Di-n-butylphthalate	UG/KG	8100	27	JB	78	U	77	U	10	JB	19	J
Di-n-octylphthalate	UG/KG	50000	73	U	9.9	J	9.8	J	73	U	17	J
Dibenz[a,h]anthracene	UG/KG	14	[redacted]	J	78	U	9.7	J	[redacted]	J	[redacted]	J
Dibenzofuran	UG/KG	6200	19	J	78	U	77	U	5.1	J	13	J
Diethyl phthalate	UG/KG	7100	7.2	JB	5.8	JB	8.9	JB	11	JB	6.8	JB
Fluoranthene	UG/KG	50000	520		78	U	4.8	J	180		390	
Fluorene	UG/KG	50000	32	J	78	U	77	U	8	J	22	J
Hexachlorobenzene	UG/KG	410	8.5	J	78	U	77	U	73	U	75	U
Indeno[1,2,3-cd]pyrene	UG/KG	3200	94		78	U	8.6	J	41	J	58	J
N-Nitrosodiphenylamine	UG/KG		4.8	J	78	U	77	U	73	U	75	U
Naphthalene	UG/KG	13000	11	J	78	U	77	U	73	U	12	J
Phenanthrene	UG/KG	50000	360		78	U	77	U	96		280	
Pyrene	UG/KG	50000	380		78	U	4.7	J	170		290	
TPH	MG/KG		23.4		16.7	U	90.4		28.3		18.5	
Pesticides/PCBs												
4,4`-DDD	UG/KG	2900	3.7	U	3.9	U	3.8	U	3.7	U	3.8	U
4,4`-DDE	UG/KG	2100	13		3.9	U	3.8	U	29		13	
4,4`-DDT	UG/KG	2100	18		3.9	U	3.8	U	35		9.8	
Alpha-BHC	UG/KG	110	1.8	U	2	U	2	U	1.5	JP	1.9	U
Alpha-Chlordane	UG/KG		1.8	U	2	U	2	U	1.8	U	1.9	U
Aroclor-1242	UG/KG		37	U	39	U	38	U	37	U	38	U
Aroclor-1254	UG/KG	10000	37	U	39	U	38	U	37	U	38	U
Aroclor-1260	UG/KG	10000	37	U	39	U	38	U	30	JP	200	
Delta-BHC	UG/KG	300	1.8	U	2	U	2	U	0.95	JP	1.3	JP
Endrin ketone	UG/KG		3.7	U	3.9	U	3.8	U	3.7	U	3.8	U
Gamma-Chlordane	UG/KG	540	1.8	U	2	U	2	U	1.8	U	1.9	U
Heptachlor	UG/KG	100	1.8	U	2	U	2	U	1.8	U	1.9	U
Heptachlor epoxide	UG/KG	20	1.8	U	2	U	2	U	1.8	U	1.1	JP
Metals												
Aluminum	MG/KG	19520	15100		12800		13400		14500		16200	
Antimony	MG/KG	6	[redacted]	N	1.1	BN	1.4	BN	19.3	N	11.5	BN
Arsenic	MG/KG	8.9	6.5		5.5		4.4		6.1		8.1	
Barium	MG/KG	300	[redacted]		64.9		64.2		1500		1050	
Beryllium	MG/KG	1.13	0.47	B	0.52	B	0.72	B	0.4	B	0.43	B
Cadmium	MG/KG	2.46	2.3	*	0.07	U	0.07	U	2.7	*	3.1	
Calcium	MG/KG	125300	23400		2580	*	2280	*	31300		31600	*
Chromium	MG/KG	30	[illegible]	*	20.9		21		32.9	*	37	
Cobalt	MG/KG	30	15.7		12.8		9.4	B	16.5		16	
Copper	MG/KG	33	[illegible]	*	19.7	N*	18.7	N*	7690	*	[illegible]	N*
Iron	MG/KG	37410	[illegible]		25700		23800		41100		54100	
Lead	MG/KG	24.4	[illegible]		11.8		14.1		5280		[illegible]	
Magnesium	MG/KG	21700	6810	*	4590		4040		6820	*	6480	
Manganese	MG/KG	1100	525		598		299		612		752	
Mercury	MG/KG	0.1	0.07	B	0.06	U	0.05	B	0.05	U	0.07	B
Nickel	MG/KG	50	[redacted]	E*	40.5		35.8		[redacted]	E*	[redacted]	
Potassium	MG/KG	2623	1990		1600		1870		1840		1220	
Silver	MG/KG	0.8	0.46	U	0.46	U	0.48	U	0.41	U	0.43	U
Sodium	MG/KG	188	[redacted]	B	139	U	138	U	[redacted]	B	[redacted]	B
Vanadium	MG/KG	150	20.9	E	20.8		21.8		19.5	E	19.3	
Zinc	MG/KG	115	[redacted]		80.3	N	70.5	N	[redacted]		[redacted]	N

Attachment EBS-121C
S121C - Soil Boring Data Summary - Detects Only
IDW Plan - Non-Evaluated Baseline Study
Seneca Army Depot

SITE:			SEAD-121C		SEAD-121C		SEAD-121C		SEAD-121C		SEAD-121C	
DESCRIPTION:			DRMO Yard		DRMO Yard		DRMO Yard		DRMO Yard		DRMO Yard	
LOC ID:			SB121C-3		SB121C-3		SB121C-4		SB121C-4		SB121C-4	
DRUM #			121-2 & 4S		121-2 & 4S		121-2 & 4S		121-2 & 4S		121-2 & 4S	
SAMP_ID:			EB233		EB234		EB020		EB229		EB230	
QC CODE:			SA		SA		DU		SA		SA	
SAMP. DETH TOP:			0		2.5		0		0		2.5	
SAMP. DEPTH BOT:			0.2		3		0.2		0.2		3	
MATRIX:			SOIL		SOIL		SOIL		SOIL		SOIL	
SAMP. DATE:			9-Mar-98		9-Mar-98		9-Mar-98		9-Mar-98		9-Mar-98	
PARAMETER	UNIT	NYSDEC TAGM	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Volatiles												
Acetone	UG/KG	200	11	U	16		10	J	11	U	28	
Chloroform	UG/KG	300	11	U	11	U	11	U	4	J	2	J
Toluene	UG/KG	1500	2	J	9	J	12		10	J	4	J
Semivolatiles												
2,4-Dinitrotoluene	UG/KG		72	U	77	U	72	U	71	U	76	U
2-Methylnaphthalene	UG/KG	36400	5.5	J	8.3	J	72	U	71	U	76	U
Acenaphthene	UG/KG	50000	72	U	13	J	72	U	71	U	76	U
Anthracene	UG/KG	50000	72	U	19	J	72	U	71	U	76	U
Benzo[a]anthracene	UG/KG	224	8.2	J	68	J	3.9	J	7	J	4.6	J
Benzo[a]pyrene	UG/KG	61	8.1	J	58	J	72	U	71	U	6	J
Benzo[b]fluoranthene	UG/KG	1100	13	J	74	J	13	J	71	U	5.8	J
Benzo[ghi]perylene	UG/KG	50000	11	J	54	J	72	U	71	U	6.2	J
Benzo[k]fluoranthene	UG/KG	1100	7	J	70	J	72	U	71	U	6.7	J
Bis(2-Ethylhexyl)phthalate	UG/KG	50000	9.2	J	39	J	9.3	J	13	J	14	J
Butylbenzylphthalate	UG/KG	50000	72	U	77	U	72	U	71	U	76	U
Carbazole	UG/KG		72	U	34	J	72	U	71	U	76	U
Chrysene	UG/KG	400	11	J	82		8.8	J	12	J	7.8	J
Di-n-butylphthalate	UG/KG	8100	72	U	5.3	J	72	U	3.7	J	76	U
Di-n-octylphthalate	UG/KG	50000	72	U	77	U	72	U	71	U	3.9	J
Dibenz[a,h]anthracene	UG/KG	14	72	U	[redacted]	J	72	U	71	U	76	U
Dibenzofuran	UG/KG	6200	72	U	8	J	72	U	71	U	76	U
Diethyl phthalate	UG/KG	7100	8.5	JB	18	JB	8.1	JB	10	BJ	4.7	JB
Fluoranthene	UG/KG	50000	13	J	160		7.4	J	10	J	9.6	J
Fluorene	UG/KG	50000	72	U	12	J	72	U	71	U	76	U
Hexachlorobenzene	UG/KG	410	72	U	77	U	72	U	71	U	76	U
Indeno[1,2,3-cd]pyrene	UG/KG	3200	8.6	J	48	J	72	U	71	U	5.9	J
N-Nitrosodiphenylamine	UG/KG		72	U	77	U	72	U	71	U	76	U
Naphthalene	UG/KG	13000	72	U	6.9	J	72	U	71	U	76	U
Phenanthrene	UG/KG	50000	8.8	J	110		8.8	J	7.6	J	5.9	J
Pyrene	UG/KG	50000	13	J	130		8.3	J	14	J	8.1	J
TPH	MG/KG		19		213		413		303		38.4	
Pesticides/PCBs												
4,4`-DDD	UG/KG	2900	3.6	U	3.8	U	3.6	U	3.5	U	3.8	U
4,4`-DDE	UG/KG	2100	3.6	U	17		3.8		4.5		2.5	J
4,4`-DDT	UG/KG	2100	3.6	U	16		1.9	J	2.3	JP	3.8	U
Alpha-BHC	UG/KG	110	1.9	U	2	U	1.8	U	1.8	U	2	U
Alpha-Chlordane	UG/KG		1.9	U	2	U	1.8	U	1.8	U	2	U
Aroclor-1242	UG/KG		36	U	38	U	36	U	35	U	38	U
Aroclor-1254	UG/KG	10000	36	U	38	U	36	U	35	U	38	U
Aroclor-1260	UG/KG	10000	36	U	21	JP	36	U	35	U	38	U
Delta-BHC	UG/KG	300	1.9	U	2	U	1.8	U	1.8	U	2	U
Endrin ketone	UG/KG		3.6	U	3.8	U	3.6	U	3.5	U	3.8	U
Gamma-Chlordane	UG/KG	540	1.9	U	2	U	1.8	U	1.8	U	2	U
Heptachlor	UG/KG	100	1.9	U	2	U	1.8	U	1.8	U	2	U
Heptachlor epoxide	UG/KG	20	1.9	U	2	U	1.8	U	1.8	U	2	U
Metals												
Aluminum	MG/KG	19520	1730		8880		14400		13000		15700	
Antimony	MG/KG	6	0.93	BN	0.98	BN	1.7	BN	0.81	BN	0.69	UN
Arsenic	MG/KG	8.9	3.8		4.6		5		3.7		6.4	
Barium	MG/KG	300	18.1	B	46.3	B	86.6		69.6		72.4	
Beryllium	MG/KG	1.13	0.25	B	0.32	B	0.57	B	0.49	B	0.63	B
Cadmium	MG/KG	2.46	0.07	U	0.07	U	0.07	U	0.05	U	0.06	U
Calcium	MG/KG	125300	[redacted]	*	97200	*	17200	*	25500	*	13000	*
Chromium	MG/KG	30	3.8		13.1		27.8		22.6		30	
Cobalt	MG/KG	30	3.5	B	7.7	B	17.8		12.5		19.7	
Copper	MG/KG	33	8.8	N*	20.6	N*	[redacted]	N*	33	N*	[redacted]	N*
Iron	MG/KG	37410	4230		18500		32000		25900		35800	
Lead	MG/KG	24.4	11.7		[redacted]		[redacted]		23.5		[redacted]	
Magnesium	MG/KG	21700	10200		8000		6980		5630		7500	
Manganese	MG/KG	1100	213		473		413		359		394	
Mercury	MG/KG	0.1	0.04	U	0.06	U	0.04	U	0.04	U	0.06	B
Nickel	MG/KG	50	11.6		22.3		[redacted]		49.3		[redacted]	
Potassium	MG/KG	2623	1150		1500		1980		1450		1870	
Silver	MG/KG	0.8	0.46	U	0.49	U	0.46	U	0.36	U	0.41	U
Sodium	MG/KG	188	132	U	141	U	132	U	110	B	119	U
Vanadium	MG/KG	150	5.1	B	14.4		21		17		21.7	
Zinc	MG/KG	115	29.8	N	77.6	N	[redacted]	N	[redacted]	N	[redacted]	N

Attachment EBS-122E
122E - Semivolatiles in Soil vs TAGMs - Detects Only
IDW Plan For Non-Evaluated EBS Sites
Seneca Army Depot

SITE:				SEAD-122E		SEAD-122E		SEAD-122E		SEAD-122E		SEAD-122E		SEAD-122E	
DESCRIPTION:				Deicing Planes		Deicing Planes		Deicing Planes		Deicing Planes		Deicing Planes		Deicing Planes	
LOC ID:				SB122E-1		SB122E-1		SB122E-2		SB122E-2		SB122E-3		SB122E-3	
DRUM #				**122E-1S**		**122E-1S**		**122E-1S**		**122E-1S**		**122E-1S**		**122E-1S**	
SAMP ID:				EB205		EB207		EB208		EB209		EB210		EB211	
QC CODE:				SA		SA		SA		SA		SA		SA	
SAMP. DETH TOP:				0		6		0		2		0		2	
SAMP. DEPTH BOT:				0.2		7.5		0.2		2.3		0.2		2.5	
MATRIX:				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
SAMP. DATE:				6-Mar-98		6-Mar-98		6-Mar-98		6-Mar-98		6-Mar-98		6-Mar-98	
PARAMETER	UNIT	TAGM	PRG-REC	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Acenaphthene	UG/KG	50000		10	J	71	U	340	J	71	U	77	U	80	U
Anthracene	UG/KG	50000	315865385	37	J	71	U	890	J	5.9	J	4.1	J	80	U
Benzo[a]anthracene	UG/KG	224	94231	[redacted]		71	U	[redacted]		40	J	43	J	31	J
Benzo[a]pyrene	UG/KG	61	9423	[redacted]		71	U	[redacted]		49	J	61	J	41	J
Benzo[b]fluoranthene	UG/KG	1100	94231	370		71	U	[redacted]		56	J	86		52	J
Benzo[ghi]perylene	UG/KG	50000		250		71	U	5500		41	J	52	J	30	J
Benzo[k]fluoranthene	UG/KG	1100	942308	300		71	U	[redacted]		76		61	J	61	J
Bis(2-Ethylhexyl)phthalate	UG/KG	50000	4913462	11	J	8.6	J	3000	U	10	J	5.3	J	6.8	J
Butylbenzylphthalate	UG/KG	50000	210576923	150	U	5.8	JB	3000	U	71	U	77	U	80	U
Carbazole	UG/KG		3439423	64	J	71	U	2000	J	23	J	14	J	8.2	J
Chrysene	UG/KG	400	9423077	[redacted]		71	U	[redacted]		63	J	76	J	64	J
Di-n-butylphthalate	UG/KG	8100		150	U	71	U	3000	U	71	U	77	U	80	U
Di-n-octylphthalate	UG/KG	50000	21057692	150	U	71	U	3000	U	71	U	6.4	J	80	U
Dibenz[a,h]anthracene	UG/KG	14	9423	[redacted]	J	71	U	[redacted]	J	[redacted]	J	[redacted]	J	[redacted]	J
Dibenzofuran	UG/KG	6200	9827	8.3	J	71	U	240	J	71	U	77	U	80	U
Diethyl phthalate	UG/KG	7100	842307692	18	J	36	J	3000	U	14	JB	8	J	19	J
Fluoranthene	UG/KG	50000	42115385	800		3.6	J	22000		130		150		120	
Fluorene	UG/KG	50000	42115385	16	J	71	U	440	J	71	U	77	U	80	U
Indeno[1,2,3-cd]pyrene	UG/KG	3200	94231	240		71	U	[redacted]		36	J	45	J	29	J
Phenanthrene	UG/KG	50000		380		71	U	10000		66	J	77		55	J
Pyrene	UG/KG	50000	31586538	530		71	U	18000		100		110		91	
TPH	MG/KG														
Alkanes - Unknown (total)	UG/KG			2550		36		3200		1189		1321		198	

Attachment EBS-120D
120D - Semivolatiles and TPH in Soil vs TAGM
Non-Evaluated EBS Sites

SITE:				SEAD-120D		SEAD-120D		SEAD-120D	
DESCRIPTION:				MP Refueling Island in the Q		MP Refueling Island in the Q		MP Refueling Island in the Q	
LOC ID:				SB120D-1		SB120D-1		SB120D-1	
DRUM #				**120D-1S**		**120D-1S**		**120D-1S**	
SAMP_ID:				EB258		EB026		EB259	
QC CODE:				SA		DU		SA	
SAMP. DETH TOP:				0		0		6.8	
SAMP. DEPTH BOT:				0.3		0.3		7.2	
MATRIX:				SOIL		SOIL		SOIL	
SAMP. DATE:				17-Mar-98		17-Mar-98		17-Mar-98	
PARAMETER	UNIT	TAGM	PRG-REC	VALUE	Q	VALUE	Q	VALUE	Q
1,2,4-Trichlorobenzene	UG/KG	3400	10528846	72	U	73	U	74	U
1,2-Dichlorobenzene	UG/KG	7900	94759615	72	U	73	U	74	U
1,3-Dichlorobenzene	UG/KG	1600	93706731	72	U	73	U	74	U
1,4-Dichlorobenzene	UG/KG	8500	2866186	72	U	73	U	74	U
2,4,5-Trichlorophenol	UG/KG	100	105288462	180	U	180	U	180	U
2,4,6-Trichlorophenol	UG/KG		6253497	72	U	73	U	74	U
2,4-Dichlorophenol	UG/KG	400	3158654	72	U	73	U	74	U
2,4-Dimethylphenol	UG/KG		21057692	72	U	73	U	74	U
2,4-Dinitrophenol	UG/KG	200	2105769	180	U	180	U	180	U
2,4-Dinitrotoluene	UG/KG		2105769	72	U	73	U	74	U
2,6-Dinitrotoluene	UG/KG	1000	1052885	72	U	73	U	74	U
2-Chloronaphthalene	UG/KG			72	U	73	U	74	U
2-Chlorophenol	UG/KG	800	5264423	72	U	73	U	74	U
2-Methylnaphthalene	UG/KG	36400		72	U	4	J	74	U
2-Methylphenol	UG/KG	100	52644231	72	U	73	U	74	U
2-Nitroaniline	UG/KG	430	63173	180	U	180	U	180	U
2-Nitrophenol	UG/KG	330		72	U	73	U	74	U
3,3'-Dichlorobenzidine	UG/KG		152863	72	U	73	U	74	U
3-Nitroaniline	UG/KG	500	3158654	180	U	180	U	180	U
4,6-Dinitro-2-methylphenol	UG/KG			180	U	180	U	180	U
4-Bromophenyl phenyl ether	UG/KG		61067308	72	U	73	U	74	U
4-Chloro-3-methylphenol	UG/KG	240		72	U	73	U	74	U
4-Chloroaniline	UG/KG	220	4211538	72	U	73	U	74	U
4-Chlorophenyl phenyl ether	UG/KG			72	U	73	U	74	U
4-Methylphenol	UG/KG	900		72	U	73	U	74	U
4-Nitroaniline	UG/KG		3158654	180	U	180	U	180	U
4-Nitrophenol	UG/KG	100	63173077	180	U	180	U	180	U
Acenaphthene	UG/KG	50000		72	U	73	U	74	U
Acenaphthylene	UG/KG	41000		72	U	73	U	74	U
Anthracene	UG/KG	50000	315865385	3.8	J	4.3	J	74	U
Benzo[a]anthracene	UG/KG	224	94231	46	J	36	J	74	U
Benzo[a]pyrene	UG/KG	61	9423	52	J	40	J	74	U
Benzo[b]fluoranthene	UG/KG	1100	94231	52	J	47	J	74	U
Benzo[ghi]perylene	UG/KG	50000		43	J	33	J	74	U
Benzo[k]fluoranthene	UG/KG	1100	942308	67	J	55	J	74	U
Bis(2-Chloroethoxy)methane	UG/KG			72	U	73	U	74	U
Bis(2-Chloroethyl)ether	UG/KG		62535	72	U	73	U	74	U
Bis(2-Chloroisopropyl)ether	UG/KG		982692	72	U	73	U	74	U
Bis(2-Ethylhexyl)phthalate	UG/KG	50000	4913462	27	JB	19	JB	16	JB
Butylbenzylphthalate	UG/KG	50000	210576923	72	U	73	U	74	U
Carbazole	UG/KG		3439423	5	J	5.7	J	74	U
Chrysene	UG/KG	400	9423077	57	J	50	J	74	U
Di-n-butylphthalate	UG/KG	8100		3.8	J	73	U	74	U
Di-n-octylphthalate	UG/KG	50000	21057692	72	U	73	U	74	U
Dibenz[a,h]anthracene	UG/KG	14	9423	[redacted]	J	[redacted]	J	74	U
Dibenzofuran	UG/KG	6200	4211538	72	U	73	U	74	U
Diethyl phthalate	UG/KG	7100	842307692	3.8	JB	5.3	JB	7.9	JB
Dimethylphthalate	UG/KG	2000	10528846150	72	U	73	U	74	U
Fluoranthene	UG/KG	50000	42115385	87		82		74	U
Fluorene	UG/KG	50000	42115385	72	U	73	U	74	U
Hexachlorobenzene	UG/KG	410	42993	72	U	73	U	74	U
Hexachlorobutadiene	UG/KG		210577	72	U	73	U	74	U
Hexachlorocyclopentadiene	UG/KG		7370192	72	U	73	U	74	U
Hexachloroethane	UG/KG		1052885	72	U	73	U	74	U
Indeno[1,2,3-cd]pyrene	UG/KG	3200	94231	44	J	32	J	74	U
Isophorone	UG/KG	4400		72	U	73	U	74	U
N-Nitrosodiphenylamine	UG/KG		14038462	72	U	73	U	74	U
N-Nitrosodipropylamine	UG/KG		9827	72	U	73	U	74	U
Naphthalene	UG/KG	13000	42115385	72	U	73	U	74	U
Nitrobenzene	UG/KG	200	526442	72	U	73	U	74	U
Pentachlorophenol	UG/KG	1000	573237	180	U	180	U	180	U
Phenanthrene	UG/KG	50000		22	J	26	J	74	U
Phenol	UG/KG	30	631730769	72	U	73	U	74	U
Pyrene	UG/KG	50000	31586538	70	J	66	J	4	J
TPH	MG/KG			118		141		18.4	U

SEAD-4 IDW Plan: Table 3B

Table 4

Attachments (Data Tables)

Table 3B
SEAD 4 Remedial Investigation
Drum Inventory/Disposal Rational
Seneca Army Depot Activity

Drum Num	Location	Matrix: Soil	Matrix: Water	Matrix: PPE	Source/Start Date i.e.(MW, Boring, Decon. water, Condensate', PPE)	RCRA Hazardous/ Non-Hazardous	Contaminated/ Noncontaminated	*Chemical Of Concern (Exceeding TAGM Levels)	Rationale	Disposal Option (Offsite Hazardous) (Offsite Non-Hazardous) (Onsite)
4-10S	SEAD-4 STAGING AREA				Drill Cuttings: SB4-18,19, SB4-26,&23 12/16/1998	Non-Hazardous	Contaminated	Metals: As,Mg,Cr,Ni,Zn	< RCRA Criteria < 10x TAGM	Onsite Non-Hazardous
4-11S	SEAD-4 STAGING AREA	X			Drill Cuttings: SB4-11,12,13 SB4-15,16,17,20,21,22,27,28 12/17/1998	RCRA Hazardous	Contaminated	Metals: Pb, Cu,Cr,Mg	>RCRA Criteria: Chromium <10x TAGM: Copper,Lead,Magnesium	On-site No threat of contamination migration
4-12S	SEAD-4 STAGING AREA	X			Drill Cuttings SB4-14/MW4-10 12/17/1998	Non-Hazardous	Contaminated	Metals Sb,As	<10X TAGM Limit Arsenic & Antimony	Onsite Non-Hazardous
4-13S	SEAD-4 STAGING AREA	X			Drill Cuttings MW4-8 12/19/1998	RCRA Hazardous	Contaminated	Metals: Sb,Cr,Cu	20x RCRA Limits Chromium <10x TAGM: Antimony & Copper	On site No threat of contamination migration
4-14W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 12/14/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-15W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 12/15/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-16W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 12/16/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-17W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 12/17/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-18W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 12/18/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-19W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 12/19/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-20S	SEAD-4 STAGING AREA	X			Drill Cuttings MW4-6 12/19/1998	RCRA Hazardous	Contaminated	Metals: Sb,Cr,Cu,Zn	>5x RCRA Limits: Chromium <10x TAGM: Antimony,Copper,&Zinc	On site No threat of contamination migration
4-21S	SEAD-4 STAGING AREA	X			Drill Cuttings MW4-7 12/20/1998	RCRA Non-Hazardous	Noncontaminated	None	<TAGM Limits	Onsite Non-Hazardous
4-22W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 12/20/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-23S	SEAD-4 STAGING AREA	X			Drill Cuttings MW4-13 12/20/1998	RCRA Non-Hazardous	Noncontaminated	None	<TAGM Limits	Onsite Non-Hazardous

Table 3B
SEAD 4 Remedial Investigation
Drum Inventory/Disposal Rational
Seneca Army Depot Activity

Drum Num	Location	Matrix			Source/Start Date i.e.(MW, Boring, Decon. water, Condensate¹, PPE)	RCRA Hazardous/ Non-Hazardous	Contaminated/ Noncontaminated	*Chemical Of Concern (Exceeding TAGM Levels)	Rationale	Disposal Option (Offsite Hazardous) (Offsite Non-Hazardous) (Onsite)
		Soil	Water	PPE						
4-24S	SEAD-4 STAGING AREA	X			Drill Cuttings MW4-9 12/20/1998	RCRA Non-Hazardous	Contaminated	Metals: Cr	<RCRA Limits >TAGM Limits < 10x TAGM Limits	Onsite Non-Hazardous
4-25S	SEAD-4 STAGING AREA	X			Drill Cuttings MW4-11 12/20/1998	RCRA Non-Hazardous	Contaminated	Metals: Cr, Pb,&Cu	<RCRA Limits <10x TAGM Limits	Onsite Non-Hazardous
4-26S	SEAD-4 STAGING AREA	X			Drill Cuttings MW4-12 12/21/1998	RCRA Non-Hazardous	Contaminated	SVOC's & Lead	<RCRA Limits <10x TAGM Limits	Onsite Non-Hazardous
4-27W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 12/21/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-28S	SEAD-4 STAGING AREA	X			Drill Cuttings SB4-24 & 25 12/22/1998	**RCRA Hazardous**	Contaminated	SVOC's Metals:Sb,As,Cr,Cu Pb,Hg,Ag,Tl,Zn	>RCRA Limits: Mercury, Chromium(186x) >10x TAGM: Antimony,Copper,Zinc	On site No threat of contamination migration
4-29W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 12/22/1998	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-30S	SEAD-4 STAGING AREA			X	PPE 12/23/1999	RCRA Non-Hazardous	Noncontaminated	None	Disposible /Washable PPE	Offsite Non-Hazardous
4-31S	SEAD-4 STAGING AREA				Lumber & Sheet Plastic Decon Pad 1/7/1999	RCRA Non-Hazardous	Noncontaminated	None	Soils were cleaned from plastic sheeting prior to disassembly of decon pad Minimum Soil-No Threat	Offsite Non-Hazardous
4-32W	SEAD-4 STAGING AREA		X		Decon Water (Steam Condensate) 1/7/1999	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
4-33W	SEAD-4 STAGING AREA		X		Well Development Groundwater MW4-4,6,7,8,&13 3/16/1999	RCRA Non-Hazardous	Noncontaminated	Selenium (MW4-8)	<GA Stds. For Selenium** (MW4-8)	Onsite Non-Hazardous
4-34W	SEAD-4 STAGING AREA		X		Well Development Groundwater MW4-3,9,10,&11 3/16/1999	RCRA Non-Hazardous	Contaminated	Benzene,Ethyl Benzene (MW4-10) Chromium (MW4-9) Selenium (MW4-10)	> GA Stds. For Chromium* (MW4-9)	On site No threat of contamination migration
4-35W	SEAD-4 STAGING AREA		X		Well Development Groundwater MW4-1,2,11,12,&13 3/18/1999	RCRA Non-Hazardous	Noncontaminated	Selenium (MW4-12)	<GA Stds. For Selenium** (MW4-12)	Onsite Non-Hazardous
4-36W	SEAD-4 STAGING AREA		X		Purge Groundwater (Round 1) All SEAD-4 Monitoring Wells 3/19/1999	RCRA Non-Hazardous	Noncontaminated	Benzene,Ethyl Benzene (MW4-10) Chromium (MW4-9) Selenium (MW4-8,10,12)	< GA Stds. For Chromium** (MW4-9)	Onsite Non-Hazardous
4-37W	SEAD-4 STAGING AREA		X		Purge Groundwater (Round 2) All SEAD-4 Monitoring Wells 7/7/1999	RCRA Non-Hazardous	Noncontaminated	None*	No Detects*	Onsite Non-Hazardous

Table 4
Monitoring Well Purge Water Drum Dilution Calculations
SEAD-4 Remedial Investagation IDW Plan
Seneca Army Depot

Drum#	Total Drum Volume (gallons)	Well ID#	Volume from Well (gallons)	Chemical of Concern (COC)	Concentration of COC in Well (ppb)	GA Standard (ppb)	Concentration in the Drum After Dilution
4-33W	50	MW4-8	16.0	Selenium	24.0	10.0	7.7
4-34W	50	MW4-9	23.0	Chromium	260.0	50.0	119.6
4-34W	50	MW4-10	11.5	Selenium	10.4	10.0	2.4
4-34W	50	MW4-10	11.5	Benzene	2.0	0.7	0.5
4-34W	50	MW4-10	11.5	Ethyl Benzene	6.0	5.0	1.4
4-35W	50	MW4-12	14.5	Selenium	13.4	10.0	3.9
4-36W	*50*	*MW4-8*	*3.2*	*Selenium*	*24.0*	*10.0*	*1.5*
4-36W	*50*	*MW4-10*	*2.0*	*Selenium*	*10.4*	*10.0*	*0.4*
4-36W	*50*	*MW4-12*	*4.6*	*Selenium*	*13.4*	*10.0*	*1.2*
4-36W	**50**	**MW4-8,10,12**	**9.8**	**Selenium**	**Total**	**10.0**	**3.2**
4-36W	50	MW4-9	2.0	Chromium	260.0	50.0	10.4
4-36W	50	MW4-10	2.0	Benzene	2.0	0.7	0.1
4-36W	50	MW4-10	2.0	Ethyl Benzene	6.0	5.0	0.2

Formula to determine diluted COC concentration in drum :

$$\text{Concentration}_{drum} = \frac{\text{Volume}_A \times \text{Concentration}_A + \text{Volume}_B \times \text{Concentration}_{B\ldots}}{\text{Volume}_A + \text{Volume}_{B\ldots}}$$

Attachment SEAD-4 Surface Soil
Summary Statistics for
Surface Soil (Borings) Samples-Detects Only
SEAD-4 Remedial Investigation
Seneca Army Depot

	UNITS	NYSDEC TAGM	SEAD-4 MW4-11 SOIL 43170 0 0.2 12/20/1998 SA RI Phase 1 Step 1 N	SEAD-4 MW4-12 SOIL 43167 0 0.2 12/21/1998 SA RI Phase 1 Step 1 N	SEAD-4 MW4-6 SOIL 43153 0 0.2 12/19/1998 SA RI Phase 1 Step 1 N	SEAD-4 MW4-8 SOIL 43150 0 0.2 12/18/1998 SA RI Phase 1 Step 1 N	SEAD-4 MW4-9 SOIL 43164 0 0.2 12/20/1998 SA RI Phase 1 Step 1 N	SEAD-4 SB4-12 SOIL 43113 0 0.2 12/16/1998 SA RI Phase 1 Step 1 N	SEAD-4 SB4-13 SOIL 43116 0 0.2 12/16/1998 SA RI Phase 1 Step 1 N	SEAD-4 SB4-14 SOIL 43110 0 0.2 12/16/1998 DU RI Phase 1 N
VOLATILES										
None above TAGM										
SEMIVOLATILES										
Benzo(a)anthracene	UG/KG	224	17 J	4.6 J	5.2 J	10 J	8.6 J	82 U	6.6 J	320
Benzo(a)pyrene	UG/KG	61	18 J	6.9 J	92 U	12 J	8.5 J	6.5 J	10 J	320
Chrysene	UG/KG	400	41 J	7.3 J	8.7 J	16 J	16 J	7.6 J	14 J	320
Dibenz(a,h)anthracene	UG/KG	14	73 U	72 UJ	92 U	92 U	89 U	82 U	73 U	320
EXPLOSIVES										
1,3,5-Trinitrobenzene	UG/KG		120 U	120 UJ	120 U	120 U	120 U	120 U	120 U	120
2,4,6-Trinitrotoluene	UG/KG		120 U	120 UJ	120 U	120 U	120 U	120 U	120 U	120
2,4-Dinitrotoluene	UG/KG		120 U	120 UJ	120 U	120 U	120 U	120 U	120 U	120
2-amino-4,6-Dinitrotoluene	UG/KG		120 U	120 UJ	120 U	120 U	120 U	120 U	120 U	120
4-Nitrotoluene	UG/KG		120 U	120 UJ	120 U	120 U	120 U	120 U	120 U	120
PESTICIDES/PCBs										
None Above TAGMS										
HERBICIDES										
None above TAGMS										
METALS										
Aluminum	MG/KG	19520	12100	13200	7630	12100	13600	12700	11700	11400
Antimony	MG/KG	6	1.1 J	0.8 J	[redacted] J	0.93 J	1 R	4.1 J	0.98 J	[redacted]
Arsenic	MG/KG	8.9	3.7	4.9	3.1	4.6	3.9	5.1	5.1	[redacted]
Barium	MG/KG	300	35.2 J	81.9	77.8	95	92.8	79.5	57.3	145
Beryllium	MG/KG	1.13	0.51 J	0.49 J	0.5 J	0.72 J	0.57 J	0.49 J	0.42 J	0.47
Cadmium	MG/KG	2.46	0.09 U	0.05 U	0.11 U	0.12 U	0.13 U	0.05 U	0.03 U	1.4
Calcium	MG/KG	125300	54500	3780	8260	3860	2010	3860	70800	9530
Chromium	MG/KG	30	29.7	19.5 J	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Cobalt	MG/KG	30	11.3	9.1 J	6.9 J	10.1 J	8.6 J	10.9 J	11.9	19.9
Copper	MG/KG	33	[redacted]	19	[redacted]	24.1	14.3	[redacted]	[redacted]	[redacted]
Cyanide	MG/KG	0.35	0.84 U	0.73 U	0.78 U	0.8 U	0.83 U	0.71 U	0.6 U	0.81
Iron	MG/KG	37410	27300	22400	16000	22200	19600 J	27100	25400	29600
Lead	MG/KG	24.4	[redacted] J	[redacted]	22.8	15.3	18.7 J	14.2	15.7	[redacted]
Magnesium	MG/KG	21700	12900	3930	2780	3430	3020	4550	[redacted]	5800
Manganese	MG/KG	1100	337	509	579 J	625 J	740	624 J	478 J	384
Mercury	MG/KG	0.1	0.05 J	0.09 J	0.06 UJ	0.06 UJ	0.09 J	[redacted] J	0.05 UJ	0.06
Nickel	MG/KG	50	41	23.9	18.1	22.5	19.1	31.4	31.9	34.7
Potassium	MG/KG	2623	1880	2010	1040 J	1950	1520	1290	1150	1090
Selenium	MG/KG	2	0.67 U	0.93 UJ	0.8 U	0.84 U	0.96 U	0.46 U	0.34 U	0.44
Silver	MG/KG	0.8	0.19 U	0.26 U	0.22 U	0.23 U	0.27 U	0.23 U	0.17 U	0.22
Sodium	MG/KG	188	48.9 U	68.4 J	75.2 U	97 J	69.9 U	60.6 U	52.2 J	57.6
Thallium	MG/KG	0.855	0.58 U	9.3 R	0.69 U	0.72 U	0.83 U	8.3 UJ	6.1 UJ	0.79
Vanadium	MG/KG	150	21.5	26.3	11.8	20	24.8	20.8	18.9	23.8
Zinc	MG/KG	115	77.2 J	78.1 J	[redacted]	86.6	68.4 J	[redacted]	93.2	[redacted]
Chromium, Hexavalent	MG/KG									

Attachment SEAD-4 Surface Soil
Summary Statistics for
Surface Soil (Borings) Samples-Detects Only
SEAD-4 Remedial Investigation
Seneca Army Depot

			SEAD-4	SEAD-4	SEAD-4	SEAD-4	SEAD-4	SEAD-4	SEAD-4
			SB4-14	SB4-16	SB4-17	SB4-18	SB4-19	SB4-25	SB4-27
			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			43109	43122	43119	43080	43083	43174	43125
			0	0	0	0	0	0	0
			0.2	0.2	0.2	0.2	0.2	0.2	0.2
			12/16/1998	12/21/1998	12/16/1998	12/15/1998	12/15/1998	12/22/1998	12/21/1998
			SA	SA	SA	SA	SA	SA	SA
		tep 1	RI Phase 1 Step 1	RI Phase 1 Step 1	RI Phase 1 Step 1	RI Phase 1 Step 1	RI Phase 1 Step 1	RI Phase 1 Step 1	RI Phase 1 Step 1
	UNITS	NYSDEC TAGM	N	N	N	N	N	N	N
VOLATILES									
None above TAGM									
SEMIVOLATILES									
Benzo(a)anthracene	UG/KG	224 U	320 U	81	[redacted]	14 J	21 J	180 J	190
Benzo(a)pyrene	UG/KG	61 U	320 U	[redacted]	[redacted]	14 J	44 J	[redacted] J	[redacted]
Chrysene	UG/KG	400 U	320 U	120	[redacted]	30 J	43 J	240 J	200
Dibenz(a,h)anthracene	UG/KG	14 U	320 U	74 U	[redacted] J	72 R	[redacted] J	[redacted] J	[redacted] J
EXPLOSIVES									
1,3,5-Trinitrobenzene	UG/KG	U	120 U	120 U	120 U	120 U	120 UJ	120 U	120 U
2,4,6-Trinitrotoluene	UG/KG	U	120 U	120 U	120 U	120 U	120 UJ	120 U	120 U
2,4-Dinitrotoluene	UG/KG	U	120 U	120 U	120 U	120 U	120 UJ	120 U	120 U
2-amino-4,6-Dinitrotoluene	UG/KG	U	120 U	120 U	120 U	120 U	120 UJ	120 U	120 U
4-Nitrotoluene	UG/KG	U	120 U	120 U	120 U	390 J	120 UJ	120 U	120 U
PESTICIDES/PCBs									
None Above TAGMS									
HERBICIDES									
None above TAGMS									
METALS									
Aluminum	MG/KG	19520	12900	12700	6430	5860	11900	17300	12600
Antimony	MG/KG	6 J	[redacted] J	0.72 R	0.67 UJ	0.64 UJ	0.65 UJ	[redacted] J	1.1 J
Arsenic	MG/KG	8.9	7.5	3.7	3.2	3.1	4.6	[redacted]	4.1
Barium	MG/KG	300	156	50.1	32.2 J	32.4 J	68.8	278	75.3
Beryllium	MG/KG	1.13 J	0.54 J	0.54 J	0.3 J	0.33 J	0.42 J	0.63 J	0.53 J
Cadmium	MG/KG	2.46	1.6	0.09 U	0.04 U	0.04 U	0.04 U	0.1 U	0.12 U
Calcium	MG/KG	125300	8640	23300	123000	[redacted]	2130	17200	8580
Chromium	MG/KG	30	[redacted]	23.7	12.8	12.6	15.7	[redacted] J	19.6
Cobalt	MG/KG	30	18.3	13.2	7.4 J	6.1 J	8.9 J	11.6 J	9.9 J
Copper	MG/KG	33	[redacted]	32.1	18.4	18.6	13.5	[redacted]	21.9
Cyanide	MG/KG	0.35 U	[redacted] J	0.67 U	0.61 U	0.65 U	0.65 U	1.6 U	0.76 U
Iron	MG/KG	37410	30800	27600	15500	13900	20100	34300 J	24000
Lead	MG/KG	24.4	[redacted]	[redacted] J	22.3	17.2	[redacted]	[redacted]	[redacted] J
Magnesium	MG/KG	21700	6020	7330	9690	6080	2840	6810	5190
Manganese	MG/KG	1100 J	403 J	395	339 J	252	531	340	429
Mercury	MG/KG	0.1 UJ	0.06 J	0.06 J	0.05 UJ	0.05 UJ	0.06 UJ	[redacted]	0.07 J
Nickel	MG/KG	50	38.1	42	24.2	23.2	17.3	47.4	27.9
Potassium	MG/KG	2623 J	1330	1650	1150	1260	1200	2340 J	1710
Selenium	MG/KG	2 U	0.46 U	0.66 U	0.43 U	0.41 U	0.42 U	1.8 UJ	0.89 U
Silver	MG/KG	0.8 U	0.23 U	0.18 U	0.22 U	0.21 U	0.21 U	[redacted] J	0.25 U
Sodium	MG/KG	188 U	60.6 U	48 U	73 J	64.7 J	54.8 U	128 U	64.5 U
Thallium	MG/KG	0.855 UJ	0.83 UJ	0.57 U	0.77 UJ	0.74 U	7.5 U	[redacted] J	0.76 U
Vanadium	MG/KG	150	24.8	24.7	14.6	13	30.6	36.4	24.4
Zinc	MG/KG	115	[redacted]	85.7 J	56.6	56.4	65.2	[redacted] J	81.4 J
Chromium, Hexavalent	MG/KG								

	UNITS	NYSDEC TAGM	SEAD-4 SB4-28 SOIL 43128 0 0.2 12/21/1998 SA RI Phase 1 Step 1 N	
VOLATILES				
None above TAGM				
SEMIVOLATILES				
Benzo(a)anthracene	UG/KG	224	35	J
Benzo(a)pyrene	UG/KG	61	32	J
Chrysene	UG/KG	400	63	J
Dibenz(a,h)anthracene	UG/KG	14	77	U
EXPLOSIVES				
1,3,5-Trinitrobenzene	UG/KG		120	U
2,4,6-Trinitrotoluene	UG/KG		120	U
2,4-Dinitrotoluene	UG/KG		120	U
2-amino-4,6-Dinitrotoluene	UG/KG		120	U
4-Nitrotoluene	UG/KG		120	U
PESTICIDES/PCBs				
None Above TAGMS				
HERBICIDES				
None above TAGMS				
METALS				
Aluminum	MG/KG	19520	12100	
Antimony	MG/KG	6	1.1	J
Arsenic	MG/KG	8.9	3	
Barium	MG/KG	300	53.1	
Beryllium	MG/KG	1.13	0.5	J
Cadmium	MG/KG	2.46	0.1	U
Calcium	MG/KG	125300	18400	
Chromium	MG/KG	30	22.6	
Cobalt	MG/KG	30	13.2	
Copper	MG/KG	33	30.3	
Cyanide	MG/KG	0.35	0.7	U
Iron	MG/KG	37410	26600	
Lead	MG/KG	24.4	30.9	J
Magnesium	MG/KG	21700	6360	
Manganese	MG/KG	1100	420	
Mercury	MG/KG	0.1	0.06	J
Nickel	MG/KG	50	42.6	
Potassium	MG/KG	2623	1460	
Selenium	MG/KG	2	0.7	U
Silver	MG/KG	0.8	0.19	U
Sodium	MG/KG	188	50.6	U
Thallium	MG/KG	0.855	0.6	U
Vanadium	MG/KG	150	20.8	
Zinc	MG/KG	115	81.1	J
Chromium, Hexavalent	MG/KG			

Attachment SEAD-4 Sub-surface Soil
Summary Statistics for Subsurface Soils-Detects Only
SEAD-4 Remedial Investigation
Seneca Army Depot

				RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1	
				MW4-11		MW4-11		MW4-12		MW4-6		MW4-7		MW4-8		SB4-12	
				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
				2		4		2		2		0.5		6		4	
				3.3		5.5		3.4		3.5		1.5		6.5		4.6	
				12/20/1998		12/20/1998		12/21/1998		12/19/1998		12/20/1998		12/19/1998		12/16/1998	
				43171		43172		43168		43154		43159		43152		43114	
	UNIT	MAXIMUM	TAGM	SA		SA		SA		SA		SA		SA		SA	
				N		N		N		N		N		N		N	
Volatiles																	
None above TAGM																	
Semivolatile Organics																	
Benzo(a)anthracene	UG/KG	1100	224	76	U	72	U	330	J	72	U	76	U	72	U	77	U
Benzo(a)pyrene	UG/KG	880	61	76	U	72	U	260	J	72	U	76	U	72	U	77	U
Chrysene	UG/KG	1000	400	76	U	72	U	470	J	72	U	76	U	72	U	77	U
Dibenz(a,h)anthracene	UG/KG	48	14	76	U	72	U	48	J	72	U	76	U	72	U	77	U
Nitroaromatics																	
None above TAGM																	
Pesticides/PCBs																	
None above TAGM																	
Herbicides																	
None above TAGM																	
Metals																	
Aluminum	MG/KG	21000	19520	10500		13300		11700		7600		12000		5340		13800	
Antimony	MG/KG	57.8	6	0.83	R	1.2	J	0.63	J	6.1	J	0.8	R	[illegible]	J	0.57	UJ
Arsenic	MG/KG	21.5	8.9	3.3		5		3.8		4		5.7		2.6		6.5	
Barium	MG/KG	133	300	75.4		49.1		87.3		51.9		90.6		44.4		67.7	
Beryllium	MG/KG	1	1.13	0.41	J	0.6	J	0.43	J	0.36	J	0.37	J	0.29	J	0.34	J
Cadmium	MG/KG	1.5	2.46	0.11	U	0.1	U	0.04	U	0.08	U	0.1	U	0.09	U	0.04	U
Calcium	MG/KG	102000	125300	86500		21600		37500		7590		2730		4020		1890	
Chromium	MG/KG	3820	30	18.1		23.2		16.5	J	541		17.5		2000		25.3	
Cobalt	MG/KG	29.1	30	9.8	J	11.8		8.4	J	11		13.8		3.4	J	17.8	
Copper	MG/KG	2250	33	51.1		22.8		15.3		310		19		210		25.8	
Cyanide	MG/KG	0	0.35	0.59	U	0.62	U	0.64	U	0.64	U	0.58	U	0.64	U	0.59	U
Iron	MG/KG	40900	37410	22000		28300		20300		17900		25500		9900		31800	
Lead	MG/KG	251	24.4	11.1	J	10.1	J	18.8		11.7		12.9	J	14.9		14.7	
Magnesium	MG/KG	32000	21700	10400		7720		4030		3430		3670		1750		5370	
Manganese	MG/KG	2100	1100	455		285		566		881	J	1120		148	J	1150	J
Mercury	MG/KG	0.12	0.1	0.06	J	0.05	U	0.06	J	0.05	UJ	0.06	J	0.05	UJ	0.05	UJ
Nickel	MG/KG	62.3	50	29.4		40.4		20		24.7		31		11.6		38.1	
Potassium	MG/KG	2490	2623	1110		1500		1090		535	J	1280		824	J	1460	
Selenium	MG/KG	0.86	2	0.76	U	0.73	U	0.73	UJ	0.56	U	0.74	U	0.84	J	0.39	J
Silver	MG/KG	1.2	0.8	0.21	U	0.2	U	0.2	U	0.16	U	0.2	U	0.17	U	0.18	U
Sodium	MG/KG	134	188	55.6	U	53.2	U	53.2	U	52.9	U	53.6	U	57.8	U	48.3	U
Thallium	MG/KG	0	0.855	0.66	U	0.63	U	7.3	R	0.48	U	0.63	U	0.53	U	6.6	UJ
Vanadium	MG/KG	31	150	17.1		19.8		21.6		10.6		23.5		9.5		23.4	
Zinc	MG/KG	1010	115	56.7	J	94.1	J	62.5	J	197		62.9	J	89.8		91.5	

Attachment SEAD-4 Sub-surface Soil
Summary Statistics for Subsurface Soils-Detects Only
SEAD-4 Remedial Investigation
Seneca Army Depot

				RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1	
				SB4-14		SB4-20		SB4-20		SB4-22		SB4-23		SB4-23		SB4-24	
				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
				2		2		6		4		2		4		3	
				3		3.5		6.8		5.7		3		5.6		4	
				12/16/1998		12/18/1998		12/18/1998		12/22/1998		12/15/1998		12/16/1998		12/22/1998	
				43112		43136		43149		43139		43087		43088		43173	
	UNIT	MAXIMUM	TAGM	SA		SA		SA		SA		SA		SA		DU	
				N		N		N		N		N		N		N	
Volatiles																	
None above TAGM																	
Semivolatile Organics																	
Benzo(a)anthracene	UG/KG	1100	224	71	U	72	U	72	U	72	UJ	71	U	73	U	77	UJ
Benzo(a)pyrene	UG/KG	880	61	71	UJ	72	U	72	U	72	UJ	71	U	73	U	77	UJ
Chrysene	UG/KG	1000	400	4.7	J	72	U	72	U	72	UJ	71	U	73	U	77	UJ
Dibenz(a,h)anthracene	UG/KG	48	14	71	UJ	72	U	72	U	72	UJ	71	U	73	U	77	UJ
Nitroaromatics																	
None above TAGM																	
Pesticides/PCBs																	
None above TAGM																	
Herbicides																	
None above TAGM																	
Metals																	
Aluminum	MG/KG	21000	19520	19400		12500		12000		9230		16900		17000		14400	
Antimony	MG/KG	57.8	6	0.66	UJ	0.55	UJ	0.73	R	0.68	UJ	0.46	UJ	0.5	UJ	6.7	J
Arsenic	MG/KG	21.5	8.9	7.8		4.9		5.2		4.1		5.3		15.8		6	
Barium	MG/KG	133	300	67.8		55.1		43.9		63.3		65.9		81.5		115	
Beryllium	MG/KG	1	1.13	0.94	J	0.39	J	0.56	J	0.26	J	0.79		0.82		0.53	J
Cadmium	MG/KG	1.5	2.46	0.04	U	0.04	U	0.09	U	0.04	U	0.03	U	0.03	U	0.04	U
Calcium	MG/KG	102000	125300	2860		3570		36500		53200		2330		2990		4140	
Chromium	MG/KG	3820	30	74.4		74.9		32.3		20.9	J	74.2		42.6		171	J
Cobalt	MG/KG	29.1	30	20.1		14.5		10.8		9.2	J	16.2		15.5		11.7	
Copper	MG/KG	2250	33	22.7		47.5		23.9		22.8		26.9		23		277	J
Cyanide	MG/KG	0	0.35	0.55	U	0.59	U	0.61	U	0.62	U	0.61	U	0.66	U	0.69	U
Iron	MG/KG	40900	37410	40900		29100		26200		22700		37200		40500		29600	J
Lead	MG/KG	251	24.4	251		8		6.5		[illegible]		10.8		10.6		14.7	
Magnesium	MG/KG	32000	21700	8390		5350		7120		9190		7440		7500		4490	
Manganese	MG/KG	2100	1100	337	J	671	J	368	J	560		320		351		832	
Mercury	MG/KG	0.12	0.1	0.05	UJ	0.05	UJ	0.05	UJ	0.05	U	0.05	UJ	0.06	UJ	0.09	J
Nickel	MG/KG	62.3	50	59.7		36.9		29.6		24.7		54.6		53.2		30.4	
Potassium	MG/KG	2490	2623	1620		1150		1230		1090		1590		1790		1480	
Selenium	MG/KG	0.86	2	0.43	U	0.36	U	0.68	U	0.79	UJ	0.29	U	0.32	U	0.75	UJ
Silver	MG/KG	1.2	0.8	0.21	U	0.18	U	0.19	U	0.22	U	0.15	U	0.16	U	0.21	U
Sodium	MG/KG	134	188	56	U	46.6	U	63.7	U	101	J	43.8	J	42.5	U	54.6	UJ
Thallium	MG/KG	0	0.855	0.77	UJ	6.4	UJ	0.58	U	7.9	R	0.53	U	0.58	U	7.5	R
Vanadium	MG/KG	31	150	27.5		18.9		16.5		16.3		24.9		27.1		24	
Zinc	MG/KG	1010	115	149		71.2		74		68.1	J	122		133		143	J

Summary Statistics for Subsurface Soils-Detects Only
SEAD-4 Remedial Investigation
Seneca Army Depot

				RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1		RI Phase 1 Step 1	
				SB4-24		SB4-24		SB4-25		SB4-25		SB4-26		SB4-26	
				SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
				3		8		2		6		2		4	
				4		8.6		3.5		7.2		3.5		5	
				12/22/1998		12/22/1998		12/23/1998		12/23/1998		12/15/1998		12/15/1998	
				43141		43142		43143		43144		43091		43092	
	UNIT	MAXIMUM	TAGM	SA		SA		SA		SA		SA		SA	
				N		N		N		N		N		N	
Volatiles															
None above TAGM															
Semivolatile Organics															
Benzo(a)anthracene	UG/KG	1100	224	75	UJ	70	UJ	82	UJ	75	UJ	72	U	70	U
Benzo(a)pyrene	UG/KG	880	61	6.4	J	70	UJ	82	UJ	75	UJ	72	U	70	U
Chrysene	UG/KG	1000	400	75	UJ	70	UJ	82	UJ	75	UJ	72	U	70	U
Dibenz(a,h)anthracene	UG/KG	48	14	75	UJ	70	UJ	82	UJ	75	UJ	72	U	70	U
Nitroaromatics															
None above TAGM															
Pesticides/PCBs															
None above TAGM															
Herbicides															
None above TAGM															
Metals															
Aluminum	MG/KG	21000	19520	15500		10700		11800		10900		9320		16800	
Antimony	MG/KG	57.8	6	0.78	J	0.66	J	30.1	J	0.58	J	0.62	UJ	0.51	UJ
Arsenic	MG/KG	21.5	8.9	7.4		7.9		9.2		6		3.7		5.7	
Barium	MG/KG	133	300	88.7		70.8		110		60.5		51.8		65	
Beryllium	MG/KG	1	1.13	0.42	J	0.3	J	0.37	J	0.02	U	0.4	J	0.76	J
Cadmium	MG/KG	1.5	2.46	0.04	U	0.04	U	0.05	U	0.04	U	0.04	U	0.03	U
Calcium	MG/KG	102000	125300	3240		56200		18600		19900		102000		10300	
Chromium	MG/KG	3820	30	120	J	87.1	J	3820	J	34.2	J	17		31.8	
Cobalt	MG/KG	29.1	30	15.4		16.9		15.7		13.2		9	J	18.5	
Copper	MG/KG	2250	33	25.8	J	51.8		1250		21.7		16.5		30.4	
Cyanide	MG/KG	0	0.35	0.65	U	0.58	U	0.71	U	0.61	U	0.62	U	0.6	U
Iron	MG/KG	40900	37410	33600		27400	J	38100	J	30300	J	21000		39000	
Lead	MG/KG	251	24.4	10.4		10.6		26.5		11.6		8.8		13.6	
Magnesium	MG/KG	32000	21700	5980		12500		5170		5190		26400		8410	
Manganese	MG/KG	2100	1100	977		639		565		2100		365		370	
Mercury	MG/KG	0.12	0.1	0.05	UJ	0.05	U	0.12	J	0.06	U	0.05	UJ	0.05	UJ
Nickel	MG/KG	62.3	50	39.8		33.4		43.8		32.6		29.3		56.9	
Potassium	MG/KG	2490	2623	1310		1270		1320		873	J	1290		1640	
Selenium	MG/KG	0.86	2	0.8	UJ	0.67	UJ	0.83	UJ	0.68	UJ	0.4	U	0.33	U
Silver	MG/KG	1.2	0.8	0.22	U	0.19	U	0.35	J	0.19	U	0.2	U	0.16	U
Sodium	MG/KG	134	188	88.5	J	121	J	60.3	U	74.1	J	52.5	U	43.2	U
Thallium	MG/KG	0	0.855	8	R	6.7	R	0.83	R	6.8	R	7.2	U	5.9	U
Vanadium	MG/KG	31	150	22.4		16.7		21.9		15.2		16.4		25.7	
Zinc	MG/KG	1010	115	78.3	J	87.1	J	507	J	64.2	J	75.3	J	127	J

Attachment SEAD-4 Ground Water
Summary Statistics for Ground water Samples-Detects Only
SEAD-4 Remedial Investigation
Seneca Army Depot Activity

ANALYTE		MAXIMU	NYS CLASS GA	SEAD-4 MW4-1 GROUND WATER 4/1/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-1 GROUND WATER 7/7/1999 DU RI Phase 1 Step 1	SEAD-4 MW4-10 GROUND WATER 3/30/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-10 GROUND WATER 7/7/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-11 GROUND WATER 3/31/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-11 GROUND WATER 7/8/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-12 GROUND WATER 3/30/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-12 GROUND 7/8/1999 SA RI Phase 1
Volatile Organic Compounds											
Acetone	UG/L	8		5 U	5 UJ	8	5 U	5 U	5 U	5 U	5
Benzene	UG/L	2	0.7	1 U	0.5 UJ	[redacted]	0.5 U	1 U	0.5 U	1 U	0.5
Ethyl benzene	UG/L	6	5	1 U	0.5 UJ	[redacted]	0.5 U	1 U	0.5 U	1 U	0.5
Toluene	UG/L	0.4	5	1 U	0.5 UJ	0.4 J	0.5 U	1 U	0.5 U	1 U	0.5
Total Xylenes	UG/L	4	5	1 U	0.5 UJ	4	0.5 U	1 U	0.5 U	1 U	0.5
Semivolatile Organic Compounds											
4-Methylphenol	UG/L	2.2	5	1 U	1.1 U	2.2	0.53 J	1 U	1 U	1 U	1
Bis(2-Ethylhexyl)phthalate	UG/L	1.1	50	1 U	1.1 U	4.1 U	1.1 U	0.51 UJ	1 U	1.5 U	1
Di-n-butylphthalate	UG/L	0.15	50	0.15 J	1.1 U	1 U	1.1 U	1 U	1 U	1 U	1
Diethyl phthalate	UG/L	0.9		1 U	1.1 U	1 U	1.1 U	1 U	1 U	1 U	1
Naphthalene	UG/L	2.2		1 U	1.1 U	2.2	1.1 U	1 U	1 U	1 U	1
Phenol	UG/L	0.4	1	1 U	1.1 U	1 U	1.1 U	1 U	1 U	1 U	1
Nitroaromatics											
2-Nitrotoluene	UG/L	0.87		0.25 U	0.25 U	0.87	0.25 U	0.25 U	0.25 U	0.25 U	0.25
3-Nitrotoluene	UG/L	2.6		0.25 U	0.25 U	2.6	0.25 U	0.25 U	0.25 U	0.25 U	0.25
4-Nitrotoluene	UG/L	10		0.25 U	0.25 U	10	0.25 U	0.25 U	0.25 U	0.25 U	0.25
Nitrobenzene	UG/L	0.89		0.25 U	0.25 U	0.89	0.25 U	0.25 U	0.25 U	0.25 U	0.25
Pesticides/PCBs											
Aldrin	UG/L	0.0036	0.055	0.0065 U	0.006 U	0.0051 U	0.005 U	0.0052 U	0.0056 U	0.005 U	0.0056
Alpha-BHC	UG/L	0.0028		0.0065 U	0.006 U	0.0051 U	0.005 U	0.0052 U	0.0056 U	0.0028 J	0.0056
Aroclor-1260	UG/L	0.079	0.1	0.13 U	0.12 U	0.1 U	0.079 J	0.1 U	0.11 U	0.1 U	0.11
Delta-BHC	UG/L	0.0041		0.0065 U	0.006 U	0.0051 U	0.005 U	0.0052 U	0.0056 U	0.005 U	0.0056
Gamma-Chlordane	UG/L	0.0054		0.0065 U	0.006 U	0.0051 U	0.005 U	0.0052 U	0.0056 U	0.005 U	0.0056
Heptachlor	UG/L	0.0056	0.05	0.0065 U	0.006 U	0.0051 U	0.005 U	0.0052 U	0.0056 U	0.005 U	0.0056
Metals											
Aluminum	UG/L	3820	50	2430 J	322	222 J	167 J	947 J	1390	1260 J	1260
Antimony	UG/L	39.3	6	2.2 U	3.7 U	2.2 U	3.7 U	13.8 J	3.7 U	2.9 J	3.7
Arsenic	UG/L	6.5	25	1.8 U	5.2 U	1.8 U	6.5 J	1.8 U	5.2 U	1.8 U	5.2
Barium	UG/L	121	1000	30.9 J	22.3 J	27.6 J	33.4 J	35.2 J	55.1 J	53.8 J	57.3
Beryllium	UG/L	6.3	4	0.1 U	0.4 U	0.1 U	0.4 U	0.1 U	0.4 U	0.1 U	0.4
Cadmium	UG/L	5.6	10	0.3 U	0.9 U	0.3 U	0.9 U	0.3 U	0.9 U	0.3 U	0.9
Calcium	UG/L	147000		115000	112000	75800	81800	119000	84100	134000	128000
Chromium	UG/L	260	50	2.8 J	0.8 U	8.1 J	0.86 J	0.7 U	3.2 J	3.2 J	2.6
Cobalt	UG/L	8.2		1.5 U	3.4 U	1.5 U	3.4 U	1.5 U	3.4 U	1.5 J	3.4
Copper	UG/L	37.6	200	4.3 J	2.9 U	2.4 U	2.9 U	2.4 U	3.8 J	2.4 U	2.9
Iron	UG/L	6900	300	[redacted]	[redacted]	257	204	[redacted]	[redacted]	[redacted]	[redacted]
Lead	UG/L	2.2	25	0.9 U	0.8 U	0.9 UJ	0.8 U	0.9 UJ	0.8 U	0.9 UJ	0.8
Magnesium	UG/L	57600		51700	49000	28800	22600	40000	19800	30100	28100
Manganese	UG/L	855	300	42.9	17.8	246	145	288	229	262	137
Mercury	UG/L	0.04	2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1
Nickel	UG/L	9.9	100	6 J	4 U	1.9 J	4 U	1.4 U	4 U	4 J	4
Potassium	UG/L	14400		2900 J	2200 J	2000 J	3350 J	4570 J	4520 J	3110 J	1540
Selenium	UG/L	24	10	5.1	2.9 U	[redacted]	3.9 J	1.8 U	2.9 U	[redacted]	2.9
Silver	UG/L	6.7	50	0.9 U	2.5 U	1 J	2.5 U	0.9 U	2.5 U	0.9 U	2.5
Sodium	UG/L	82600	20000	6820	7930	7990	10200	[redacted]	[redacted]	[redacted]	[redacted]
Thallium	UG/L	4.9	2	1.9 U	3 U	3.3 J	3 U	1.9 U	3 U	4.9 J	3
Vanadium	UG/L	11.4		4.3 J	2.5 U	1.8 J	2.5 U	1.6 U	4.7 J	3.3 J	2.5
Zinc	UG/L	95	300	82.8	7.1 J	27.6	3 U	9 J	10.5 J	7.9 J	5.3

Attachment SEAD-4 Ground Water
Summary Statistics for Ground water Samples-Detects Only
SEAD-4 Remedial Investigation
Seneca Army Depot Activity

ANALYTE		MAXIMU	NYS CLASS GA	WATER Step 1	SEAD-4 MW4-13 GROUND WATER 3/31/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-13 GROUND WATER 7/9/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-2 GROUND WATER 4/1/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-3 GROUND WATER 3/29/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-3 GROUND WATER 7/7/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-4 GROUND WATER 4/24/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-4 GROUND WATER 7/8/1999 SA RI Phase 1 Step 1
Volatile Organic Compounds											
Acetone	UG/L	8		U	5 U		5 U	5 U	5 U	5 U	5 U
Benzene	UG/L	2	0.7	U	1 U		1 U	1 U	0.5 U	1 U	0.5 U
Ethyl benzene	UG/L	6	5	U	1 U		1 U	1 U	0.5 U	1 U	0.5 U
Toluene	UG/L	0.4	5	U	1 U		1 U	1 U	0.5 U	1 U	0.5 U
Total Xylenes	UG/L	4	5	U	1 U		1 U	1 U	0.5 U	1 U	0.5 U
Semivolatile Organic Compounds											
4-Methylphenol	UG/L	2.2	5	U	1 U		1 U	1.1 U	1 U	1.1 U	1.1 U
Bis(2-Ethylhexyl)phthalate	UG/L	1.1	50	U	1.3 U		1 U	1.1 U	1 U	1.1 J	1.1 U
Di-n-butylphthalate	UG/L	0.15	50	U	1 U		1 U	1.1 U	1 U	1.1 UJ	1.1 U
Diethyl phthalate	UG/L	0.9		U	1 U		1 U	1.1 U	1 U	0.061 J	1.1 U
Naphthalene	UG/L	2.2		U	1 U		1 U	1.1 U	1 U	1.1 U	1.1 U
Phenol	UG/L	0.4	1	U	1 U		1 U	1.1 U	1 U	1.1 U	1.1 U
Nitroaromatics											
2-Nitrotoluene	UG/L	0.87		U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
3-Nitrotoluene	UG/L	2.6		U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Nitrotoluene	UG/L	10		U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Nitrobenzene	UG/L	0.89		U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Pesticides/PCBs											
Aldrin	UG/L	0.0036	0.055	U	0.0055 U		0.0056 U	0.0052 U	0.0056 U	0.0056 U	0.0052 U
Alpha-BHC	UG/L	0.0028		U	0.0055 U		0.0056 U	0.0052 U	0.0056 U	0.0056 U	0.0052 U
Aroclor-1260	UG/L	0.079	0.1	U	0.11 U		0.11 U	0.1 U	0.11 U	0.11 U	0.1 U
Delta-BHC	UG/L	0.0041		U	0.0055 U		0.0056 U	0.0052 U	0.0056 U	0.0056 U	0.0052 U
Gamma-Chlordane	UG/L	0.0054		U	0.0054 J		0.0056 U	0.0052 U	0.0056 U	0.0056 U	0.0052 U
Heptachlor	UG/L	0.0056	0.05	J	0.0055 U		0.0056 U	0.0052 U	0.0056 U	0.0056 U	0.0052 U
Metals											
Aluminum	UG/L	3820	50		320 J	308		22.8 J	445	10.4 U	18.9 U
Antimony	UG/L	39.3	6	U	2.2 U	3.7 U		2.2 U	3.7 U	2.2 U	3.7 U
Arsenic	UG/L	6.5	25	U	1.8 U	5.9 J		1.8 U	5.2 U	1.8 U	5.2 U
Barium	UG/L	121	1000	J	30 J	118 J		46.1 J	54 J	37 J	41.1 J
Beryllium	UG/L	6.3	4	U	0.1 U	0.4 U		0.1 U	0.4 U	0.22 J	0.4 U
Cadmium	UG/L	5.6	10	U	0.3 U	0.9 U		0.3 U	0.9 U	0.3 U	0.9 U
Calcium	UG/L	147000			61900	103000		98400	96300	94200	91900
Chromium	UG/L	260	50	J	1.7 J	0.62 J		0.7 U	0.8 U	1.8 J	2.9 J
Cobalt	UG/L	8.2		U	1.5 U	3.4 U		1.5 U	3.4 U	1.5 U	3.4 U
Copper	UG/L	37.6	200	U	2.4 U	10.2 J		2.4 U	2.9 U	1 U	2.9 U
Iron	UG/L	6900	300		297	[redacted]		14.9 U	[redacted]	14.9 U	65.9 J
Lead	UG/L	2.2	25	U	0.9 UJ	0.8 U		0.9 UJ	0.8 U	0.9 U	0.8 U
Magnesium	UG/L	57600			5590	15600		25600	25700	13700	13400
Manganese	UG/L	855	300		[redacted]	[redacted]		0.4 U	11.4 J	0.4 U	7.4 J
Mercury	UG/L	0.04	2	U	0.1 U	0.1 U		0.1 U	0.1 U	0.1 UJ	0.1 U
Nickel	UG/L	9.9	100	U	3.1 J	5.8 J		1.4 U	4 U	1.4 U	4 U
Potassium	UG/L	14400		J	2990 J	14400		1480 J	1480 J	766 J	1110 J
Selenium	UG/L	24	10	U	1.8 U	2.9 U		1.8 U	2.9 U	1.8 U	2.9 U
Silver	UG/L	6.7	50	U	1.2 J	2.5 U		0.9 U	2.5 U	0.9 U	2.5 U
Sodium	UG/L	82600	20000		4650 J	8090		[redacted]	[redacted]	9270	10500
Thallium	UG/L	4.9	2	U	1.9 U	3 U		1.9 U	3 U	1.9 U	3 U
Vanadium	UG/L	11.4		U	1.6 U	2.5 U		1.6 U	2.5 U	1.6 U	2.5 U
Zinc	UG/L	95	300	J	9.3 J	16.2 J		3.2 J	4 J	6.2 J	4.3 J

Attachment SEAD-4 Ground Water
Summary Statistics for Ground water Samples-Detects Only
SEAD-4 Remedial Investigation
Seneca Army Depot Activity

ANALYTE		MAXIMU	NYS CLASS GA	SEAD-4 MW4-5 GROUND WATER 4/24/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-6 GROUND WATER 4/1/1999 DU RI Phase 1 Step 1	SEAD-4 MW4-6 GROUND WATER 4/1/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-6 GROUND WATER 7/10/1999 DU RI Phase 1 Step 1	SEAD-4 MW4-6 GROUND WATER 7/10/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-7 GROUND WATER 3/29/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-7 GROUND WATER 7/10/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-8 GROUND 3/30/1999 SA RI Phase
Volatile Organic Compounds											
Acetone	UG/L	8		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
Benzene	UG/L	2	0.7	1 U	1 U	1 U	0.5 U	0.5 U	1 U	0.5 U	1
Ethyl benzene	UG/L	6	5	1 U	1 U	1 U	0.5 U	0.5 U	1 U	0.5 U	1
Toluene	UG/L	0.4	5	1 U	1 U	1 U	0.5 U	0.5 U	1 U	0.5 U	1
Total Xylenes	UG/L	4	5	1 U	1 U	1 U	0.5 U	0.5 U	1 U	0.5 U	1
Semivolatile Organic Compounds											
4-Methylphenol	UG/L	2.2	5	1.1 U	1.1 U	1 U	1.1 U	1 U	1 U	1.2 U	1
Bis(2-Ethylhexyl)phthalate	UG/L	1.1	50	1.1 U	1.1 U	1 U	1.1 U	1 U	1 U	1.2 U	1.3
Di-n-butylphthalate	UG/L	0.15	50	1.1 U	1.1 U	1 U	1.1 U	1 U	1 U	1.2 U	1
Diethyl phthalate	UG/L	0.9		0.072 J	1.1 U	1 U	1.1 U	1 U	1 U	1.2 U	1
Naphthalene	UG/L	2.2		1.1 U	1.1 U	1 U	1.1 U	1 U	1 U	1.2 U	1
Phenol	UG/L	0.4	1	1.1 U	1.1 U	1 U	1.1 U	1 U	1 U	1.2 U	1
Nitroaromatics											
2-Nitrotoluene	UG/L	0.87		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25
3-Nitrotoluene	UG/L	2.6		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25
4-Nitrotoluene	UG/L	10		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25
Nitrobenzene	UG/L	0.89		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25
Pesticides/PCBs											
Aldrin	UG/L	0.0036	0.055	0.0056 U	0.0054 U	0.005 U	0.005 U	0.005 U	0.0036 J	0.0057 U	0.0051
Alpha-BHC	UG/L	0.0028		0.0056 U	0.0054 U	0.005 U	0.005 U	0.005 U	0.0052 U	0.0057 U	0.0051
Aroclor-1260	UG/L	0.079	0.1	0.11 U	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U	0.1
Delta-BHC	UG/L	0.0041		0.0056 U	0.0054 U	0.005 U	0.005 U	0.005 U	0.0052 U	0.0057 U	0.0051
Gamma-Chlordane	UG/L	0.0054		0.0056 U	0.0054 U	0.005 U	0.005 U	0.005 U	0.0052 U	0.0057 U	0.0051
Heptachlor	UG/L	0.0056	0.05	0.0056 U	0.0054 U	0.005 U	0.005 U	0.005 U	0.0038 J	0.0057 U	0.0051
Metals											
Aluminum	UG/L	3820	50	249	115 J	226 J	39.5 J	75.3 J	170 J	3820	176
Antimony	UG/L	39.3	6	2.2 U	2.2 U	2.8 J	3.7 U	5.2 U	2.2 U	3.7 U	3.2
Arsenic	UG/L	6.5	25	1.6 U	1.6 U	1.6 U	5.2 U	5.2 U	1.8 U	5.2 U	1.8
Barium	UG/L	121	1000	38.5 J	18.6 J	19.7 J	28.2 J	99.1 J	19.5 J	121 J	20.3
Beryllium	UG/L	6.3	4	0.26 J	0.1 U	0.1 U	0.4 U	0.4 U	0.1 U	0.4 U	0.1
Cadmium	UG/L	5.6	10	0.3 U	0.3 U	0.3 U	0.9 U	0.55 J	0.3 U	0.9 U	0.3
Calcium	UG/L	147000		128000	46300	48900	68100	73000	43800	102000	57300
Chromium	UG/L	260	50	0.7 U	1 J	0.7 U	0.8 U	0.8 U	0.7 U	9.3 J	2.3
Cobalt	UG/L	8.2		1.5 U	1.5 U	1.5 U	3.4 U	2.5 U	1.5 U	3.9 J	1.5
Copper	UG/L	37.6	200	1.9 J	2.4 U	2.4 U	2.9 U	4.5 J	2.4 U	6.6 J	2.4
Iron	UG/L	6900	300	296	153 J	245 J	20.8 U	76.7 J	196	[redacted]	228
Lead	UG/L	2.2	25	0.9 U	0.9 U	0.9 U	0.8 U	0.8 U	0.9 UJ	1 J	0.9
Magnesium	UG/L	57600		18400	5420	5700	8860	8890	5680	20200	6150
Manganese	UG/L	855	300	8.5 J	27.4	30.2	116	117	42.8	187	30.4
Mercury	UG/L	0.04	2	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1
Nickel	UG/L	9.9	100	2.2 J	2 J	1.4 U	4 U	2.3 U	1.5 J	9.9 J	1.4
Potassium	UG/L	14400		1050 J	260 J	366 J	1110 J	1090 J	1560 J	9450	968
Selenium	UG/L	24	10	3.2 J	1.8 U	1.8 U	2.9 U	2.9 UJ	2.6 J	2.9 UJ	[redacted]
Silver	UG/L	6.7	50	0.9 U	0.9 U	0.9 U	2.5 U	2.5 J	0.9 U	2.5 U	1.2
Sodium	UG/L	82800	20000	11200	2030 J	2280 J	6600	5560	5740	9380	3840
Thallium	UG/L	4.9	2	1.9 U	1.9 U	1.9 U	3 U	2.2 U	3.7 J	3 U	1.9
Vanadium	UG/L	11.4		1.6 U	1.6 U	1.6 U	2.5 U	2.9 U	1.6 U	11.4 J	1.9
Zinc	UG/L	95	300	10.8 J	48 J	2.3 J	3 UJ	81.1 J	3.5 J	29.5	8.8

Attachment SEAD-4 Ground Water
Summary Statistics for Ground water Samples-Detects Only
SEAD-4 Remedial Investigation
Seneca Army Depot Activity

ANALYTE		MAXIMU	NYS CLASS GA	WATER Step 1	SEAD-4 MW4-8 GROUND WATER 7/10/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-9 GROUND WATER 3/30/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-9 GROUND WATER 7/8/1999 SA RI Phase 1 Step 1	SEAD-4 MW4-9 GROUND WATER 7/8/1999 SA RI Phase 1 Step 1
Volatile Organic Compounds								
Acetone	UG/L	8		U	5 U	5 U	5 U	
Benzene	UG/L	2	0.7	U	0.5 U	1 U	0.5 U	
Ethyl benzene	UG/L	6	5	U	0.5 U	1 U	0.5 U	
Toluene	UG/L	0.4	5	U	0.5 U	1 U	0.5 U	
Total Xylenes	UG/L	4	5	U	0.5 U	1 U	0.5 U	
Semivolatile Organic Compounds								
4-Methylphenol	UG/L	2.2	5	U	1.1 U	1.1 U	1 U	
Bis(2-Ethylhexyl)phthalate	UG/L	1.1	50	U	2.2 U	4.2 U	1 U	
Di-n-butylphthalate	UG/L	0.15	50	U	1.1 U	1.1 U	1 U	
Diethyl phthalate	UG/L	0.9		U	1.1 U	1.1 U	1 U	
Naphthalene	UG/L	2.2		U	1.1 U	1.1 U	1 U	
Phenol	UG/L	0.4	1	U	1.1 U	0.4 J	1 U	
Nitroaromatics								
2-Nitrotoluene	UG/L	0.87		U	0.25 U	0.25 U	0.25 U	0.25 U
3-Nitrotoluene	UG/L	2.6		U	0.25 U	0.25 U	0.25 U	0.25 U
4-Nitrotoluene	UG/L	10		U	0.25 U	0.25 U	0.25 U	0.25 U
Nitrobenzene	UG/L	0.89		U	0.25 U	0.25 U	0.25 U	0.25 U
Pesticides/PCBs								
Aldrin	UG/L	0.0036	0.055	U	0.005 U	0.005 U	0.0056 U	
Alpha-BHC	UG/L	0.0028		U	0.005 U	0.005 U	0.0056 U	
Aroclor-1260	UG/L	0.079	0.1	U	0.1 U	0.1 U	0.11 U	
Delta-BHC	UG/L	0.0041		U	0.0041 J	0.005 U	0.0056 U	
Gamma-Chlordane	UG/L	0.0054		U	0.005 U	0.005 U	0.0056 U	
Heptachlor	UG/L	0.0056	0.05	U	0.005 U	0.005 U	0.0056 U	
Metals								
Aluminum	UG/L	3820	50	J	289	2040 J	91.8 J	
Antimony	UG/L	39.3	6	J	3.7 U	3.7 J	3.7 U	
Arsenic	UG/L	6.5	25	U	5.5 J	1.8 U	5.2 U	
Barium	UG/L	121	1000	J	39.2 J	32 J	44.4 J	
Beryllium	UG/L	6.3	4	U	0.4 U	0.1 U	0.4 U	
Cadmium	UG/L	5.6	10	U	0.9 U	0.3 U	0.9 U	
Calcium	UG/L	147000			107000	26400	92400	
Chromium	UG/L	260	50	J	1.8 J	[redacted]	21.8	
Cobalt	UG/L	8.2		U	3.4 U	1.5 U	3.4 U	
Copper	UG/L	37.6	200	U	3.2 J	2.4 U	2.9 U	
Iron	UG/L	6900	300		[redacted]	[redacted]	86.7 J	
Lead	UG/L	2.2	25	UJ	0.8 U	0.9 UJ	0.8 U	
Magnesium	UG/L	57600			20200	6500	20800	
Manganese	UG/L	855	300		[redacted]	13.5 J	87.6	
Mercury	UG/L	0.04	2	U	0.1 U	0.1 U	0.1 U	
Nickel	UG/L	9.9	100	U	4 U	2.1 J	4 U	
Potassium	UG/L	14400		J	8580	1130 J	3580 J	
Selenium	UG/L	24	10		3 J	1.8 U	2.9 U	
Silver	UG/L	6.7	50	J	2.5 U	0.9 U	2.5 U	
Sodium	UG/L	82600	20000	J	9930	6760	10500	
Thallium	UG/L	4.9	2	U	3 U	1.9 U	3 U	
Vanadium	UG/L	11.4		J	2.5 U	1.6 J	2.5 U	
Zinc	UG/L	95	300	J	3 U	12.2 J	3 U	

Ash Landfill IDW Plan: Table 3C

Attachment (Data Tables)

Table 3C
Ash Landfill Remedial Design/Feasibility Study
Drum Inventory/Disposal Plan
Seneca Army Depot Activity

Drum Num	Location	MEDIUM				Source/Start Date i.e.(MW, Boring, Decon. water, Condensate¹, PPE)	RCRA Hazardous/ Non-Hazardous	Contaminated/ Noncontaminated	*Chemical Of Concern (Exceeding TAGM Levels)	Rationale	Disposal Option (Offsite Hazardous) (Offsite Non-Hazardous) (Onsite)
		Soil	Water	PPE	Other						
AL-1S	Ash Landfill Staging Area	X				Drill Cuttings: MWT-11 3/29/1999	RCRA Non-Hazardous	Noncontaminated	None	< RCRA Criteria < TAGM	Onsite Non-Hazardous
AL-2S	Ash Landfill Staging Area	X				Drill Cuttings: MWT-7,9,&10 3/30/1999	RCRA Non-Hazardous	Noncontaminated	None	< RCRA Criteria < TAGM	Onsite Non-Hazardous
AL-3S	Ash Landfill Staging Area	X				Drill Cuttings: MWT-4 & 6 3/30/1999	RCRA Non-Hazardous	Noncontaminated	None	< RCRA Criteria < TAGM	Onsite Non-Hazardous
AL-4S	Ash Landfill Staging Area	X				Drill Cuttings: MWT-1 & 3 3/31/1999	RCRA Non-Hazardous	Noncontaminated	None	< RCRA Criteria < TAGM	Onsite Non-Hazardous
AL-5	Ash Landfill Staging Area				X	Lumber & Sheet Plastic Decon Pad 4/1/1999	RCRA Non-Hazardous	Noncontaminated	NA	Soils were cleaned from plastic sheeting prior to disassembly of decon pad Minimum Soil-No Threat	Offsite Non-Hazardous
AL-6W	Ash Landfill Staging Area		X			Decon Water (Steam Condensate) 3/30/1999	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
AL-7W	Ash Landfill Staging Area		X			Decon Water (Steam Condensate) 3/31/1999	RCRA Non-Hazardous	Noncontaminated	None	Steam Cleaning Condensate Minimum Soil-No Threat	Onsite Non-Hazardous
AL-8W	Ash Landfill Staging Area		X			Well Development & Purge Groundwater: MWT-11 4/2/1999	RCRA Non-Hazardous	Noncontaminated	None	< TCLP Limits < GA Standards	Onsite Non-Hazardous
AL-9W	Ash Landfill Staging Area		X			Well Development & Purge Groundwater: MWT-1 thru 11 4/1/1999	RCRA Non-Hazardous	**Contaminated**	VOC's: cis-1,2-Dichloroethene Trichloroethene	> GA Standards for TCE & DCE	On Site No Threat of contamination migration
AL-10W	Ash Landfill Staging Area		X			Well Development & Purge Groundwater: MWT-1 thru 11 4/1/1999	RCRA Non-Hazardous	**Contaminated**	VOC's: cis-1,2-Dichloroethene Trichloroethene	> GA Standards for TCE & DCE	On Site No Threat of contamination migration
AL-11W	Ash Landfill Staging Area		X			Well Development & Purge Groundwater: MWT-1 thru 11 4/1/1999	RCRA Non-Hazardous	**Contaminated**	VOC's: cis-1,2-Dichloroethene Trichloroethene	> GA Standards for TCE & DCE	On Site No Threat of contamination migration
AL-12W	Ash Landfill Staging Area		X			Well Development & Purge Groundwater: MWT-1 thru 11 4/1/1999	RCRA Non-Hazardous	**Contaminated**	VOC's: cis-1,2-Dichloroethene Trichloroethene	> GA Standards for TCE & DCE	On Site No Threat of contamination migration
AL-13W	Ash Landfill Staging Area		X			Purge Groundwater Ash Landfill: All Plume Wells 9/29/1999	RCRA Non-Hazardous	Contaminated	VOC's: Vinyl Chloride cis-1,2-Dichloroethene Trichloroethene	> TCLP Limits: TCE > GA Standards: V.C. & DCE	On Site No Threat of contamination migration
AL-14W	Ash Landfill Staging Area		X			Purge Groundwater Ash Landfill: All Plume Wells 10/21/1999	RCRA Non-Hazardous	**Contaminated**	VOC's: Vinyl Chloride cis-1,2-Dichloroethene Trichloroethene	> TCLP Limits: TCE > GA Standards: V.C. & DCE	On Site No Threat of contamination migration
AL-15W	Ash Landfill Staging Area		X			Purge Groundwater Ash Landfill: All Plume Wells 1/20/1999	RCRA Non-Hazardous	Contaminated	VOC's: Vinyl Chloride cis-1,2-Dichloroethene Trichloroethene	> TCLP Limits: TCE > GA Standards: V.C. & DCE	On Site No Threat of contamination migration
AL-16W	Ash Landfill Staging Area		X			Decon Water w/Solvents Calibration Waste 1/20/1999	RCRA Non-Hazardous	Contaminated	Diluted Isoprop.Alcohol & HNO_3 alibration Buffers, Quinhydrone	Disposal pre-determined by Plan	On Site No Threat of contamination migration

Attachment
Ground Water Analysis Results (VOC's Only) -Round 1
Ash Landfill Treatability Study
Seneca Army Depot Activity

			ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL	
			MWT-1		MWT-10		MWT-11		MWT-2		MWT-3		MWT-4		MWT-5	
			GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER	
			8		7		8		11.3		8		10		11.1	
			8		7		8		11.3		8		10		11.1	
			4/26/1999		4/26/1999		4/26/1999		4/28/1999		4/27/1999		4/26/1999		4/28/1999	
		NYSDEC	ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH	
		CLASS GA	TR2002		TR2001		TR2000		TR2008		TR2007		TR2004		TR2009	
		STANDARD	SA		SA		SA		SA		SA		SA		SA	
Volatile Organic Compounds			N		N		N		N		N		N		N	
1,1,1-Trichloroethane	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,1,2,2-Tetrachloroethane	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,1,2-Trichloroethane	UG/L		4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,1-Dichloroethane	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,1-Dichloroethene	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,2,4-Trichlorobenzene	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,2-Dibromo-3-chloropropane	UG/L		4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,2-Dibromoethane	UG/L		4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,2-Dichlorobenzene	UG/L	4.7	4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,2-Dichloroethane	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,2-Dichloropropane	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,3-Dichlorobenzene	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
1,4-Dichlorobenzene	UG/L	4.7	4	U	1	U	1	U	1	U	2	U	3	U	1	U
Acetone	UG/L		20	U	5	U	5	U	6		8	U	14	U	7	
Benzene	UG/L	1	4	U	0.7	J	1	U	0.7	J	0.4	J	3	U	0.9	J
Bromochloromethane	UG/L		4	U	1	U	1	U	1	U	2	U	3	U	1	U
Bromodichloromethane	UG/L		4	U	1	U	1	U	1	U	2	U	3	U	1	U
Bromoform	UG/L		4	U	1	U	1	U	1	U	2	U	3	U	1	U
Carbon disulfide	UG/L		4	U	1	U	1	U	1		2	U	3	U	1	U
Carbon tetrachloride	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
Chlorobenzene	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
Chlorodibromomethane	UG/L		4	U	1	U	1	U	1	U	2	U	3	U	1	U
Chloroethane	UG/L	5	4	UJ	1	UJ	1	UJ	1	U	2	UJ	3	UJ	1	U
Chloroform	UG/L	7	4	U	1	U	1	U	1	U	2	U	3	U	1	U
Cis-1,2-Dichloroethene	UG/L	5	[illegible]		6		1	U	[illegible]		27		[illegible]		0.7	J
Cis-1,3-Dichloropropene	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
Ethyl benzene	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
Methyl bromide	UG/L		4	U	1	U	1	U	1	U	2	U	3	U	1	U
Methyl butyl ketone	UG/L		20	U	5	U	5	U	5	U	8	U	14	U	5	U
Methyl chloride	UG/L	5	4	UJ	1	UJ	1	UJ	1	U	2	UJ	3	UJ	1	U
Methyl ethyl ketone	UG/L	50	20	U	5	U	5	U	5	U	8	U	14	U	5	U
Methyl isobutyl ketone	UG/L		20	U	5	U	5	U	5	U	8	U	14	U	5	U
Methylene chloride	UG/L	5	8	U	2	U	2	U	2	U	3	U	6	U	2	U
Styrene	UG/L		4	U	1	U	1	U	1	U	2	U	3	U	1	U
Tetrachloroethene	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
Toluene	UG/L	5	4	U	1	U	1	U	0.7	J	2	U	3	U	0.3	J
Total Xylenes	UG/L	5	4	U	1	U	1	U	1	U	2	- U	3	U	1	U
Trans-1,2-Dichloroethene	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
Trans-1,3-Dichloropropene	UG/L	5	4	U	1	U	1	U	1	U	2	U	3	U	1	U
Trichloroethene	UG/L	5	[illegible]		1	U	1	U	1		1	J	2	J	1	U
Vinyl chloride	UG/L	2	4	U	1	U	1	U	1	U	2	U	3	U	1	U

Attachment
Ground Water Analysis Results (VOC's Only) -Round 1
Ash Landfill Treatability Study
Seneca Army Depot Activity

			ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL	
			MWT-6		MWT-6		MWT-7		MWT-8		MWT-9	
			GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER	
			10.5		10.5		11.5		11.58		12.14	
			10.5		10.5		11.5		11.58		12.14	
			4/28/1999		4/28/1999		4/27/1999		4/28/1999		4/27/1999	
		NYSDEC	ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH	
		CLASS GA	TR2011		TR2006		TR2003		TR2010		TR2005	
		STANDARD	DU		SA		SA		SA		SA	
Volatile Organic Compounds			N		N		N		N		N	
1,1,1-Trichloroethane	UG/L	5	1	U	1	U	22	U	1	U	2	U
1,1,2,2-Tetrachloroethane	UG/L	5	1	U	1	U	22	U	1	U	2	U
1,1,2-Trichloroethane	UG/L		1	U	1	U	22	U	1	U	2	U
1,1-Dichloroethane	UG/L	5	1	U	1	U	22	U	1	U	2	U
1,1-Dichloroethene	UG/L	5	1	U	1	U	22	U	1	U	2	U
1,2,4-Trichlorobenzene	UG/L	5	1	U	1	U	22	U	1	U	2	U
1,2-Dibromo-3-chloropropane	UG/L		1	U	1	U	22	U	1	U	2	U
1,2-Dibromoethane	UG/L		1	U	1	U	22	U	1	U	2	U
1,2-Dichlorobenzene	UG/L	4.7	1	U	1	U	22	U	1	U	2	U
1,2-Dichloroethane	UG/L	5	1	U	1	U	22	U	1	U	2	U
1,2-Dichloropropane	UG/L	5	1	U	1	U	22	U	1	U	2	U
1,3-Dichlorobenzene	UG/L	5	1	U	1	U	22	U	1	U	2	U
1,4-Dichlorobenzene	UG/L	4.7	1	U	1	U	22	U	1	U	2	U
Acetone	UG/L		6		5		110	U	16		11	U
Benzene	UG/L	1	0.7	J	0.7	J	22	U	1	U	2	U
Bromochloromethane	UG/L		1	U	1	U	22	U	1	U	2	U
Bromodichloromethane	UG/L		1	U	1	U	22	U	1	U	2	U
Bromoform	UG/L		1	U	1	U	22	U	1	U	2	U
Carbon disulfide	UG/L		1	U	1	U	22	U	1	U	2	U
Carbon tetrachloride	UG/L	5	1	U	1	U	22	U	1	U	2	U
Chlorobenzene	UG/L	5	1	U	1	U	22	U	1	U	2	U
Chlorodibromomethane	UG/L		1	U	1	U	22	U	1	U	2	U
Chloroethane	UG/L	5	1	U	1	U	22	UJ	1	U	2	UJ
Chloroform	UG/L	7	1	U	1	U	22	U	1	U	2	U
Cis-1,2-Dichloroethene	UG/L	5	3		3		20	J	1	U	11	
Cis-1,3-Dichloropropene	UG/L	5	1	U	1	U	22	U	1	U	2	U
Ethyl benzene	UG/L	5	1	U	1	U	22	U	1	U	2	U
Methyl bromide	UG/L		1	U	1	U	22	U	1	U	2	U
Methyl butyl ketone	UG/L		5	U	5	U	110	U	5	U	11	U
Methyl chloride	UG/L	5	1	U	1	U	22	UJ	1	U	2	UJ
Methyl ethyl ketone	UG/L	50	5	U	5	U	110	U	5	U	11	U
Methyl isobutyl ketone	UG/L		5	U	5	U	110	U	5	U	11	U
Methylene chloride	UG/L	5	2	U	2	U	44	U	2	U	4	U
Styrene	UG/L		1	U	1	U	22	U	1	U	2	U
Tetrachloroethene	UG/L	5	1	U	1	U	22	U	1	U	2	U
Toluene	UG/L	5	1	U	1	U	22	U	1	U	2	U
Total Xylenes	UG/L	5	1	U	1	U	22	U	1	U	2	U
Trans-1,2-Dichloroethene	UG/L	5	1	U	1	U	22	U	1	U	2	U
Trans-1,3-Dichloropropene	UG/L	5	1	U	1	U	22	U	1	U	2	U
Trichloroethene	UG/L	5	1	U	1	U	430		1	U	43	
Vinyl chloride	UG/L	2	1	U	1	U	22	U	1	U	2	U

Attachment
Ground Water Analysis Results (VOC's Only) - Round 2
Ash Landfill Treatability Study
Seneca Army Depot Activity

			ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL	
			MWT-1		MWT-10		MWT-11		MWT-2		MWT-3		MWT-4	
			GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER	
			8.1		7		9.5		8		8		10	
			8.1		7		9.5		8		8		10	
			6/29/1999		6/29/1999		6/29/1999		6/29/1999		6/29/1999		6/29/1999	
		NYSDEC	ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH	
		CLASS GA	TR2023		TR2020		TR2029		TR2021		TR2022		TR2025	
	UNIT	STANDARD	SA		SA		SA		SA		SA		SA	
Volatile Organic Compounds			N		N		N		N		N		N	
1,1,1-Trichloroethane	UG/L	5	2	UJ	1	UJ	1	UJ	1	UJ	1	UJ	4	UJ
1,1,2,2-Tetrachloroethane	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
1,1,2-Trichloroethane	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
1,1-Dichloroethane	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
1,1-Dichloroethene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
1,2,4-Trichlorobenzene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
1,2-Dibromo-3-chloropropane	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
1,2-Dibromoethane	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
1,2-Dichlorobenzene	UG/L	4.7	2	U	1	U	1	U	1	U	1	U	4	U
1,2-Dichloroethane	UG/L	5	2	UJ	1	UJ	1	UJ	1	UJ	1	UJ	4	UJ
1,2-Dichloropropane	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
1,3-Dichlorobenzene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
1,4-Dichlorobenzene	UG/L	4.7	2	U	1	U	1	U	1	U	1	U	4	U
Acetone	UG/L		4	J	3	J	5	U	5		3	J	14	J
Benzene	UG/L	1	2	U	0.9	J	1	U	0.6	J	1	U	4	U
Bromochloromethane	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
Bromodichloromethane	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
Bromoform	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
Carbon disulfide	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
Carbon tetrachloride	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Chlorobenzene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Chlorodibromomethane	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
Chloroethane	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Chloroform	UG/L	7	2	U	1	U	1	U	1	U	1	U	4	U
Cis-1,2-Dichloroethene	UG/L	5	[redacted]		0.7	J	1	U	[redacted]		[redacted]		[redacted]	
Cis-1,3-Dichloropropene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Ethyl benzene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Methyl bromide	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
Methyl butyl ketone	UG/L		8	UJ	5	UJ	5	UJ	5	UJ	5	UJ	21	UJ
Methyl chloride	UG/L	5	2	UJ	1	UJ	1	UJ	1	UJ	1	UJ	4	UJ
Methyl ethyl ketone	UG/L	50	8	U	14		5	U	7		5		21	U
Methyl isobutyl ketone	UG/L		8	U	5	U	5	U	5	U	5	U	21	U
Methylene chloride	UG/L	5	3	U	2	U	2	U	2	U	2	U	8	U
Styrene	UG/L		2	U	1	U	1	U	1	U	1	U	4	U
Tetrachloroethene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Toluene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Total Xylenes	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Trans-1,2-Dichloroethene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Trans-1,3-Dichloropropene	UG/L	5	2	U	1	U	1	U	1	U	1	U	4	U
Trichloroethene	UG/L	5	[redacted]		1	U	1	U	1	U	0.8	J	2	J
Vinyl chloride	UG/L	2	2	U	1	U	1	U	1	U	1	U	4	U

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Attachment
Ground Water Analysis Results (VOC's Only) - Round 2
Ash Landfill Treatability Study
Seneca Army Depot Activity

			ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL	
			MWT-5		MWT-6		MWT-7		MWT-8		MWT-9	
			GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER	
			10		10		10		10		12	
			10		10		10		10		12	
			6/29/1999		6/29/1999		6/29/1999		6/29/1999		6/29/1999	
		NYSDEC	ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH	
		CLASS GA	TR2024		TR2028		TR2026		TR2030		TR2027	
	UNIT	STANDARD	SA		SA		SA		SA		SA	
Volatile Organic Compounds			N		N		N		N		N	
1,1,1-Trichloroethane	UG/L	5	1	UJ	1	UJ	31	UJ	2	UJ	8	UJ
1,1,2,2-Tetrachloroethane	UG/L	5	1	U	1	U	31	U	2	U	8	U
1,1,2-Trichloroethane	UG/L		1	U	1	U	31	U	2	U	8	U
1,1-Dichloroethane	UG/L	5	0.7	J	1	U	31	U	2	U	8	U
1,1-Dichloroethene	UG/L	5	1	U	1	U	31	U	2	U	8	U
1,2,4-Trichlorobenzene	UG/L	5	1	U	1	U	31	U	2	U	8	U
1,2-Dibromo-3-chloropropane	UG/L		1	U	1	U	31	U	2	U	8	U
1,2-Dibromoethane	UG/L		1	U	1	U	31	U	2	U	8	U
1,2-Dichlorobenzene	UG/L	4.7	1	U	1	U	31	U	2	U	8	U
1,2-Dichloroethane	UG/L	5	1	UJ	1	UJ	31	UJ	2	UJ	8	UJ
1,2-Dichloropropane	UG/L	5	1	U	1	U	31	U	2	U	8	U
1,3-Dichlorobenzene	UG/L	5	1	U	1	U	31	U	2	U	8	U
1,4-Dichlorobenzene	UG/L	4.7	1	U	1	U	31	U	2	U	8	U
Acetone	UG/L		3	J	3	J	140	J	4	J	24	J
Benzene	UG/L	1	0.8	J	0.7	J	31	U	2	U	8	U
Bromochloromethane	UG/L		1	U	1	U	31	U	2	U	8	U
Bromodichloromethane	UG/L		1	U	1	U	31	U	2	U	8	U
Bromoform	UG/L		1	U	1	U	31	U	2	U	8	U
Carbon disulfide	UG/L		1	U	1	U	31	U	2	U	8	U
Carbon tetrachloride	UG/L	5	1	U	1	U	31	U	2	U	8	U
Chlorobenzene	UG/L	5	1	U	1	U	31	U	2	U	8	U
Chlorodibromomethane	UG/L		1	U	1	U	31	U	2	U	8	U
Chloroethane	UG/L	5	1	U	1	U	31	U	2	U	8	U
Chloroform	UG/L	7	1	U	1	U	31	U	2	U	8	U
Cis-1,2-Dichloroethene	UG/L	5	20		17		32		47		150	
Cis-1,3-Dichloropropene	UG/L	5	1	U	1	U	31	U	2	U	8	U
Ethyl benzene	UG/L	5	1	U	1	U	31	U	2	U	8	U
Methyl bromide	UG/L		1	U	1	U	31	U	2	U	8	U
Methyl butyl ketone	UG/L		5	UJ	5	UJ	160	UJ	8	UJ	42	UJ
Methyl chloride	UG/L	5	1	UJ	1	UJ	31	UJ	2	UJ	8	UJ
Methyl ethyl ketone	UG/L	50	5	U	5	U	160	U	8	U	42	U
Methyl isobutyl ketone	UG/L		5	U	5	U	160	U	8	U	42	U
Methylene chloride	UG/L	5	2	U	2	U	63	U	3	U	17	U
Styrene	UG/L		1	U	1	U	31	U	2	U	8	U
Tetrachloroethene	UG/L	5	1	U	1	U	31	U	2	U	8	U
Toluene	UG/L	5	1	U	1	U	31	U	2	U	8	U
Total Xylenes	UG/L	5	1	U	1	U	31	U	2	U	8	U
Trans-1,2-Dichloroethene	UG/L	5	1	U	1	U	31	U	2	U	8	U
Trans-1,3-Dichloropropene	UG/L	5	1	U	1	U	31	U	2	U	8	U
Trichloroethene	UG/L	5	1	U	1	U	530	J	2	U	57	
Vinyl chloride	UG/L	2	1		0.7	J	31	U	1	J	8	U

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Attachment
Ground Water Analysis Results (VOC's Only) - Round 3
Ash Landfill Treatability Study
Seneca Army Depot Activity

			ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL	
			MWT-1		MWT-11		MWT-10		MWT-2		MWT-3		MWT-4		MWT-4	
			GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER	
			9		0		8		8.5		9.1		0		11	
			9		0		8		8.5		9.1		0		11	
			9/28/1999		9/29/1999		9/28/1999		9/28/1999		9/29/1999		9/29/1999		9/29/1999	
			ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH	
		NYSDEC	TR2040		TR2050		TR2049		TR2041		TR2042		TR2051		TR2043	
		CLASS GA	SA		SA		SA		SA		SA		DU		SA	
		STANDARD	N		N		N		N		N		N		N	
Volatile Organic Compounds																
1,1,1-Trichloroethane	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,1,2,2-Tetrachloroethane	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,1,2-Trichloroethane	UG/L		1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,1-Dichloroethane	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,1-Dichloroethene	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,2,4-Trichlorobenzene	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,2-Dibromo-3-chloropropane	UG/L		1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,2-Dibromoethane	UG/L		1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,2-Dichlorobenzene	UG/L	4.7	1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,2-Dichloroethane	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,2-Dichloropropane	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,3-Dichlorobenzene	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
1,4-Dichlorobenzene	UG/L	4.7	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Acetone	UG/L		5	UJ	5	UJ	15	UJ	6	UJ	5	UJ	14	UJ	14	R
Benzene	UG/L	1	1	U	1	U	1		0.8	J	1	U	3	U	3	U
Bromochloromethane	UG/L		1	U	1	U	1	U	1	U	1	U	3	U	3	U
Bromodichloromethane	UG/L		1	U	1	U	1	U	1	U	1	U	3	U	3	U
Bromoform	UG/L		1	U	1	U	1	U	1	U	1	U	3	U	3	U
Carbon disulfide	UG/L		1	U	1	U	1	U	1	U	1	U	3	U	3	U
Carbon tetrachloride	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Chlorobenzene	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Chlorodibromomethane	UG/L		1	U	1	U	1	U	1	U	1	U	3	U	3	U
Chloroethane	UG/L	5	1	UJ	1	UJ	1	UJ	1	UJ	1	UJ	3	UJ	3	UJ
Chloroform	UG/L	7	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Cis-1,2-Dichloroethene	UG/L	5	6		1	U	1	U	0.6	J	2		32		40	
Cis-1,3-Dichloropropene	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Ethyl benzene	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Methyl bromide	UG/L		1	UJ	1	UJ	1	UJ	1	UJ	1	UJ	3	U	3	UJ
Methyl butyl ketone	UG/L		5	U	5	U	5	U	5	U	5	U	14	U	14	U
Methyl chloride	UG/L	5	1	U	1	UJ	1	UJ	1	U	1	U	3	UJ	3	UJ
Methyl ethyl ketone	UG/L	50	5	UJ	5	UJ	6	UJ	5	UJ	5	UJ	14	UJ	14	UJ
Methyl isobutyl ketone	UG/L		5	U	5	U	5	U	5	U	5	U	14	U	14	U
Methylene chloride	UG/L	5	2	U	2	U	2	U	2	U	2	U	6	U	6	U
Styrene	UG/L		1	U	1	U	1	U	1	U	1	U	3	U	3	U
Tetrachloroethene	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Toluene	UG/L	5	1	U	1	U	0.3	J	0.2	J	1	U	3	U	3	U
Total Xylenes	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Trans-1,2-Dichloroethene	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Trans-1,3-Dichloropropene	UG/L	5	1	U	1	U	1	U	1	U	1	U	3	U	3	U
Trichloroethene	UG/L	5	2	U	1	U	1	U	1	U	1	U	3	U	3	U
Vinyl chloride	UG/L	2	1	U	1	U	1	U	1	U	1	U	3	U	3	U

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Attachment
Ground Water Analysis Results (VOC's Only) - Round 3
Ash Landfill Treatability Study
Seneca Army Depot Activity

			ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL		ASH LANDFILL	
			MWT-5		MWT-6		MWT-7		MWT-8		MWT-9	
			GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER		GROUND WATER	
			11		11.7		12.6		11.8		13.5	
			11		11.7		12.6		11.8		13.5	
			9/28/1999		9/29/1999		9/28/1999		9/28/1999		9/29/1999	
			ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH	
		NYSDEC	TR2044		TR2045		TR2046		TR2047		TR2048	
		CLASS GA	SA		SA		SA		SA		SA	
		STANDARD	N		N		N		N		N	
Volatile Organic Compounds												
1,1,1-Trichloroethane	UG/L	5	1	U	1	U	40	U	1	U	4	U
1,1,2,2-Tetrachloroethane	UG/L	5	1	U	1	U	40	U	1	U	4	U
1,1,2-Trichloroethane	UG/L		1	U	1	U	40	U	1	U	4	U
1,1-Dichloroethane	UG/L	5	0.5	J	0.4	J	40	U	1	U	4	U
1,1-Dichloroethene	UG/L	5	1	U	1	U	40	U	1	U	4	U
1,2,4-Trichlorobenzene	UG/L	5	1	U	1	U	40	U	1	U	4	U
1,2-Dibromo-3-chloropropane	UG/L		1	U	1	U	40	U	1	U	4	U
1,2-Dibromoethane	UG/L		1	U	1	U	40	U	1	U	4	U
1,2-Dichlorobenzene	UG/L	4.7	1	U	1	U	40	U	1	U	4	U
1,2-Dichloroethane	UG/L	5	1	U	1	U	40	U	1	U	4	U
1,2-Dichloropropane	UG/L	5	1	U	1	U	40	U	1	U	4	U
1,3-Dichlorobenzene	UG/L	5	1	U	1	U	40	U	1	U	4	U
1,4-Dichlorobenzene	UG/L	4.7	1	U	1	U	40	U	1	U	4	U
Acetone	UG/L		6	UJ	5	UJ	200	R	5	UJ	20	R
Benzene	UG/L	1	0.6	J	0.4	J	40	U	0.3	J	4	U
Bromochloromethane	UG/L		1	U	1	U	40	U	1	U	4	U
Bromodichloromethane	UG/L		1	U	1	U	40	U	1	U	4	U
Bromoform	UG/L		1	U	1	U	40	U	1	U	4	U
Carbon disulfide	UG/L		1	U	1	U	40	U	1	U	4	U
Carbon tetrachloride	UG/L	5	1	U	1	U	40	U	1	U	4	U
Chlorobenzene	UG/L	5	1	U	1	U	40	U	1	U	4	U
Chlorodibromomethane	UG/L		1	U	1	U	40	U	1	U	4	U
Chloroethane	UG/L	5	1	UJ	1	UJ	40	UJ	1	UJ	4	UJ
Chloroform	UG/L	7	1	U	1	U	40	U	1	U	4	U
Cis-1,2-Dichloroethene	UG/L	5	5		11		[illegible]	J	7		38	
Cis-1,3-Dichloropropene	UG/L	5	1	U	1	U	40	U	1	U	4	U
Ethyl benzene	UG/L	5	1	U	1	U	40	U	1	U	4	U
Methyl bromide	UG/L		1	UJ	1	UJ	40	UJ	1	UJ	4	UJ
Methyl butyl ketone	UG/L		5	U	5	U	200	U	5	U	20	U
Methyl chloride	UG/L	5	1	U	1	UJ	40	UJ	1	U	4	UJ
Methyl ethyl ketone	UG/L	50	5	UJ	5	UJ	200	UJ	9	UJ	20	UJ
Methyl isobutyl ketone	UG/L		5	U	5	U	200	U	5	U	20	U
Methylene chloride	UG/L	5	2	U	2	U	80	U	2	U	8	U
Styrene	UG/L		1	U	1	U	40	U	1	U	4	U
Tetrachloroethene	UG/L	5	1	U	1	U	40	U	1	U	4	U
Toluene	UG/L	5	1	U	1	U	40	U	1	U	4	U
Total Xylenes	UG/L	5	1	U	1	U	40	U	1	U	4	U
Trans-1,2-Dichloroethene	UG/L	5	1	U	1	U	40	U	1	U	4	U
Trans-1,3-Dichloropropene	UG/L	5	1	U	1	U	40	U	1	U	4	U
Trichloroethene	UG/L	5	1	U	1	U	480		1	U	56	
Vinyl chloride	UG/L	2	1	U	1	U	40	U	1	U	4	U

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Attachment
Ground Water Analysis Results (VOS's Only) - Round 4
Ash Landfill Treatability Study
Seneca Army Depot Activity

STUDY ID:			ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		NONE		NONE	
LOC ID:			MW-T2		MW-T5		MW-T8		MW-T7		MW-T4		MW-T10		NONE		NONE	
SDG:			76497		76497		76497		76497		76497		76497		76497		76497	
SAMP. DEPTH TOP:			8.5		11		11.8		12.6		11		8		NONE		NONE	
SAMP. DEPTH BOT:			8.5		11		11.8		12.6		11		8		NONE		NONE	
MATRIX:			WATER		WATER		WATER		WATER		WATER		WATER		NONE		NONE	
SAMP. DATE:			4-Jan-00		4-Jan-00		4-Jan-00		4-Jan-00		4-Jan-00		5-Jan-00		NONE		NONE	
SAMP_ID:		NYSDEC	TR2060		TR2061		TR2062		TR2063		TR2064		TR2065		TR2065MS		TR2065MSD	
FIELD QC CODE:		CLASS GA	SA		SA		SA		SA		SA		SA		NONE		NONE	
PARAMETER	UNIT	STANDARD	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Volatile Organic Compounds																		
1,1,1-Trichloroethane	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
1,1,2,2-Tetrachloroethane	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
1,1,2-Trichloroethane	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	4		4	
1,1-Dichloroethane	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
1,1-Dichloroethene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
1,2,4-Trichlorobenzene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	5		5	
1,2-Dibromo-3-chloropropane	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
1,2-Dibromoethane	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	4		4	
1,2-Dichlorobenzene	UG/L	4.7	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
1,2-Dichloroethane	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	5		5	
1,2-Dichloropropane	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	5		5	
1,3-Dichlorobenzene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
1,4-Dichlorobenzene	UG/L	4.7	2	U	1	U	3	U	31	U	3	U	1	U	[redacted]		4	
Acetone	UG/L		9	UJ	5	UJ	17	UJ	160	UJ	14	UJ	5	UJ	5	U	5	U
Benzene	UG/L	1	2	U	1	U	3	U	31	U	3	U	1	U	[redacted]		[redacted]	
Bromochloromethane	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Bromodichloromethane	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Bromoform	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	4		4	
Carbon disulfide	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Carbon tetrachloride	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	4		4	
Chlorobenzene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Chlorodibromomethane	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Chloroethane	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Chloroform	UG/L	7	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Cis-1,2-Dichloroethene	UG/L	5	[redacted]		[redacted]		[redacted]		[redacted]	J	[redacted]		0.6	J	0.6	J	0.6	J
Cis-1,3-Dichloropropene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	4		4	
Ethyl benzene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Methyl bromide	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Methyl butyl ketone	UG/L		9	UJ	5	UJ	17	UJ	160	UJ	14	UJ	5	UJ	5	U	5	U
Methyl chloride	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Methyl ethyl ketone	UG/L	50	9	UJ	5	UJ	17	UJ	160	UJ	14	UJ	5	UJ	5	U	5	U
Methyl isobutyl ketone	UG/L		9	U	5	U	17	U	160	U	14	U	5	U	5	U	5	U
Methylene chloride	UG/L	5	4	U	2	U	7	U	63	U	6	U	2	U	2	U	2	U
Styrene	UG/L		2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Tetrachloroethene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	5		5	
Toluene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Total Xylenes	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Trans-1,2-Dichloroethene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Trans-1,3-Dichloropropene	UG/L	5	2	U	1	U	3	U	31	U	3	U	1	U	1	U	1	U
Trichloroethene	UG/L	5	2	U	1	U	3	U	[redacted]		3	U	1	U	4		4	
Vinyl chloride	UG/L	2	2	U	1	U	3	U	31	U	3	U	1	U	[redacted]		[redacted]	

Attachment
Ground Water Analysis Results (VOS's Only) - Round 4
Ash Landfill Treatability Study
Seneca Army Depot Activity

STUDY ID:			ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH		ASH TRENCH	
LOC ID:			MW-T11		MW-T10		MW-T1		MW-T3		MW-T6		MW-T9	
SDG:			76497		76497		76497		76497		76497		76497	
SAMP. DEPTH TOP:			8		8		9		8		10		10	
SAMP. DEPTH BOT:			8		8		9		8		10		10	
MATRIX:			WATER		WATER		WATER		WATER		WATER		WATER	
SAMP. DATE:			5-Jan-00		5-Jan-00		5-Jan-00		5-Jan-00		5-Jan-00		5-Jan-00	
SAMP_ID:		NYSDEC	TR2066		TR2067		TR2068		TR2069		TR2070		TR2071	
FIELD QC CODE:		CLASS GA	SA		DU		SA		SA		SA		SA	
PARAMETER	UNIT	STANDARD	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q	VALUE	Q
Volatile Organic Compounds														
1,1,1-Trichloroethane	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
1,1,2,2-Tetrachloroethane	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
1,1,2-Trichloroethane	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
1,1-Dichloroethane	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
1,1-Dichloroethene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
1,2,4-Trichlorobenzene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
1,2-Dibromo-3-chloropropane	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
1,2-Dibromoethane	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
1,2-Dichlorobenzene	UG/L	4.7	1	U	1	U	4	U	3	U	1	U	3	U
1,2-Dichloroethane	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
1,2-Dichloropropane	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
1,3-Dichlorobenzene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
1,4-Dichlorobenzene	UG/L	4.7	1	U	1	U	4	U	3	U	1	U	3	U
Acetone	UG/L		5	UJ	5	UJ	22	UJ	14	UJ	2	J	14	UJ
Benzene	UG/L	1	1	U	1	U	4	U	3	U	1	U	3	U
Bromochloromethane	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
Bromodichloromethane	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
Bromoform	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
Carbon disulfide	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
Carbon tetrachloride	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Chlorobenzene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Chlorodibromomethane	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
Chloroethane	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Chloroform	UG/L	7	1	U	1	U	4	U	3	U	1	U	3	U
Cis-1,2-Dichloroethene	UG/L	5	1	U	0.6	J	72		48		10		44	
Cis-1,3-Dichloropropene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Ethyl benzene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Methyl bromide	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
Methyl butyl ketone	UG/L		5	UJ	5	UJ	22	UJ	14	UJ	5	UJ	14	UJ
Methyl chloride	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Methyl ethyl ketone	UG/L	50	5	UJ	5	UJ	22	UJ	14	UJ	5	UJ	14	UJ
Methyl isobutyl ketone	UG/L		5	U	5	U	22	U	14	U	5	U	14	U
Methylene chloride	UG/L	5	2	U	2	U	9	U	6	U	2	U	6	U
Styrene	UG/L		1	U	1	U	4	U	3	U	1	U	3	U
Tetrachloroethene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Toluene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Total Xylenes	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Trans-1,2-Dichloroethene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Trans-1,3-Dichloropropene	UG/L	5	1	U	1	U	4	U	3	U	1	U	3	U
Trichloroethene	UG/L	5	1	U	1	U	18		2	J	1	U	32	
Vinyl chloride	UG/L	2	1	U	1	U	4	U	3	U	1	U	3	U

Attachment
Ground Water Analysis Results (Ethene Detects Only) - Round 1
Ash Landfill Remedial Design
Seneca Army Depot Activity

ASH LANDFILL ROUND 1 DESIGN SAMPLING - OCTOBER 1999 (UG/L)

LOC_ID	SAMP_ID	UNITS	TCE	TCE Q	DCE	DCE Q	VC	VC Q
BN-S	ARD2038	ug/l	10	U	10	U	10	U
FH-D	ARD2036	ug/l	10	U	10	U	10	U
FH-S	ARD2037	ug/l	10	U	10	U	10	U
MW-12A (PT-12)	ARD2047	ug/l	840		940		11	J
MW-27	ARD2030	ug/l	10	U	10	U	10	U
MW-28	ARD2044	ug/l	21		19		10	U
MW-29	ARD2056	ug/l	3	J	110		10	U
MW-30	ARD2028	ug/l	2	J	10	U	10	U
MW-31	ARD2003	ug/l	10	U	10	U	10	U
MW-32	ARD2029	ug/l	10	U	10	U	10	U
MW-33	ARD2020	ug/l	10	U	10	U	10	U
MW-34	ARD2021	ug/l	10	U	10	U	10	U
MW-35D	ARD2043	ug/l	10	U	10	U	10	U
MW-36	ARD2040	ug/l	10	U	10	U	10	U
MW-36	ARD2041	ug/l	10	U	10	U	10	U
MW-37	ARD2017	ug/l	10	U	10	U	10	U
MW-38D	ARD2015	ug/l	10	U	10	U	10	U
MW-39	ARD2007	ug/l	10	U	10	U	10	U
MW-40	ARD2008	ug/l	10	U	10	U	10	U
MW-41D	ARD2001	ug/l	10	U	10	U	10	U
MW-42D	ARD2053	ug/l	10	U	10	U	10	U
MW-43	ARD2049	ug/l	10	U	10	U	10	U
MW-44A	ARD2050	ug/l	26	J	690		180	
MW-45	ARD2054	ug/l	10	U	10	U	10	U
MW-46	ARD2009	ug/l	57		73		1	J
MW-47	ARD2032	ug/l	10	U	10	U	10	U
MW-48	ARD2012	ug/l	10	U	10	U	10	U
MW-49D	ARD2011	ug/l	4	J	14		10	U
MW-50D	ARD2010	ug/l	10	U	10	U	10	U
MW-51D	ARD2033	ug/l	10	U	10	U	10	U
MW-52D	ARD2034	ug/l	10	U	10	U	10	U
MW-53	ARD2055	ug/l	2	J	15		10	U
MW-54D	ARD2023	ug/l	10	U	2	J	10	U
MW-55D	ARD2022	ug/l	10	U	10	U	10	U
MW-56	ARD2035	ug/l	10	U	10	U	10	U
MW-57D	ARD2039	ug/l	10	U	10	U	10	U
MW-58D	ARD2042	ug/l	10	U	10	U	10	U
MW-59	ARD2005	ug/l	10	U	10	U	10	U
MW-60	ARD2004	ug/l	10	U	10	U	10	U
PT-10	ARD2002	ug/l	10	U	10	U	10	U
PT-11	ARD2006	ug/l	10	U	10	U	10	U
PT-15	ARD2031	ug/l	10	U	10	U	10	U
PT-16	ARD2013	ug/l	10	U	10	U	10	U
PT-16	ARD2014	ug/l	10	U	10	U	10	U
PT-17	ARD2027	ug/l	110		16		10	U
PT-18	ARD2048	ug/l	9100		1100		540	U
PT-19	ARD2018	ug/l	10	U	10	U	10	U
PT-20	ARD2025	ug/l	36		29		10	U
PT-20	ARD2026	ug/l	36		28		10	U
PT-21A	ARD2046	ug/l	6	J	16		10	U
PT-22	ARD2045	ug/l	74		88		10	U
PT-23	ARD2016	ug/l	10	U	10	U	10	U
PT-24	ARD2000	ug/l	4	J	86		10	U
PT-25	ARD2019	ug/l	10	U	10	U	10	U
PT-26	ARD2057	ug/l	10	U	10	U	10	U

Attachment
Ground Water Analysis Results (Ethene Detects Only) - Round 1
Ash Landfill Remedial Design
Seneca Army Depot Activity

ASH LANDFILL ROUND 1 DESIGN SAMPLING - OCTOBER 1999 (UG/L)

LOC_ID	SAMP_ID	UNITS	TCE	TCE Q	DCE	DCE Q	VC	VC Q
BN-S	ARD2038	ug/l	10	U	10	U	10	U
FH-D	ARD2036	ug/l	10	U	10	U	10	U
FH-S	ARD2037	ug/l	10	U	10	U	10	U
MW-12A (PT-12)	ARD2047	ug/l	840		940		11	J
MW-27	ARD2030	ug/l	10	U	10	U	10	U
MW-28	ARD2044	ug/l	21		19		10	U
MW-29	ARD2056	ug/l	3	J	110		10	U
MW-30	ARD2028	ug/l	2	J	10	U	10	U
MW-31	ARD2003	ug/l	10	U	10	U	10	U
MW-32	ARD2029	ug/l	10	U	10	U	10	U
MW-33	ARD2020	ug/l	10	U	10	U	10	U
MW-34	ARD2021	ug/l	10	U	10	U	10	U
MW-35D	ARD2043	ug/l	10	U	10	U	10	U
MW-36	ARD2040	ug/l	10	U	10	U	10	U
MW-36	ARD2041	ug/l	10	U	10	U	10	U
MW-37	ARD2017	ug/l	10	U	10	U	10	U
MW-38D	ARD2015	ug/l	10	U	10	U	10	U
MW-39	ARD2007	ug/l	10	U	10	U	10	U
MW-40	ARD2008	ug/l	10	U	10	U	10	U
MW-41D	ARD2001	ug/l	10	U	10	U	10	U
MW-42D	ARD2053	ug/l	10	U	10	U	10	U
MW-43	ARD2049	ug/l	10	U	10	U	10	U
MW-44A	ARD2050	ug/l	26	J	690		180	
MW-45	ARD2054	ug/l	10	U	10	U	10	U
MW-46	ARD2009	ug/l	57		73		1	J
MW-47	ARD2032	ug/l	10	U	10	U	10	U
MW-48	ARD2012	ug/l	10	U	10	U	10	U
MW-49D	ARD2011	ug/l	4	J	14		10	U
MW-50D	ARD2010	ug/l	10	U	10	U	10	U
MW-51D	ARD2033	ug/l	10	U	10	U	10	U
MW-52D	ARD2034	ug/l	10	U	10	U	10	U
MW-53	ARD2055	ug/l	2	J	15		10	U
MW-54D	ARD2023	ug/l	10	U	2	J	10	U
MW-55D	ARD2022	ug/l	10	U	10	U	10	U
MW-56	ARD2035	ug/l	10	U	10	U	10	U
MW-57D	ARD2039	ug/l	10	U	10	U	10	U
MW-58D	ARD2042	ug/l	10	U	10	U	10	U
MW-59	ARD2005	ug/l	10	U	10	U	10	U
MW-60	ARD2004	ug/l	10	U	10	U	10	U
PT-10	ARD2002	ug/l	10	U	10	U	10	U
PT-11	ARD2006	ug/l	10	U	10	U	10	U
PT-15	ARD2031	ug/l	10	U	10	U	10	U
PT-16	ARD2013	ug/l	10	U	10	U	10	U
PT-16	ARD2014	ug/l	10	U	10	U	10	U
PT-17	ARD2027	ug/l	110		16		10	U
PT-18	ARD2048	ug/l	9100		1100		540	U
PT-19	ARD2018	ug/l	10	U	10	U	10	U
PT-20	ARD2025	ug/l	36		29		10	U
PT-20	ARD2026	ug/l	36		28		10	U
PT-21A	ARD2046	ug/l	6	J	16		10	U
PT-22	ARD2045	ug/l	74		88		10	U
PT-23	ARD2016	ug/l	10	U	10	U	10	U
PT-24	ARD2000	ug/l	4	J	86		10	U
PT-25	ARD2019	ug/l	10	U	10	U	10	U
PT-26	ARD2057	ug/l	10	U	10	U	10	U

Ash Trench Soil Data

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASH1

Lab Name: SEVERN TRENT LABORATORIES Contract: 98035

Lab Code: INCHVT Case No.: 98035 SAS No.: SDG No.: 71813

Matrix: (soil/water) SOIL Lab Sample ID: 373788

Sample wt/vol: 3.0 (g/mL) G Lab File ID: 0373788DV

Level: (low/med) LOW Date Received: 12/11/98

% Moisture: not dec. 11 Date Analyzed: 12/11/98

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:________(uL) Soil Aliquot Volume: ________(uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION	Q
74-87-3	Chloromethane	19	U
74-83-9	Bromomethane	19	U
75-01-4	Vinyl Chloride	19	U
75-00-3	Chloroethane	19	U
75-09-2	Methylene Chloride	19	U
67-64-1	Acetone	19	U
75-15-0	Carbon Disulfide	19	U
75-35-4	1,1-Dichloroethene	19	U
75-34-3	1,1-Dichloroethane	19	U
540-59-0	1,2-Dichloroethene (total)	2	J
67-66-3	Chloroform	19	U
107-06-2	1,2-Dichloroethane	19	U
78-93-3	2-Butanone	19	U
71-55-6	1,1,1-Trichloroethane	19	U
56-23-5	Carbon Tetrachloride	19	U
75-27-4	Bromodichloromethane	19	U
78-87-5	1,2-Dichloropropane	19	U
10061-01-5	cis-1,3-Dichloropropene	19	U
79-01-6	Trichloroethene	160	
124-48-1	Dibromochloromethane	19	U
79-00-5	1,1,2-Trichloroethane	19	U
71-43-2	Benzene	19	U
10061-02-6	trans-1,3-Dichloropropene	19	U
75-25-2	Bromoform	19	U
108-10-1	4-Methyl-2-Pentanone	19	U
591-78-6	2-Hexanone	19	U
127-18-4	Tetrachloroethene	19	U
79-34-5	1,1,2,2-Tetrachloroethane	19	U
108-88-3	Toluene	4	J
108-90-7	Chlorobenzene	19	U
100-41-4	Ethylbenzene	19	U
100-42-5	Styrene	19	U
1330-20-7	Xylene (total)	19	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ASH2

Lab Name: SEVERN TRENT LABORATORIES Contract: 98035

Lab Code: INCHVT Case No.: 98035 SAS No.: SDG No.: 71878

Matrix: (soil/water) SOIL Lab Sample ID: 374267

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 0374267V

Level: (low/med) LOW Date Received: 12/15/98

% Moisture: not dec. 12 Date Analyzed: 12/21/98

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:________(uL) Soil Aliquot Volume: ________(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	11	U
67-64-1	Acetone	6	JB
75-15-0	Carbon Disulfide	11	U
75-35-4	1,1-Dichloroethene	11	U
75-34-3	1,1-Dichloroethane	11	U
540-59-0	1,2-Dichloroethene (total)	20	
67-66-3	Chloroform	11	U
107-06-2	1,2-Dichloroethane	11	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	11	U
56-23-5	Carbon Tetrachloride	11	U
75-27-4	Bromodichloromethane	11	U
78-87-5	1,2-Dichloropropane	11	U
10061-01-5	cis-1,3-Dichloropropene	11	U
79-01-6	Trichloroethene	3	J
124-48-1	Dibromochloromethane	11	U
79-00-5	1,1,2-Trichloroethane	11	U
71-43-2	Benzene	11	U
10061-02-6	trans-1,3-Dichloropropene	11	U
75-25-2	Bromoform	11	U
108-10-1	4-Methyl-2-Pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	11	U
79-34-5	1,1,2,2-Tetrachloroethane	11	U
108-88-3	Toluene	2	J
108-90-7	Chlorobenzene	11	U
100-41-4	Ethylbenzene	11	U
100-42-5	Styrene	11	U
1330-20-7	Xylene (total)	11	U

FORM I VOA OLM03.0