452-#7

DEPARTMENT OF THE ARMY
Office of the Assistant Chief of Staff for Installation Management
BRAC Division
Seneca Army Depot, Seneca, NY

MEMORANDUM FOR RECORD 16 May 2017

SUBJECT: Environmental Liabilities for site SEAD-001-R-01, Deactivation Furnaces (SEAD-16, 17) at Seneca Army Depot

1. This memorandum serves as formal documentation of the information used to develop the Cost-To-Complete (CTC) estimate for SEAD 001-R-01 for the 2016 data call. Estimators experience is documented on the Estimator Experience Form (Enclosure 1), per the Financial Accounting Standards Board Handbook (FASB) Technical Release 2. The Environmental Liabilities training documentation is included in enclosure 1.

2. The Final ROD for SEAD-16 and SEAD-17 March 2006, (Enclosure 2) is the regulatory driver for this cost requirement.

3. The exit strategy is based upon the Guidance document "Groundwater Statistics and Monitoring Compliance by ITRC dated Dec 2013(Enclosure 3) and the "Statistical Analysis if Groundwater Monitoring Data at RCRA Facilities", Unified Guidance, EPA 530/R-09-007 dated March 2009. (Enclosure 4)

4. LUC costs and groundwater monitoring costs are based upon the contract W912DY-09-D-0062 Delivery Order 23 (Enclosure 4).

5. Site Closeout and well decommissioning is expected to take place in FY 21 when GW testing is expected to be terminated. Future monitoring cost is based on task order pricing for monitoring (enclosure 4). Well Abandonment costs including site closeout were estimated using costs from the FY11 contract W912DY-08-D-0003, Task Order 0008; 6 wells @ $31,398= $5,223, and closeout report, $18,206.00. These costs were escalated to FY16 in the FY16 CTC. These costs were escalated from FY16 to FY17 using the FY17 escalation factor in the 3 April 2017 Data Call Memorandum. The technical and project management oversight costs were estimated using the hourly rates in the FY17 Data Call Memorandum. Seneca Army Depot Activity is in the "other US" areas and additional locality adjustment is not required. RA (O) in the form of groundwater monitoring costs were obtained from the contract task order.

6. The Estimate Summary Table is shown in Enclosure 5.

7. COE oversight costs for groundwater monitoring are estimated by estimated loaded rate hours and loaded rates shown in this MFR. COE loaded rates are based upon the Army Management System calculations at the time of

estimate. Hours are based upon project management for scoping, contract management and stakeholder interaction over the life of the project.

8. Technical and project management costs for well abandonment and closeout reports are estimated by estimated hours and rates shown in the 3 April Data Call Memorandum. Estimated hours are based upon project and technical management requirements for scoping, contract management and stakeholder interaction over the life of the project.

9. Engineering Estimates for Well Abandonment and Site Closeout are included in Enclosure 6.

10. **Site History:** Formerly known as SEAD-016/017, this site includes former and existing popping plants. The "Abandoned Deactivation Furnace (SEAD-016)", located in the east-central portion of SEDA, consists of 2.6 acres of fenced land with grasslands, a storage area and the building housing the deactivation furnace. The "Existing Deactivation Furnace (SEAD-017)" is located adjacent to and southwest of SEAD-016 and consists of a deactivation furnace building surrounded by a crushed shale road. The RI identified lead in building materials and soil and PAHs in the soil at SEAD-016. Lead concentrations in the soil at SEAD-016 were of concern. Metals in GW were also identified as a contaminant. A ROD was signed by the regulators on Sept. 29, 2006. The RA took place in FY07 which removed contaminated soil to an approved off-site disposal facility and the demolition of all structures on the site. Upon completion of the RA, LTM was initiated and GW sampling began to demonstrate that the removal action did not have any further impacts on GW.

11. **Current Condition:** SEAD 001-R-01 is in LTM phase with the GW being monitored to demonstrate that the RA did not further degrade the GW. LUC monitoring cost and the five-year review requirements are included with Site SEAD 009 as a single installation activity. The concentrations have decreased but have not yet met standards. The five year review has not yet been submitted; EPA has not agreed with discontinuing the groundwater monitoring as of May 6, 2016.

12. **Exit Strategy**: GW monitoring will discontinue when statistical evaluation shows there was no degradation of the GW as a result of the RA. At the end of the GW monitoring in FY 15, 8 rounds will have been collected and analyzed which is sufficient to for the statistics required to discontinue the monitoring program. (See Encl 3). Upon demonstration that GW has met the established cleanup goal, GW sampling will be eliminated and LUC restriction will be eliminated. Monitoring was expected to end in 2016 the Annual Report will document the end of monitoring.

EPA reviewed this status in the Five Year Review Report, to be submitted FY16 and the Annual Report Year 8 for this site. EPA required two additional sampling

events during the next Five Year Review Period. This basis is their letter dated October 18, 2016 (Enclosure 7). Groundwater monitoring can be discontinued only with EPA concurrence. The Cost Estimate assumes one additional year of groundwater monitoring will need to be performed pending EPA review of the Five Year Review.

13. **Enclosures**:
    a. Enclosure 1: Estimator Experience Form and Env. Liabilities
    b. Enclosure 2: Final ROD for SEAD-16 and SEAD-17 March 2006
    c. Enclosure 3: Groundwater Statistics and Monitoring Compliance by ITRC dated Dec 2013
    d. Enclosure 4:
        i. "Statistical Analysis if Groundwater Monitoring Data at RCRA Facilities", Unified Guidance, EPA 530/R-09-007 dated March 2009.
        i. Contract no. W912DS-09-D-0062, Task Order 0023
        ii. Escalation Factors per 3 April 17 Data call
    e. Enclosure 5: Estimate Summary Table
    f. Enclosure 6: Engineering Estimate for Site Closeout and Well Abandonment
    g. Enclosure 7: EPA letter dated October 18, 2017, Draft Annual Report Year 8: Abandoned Deactivation Furnace (SEAD 16) and Active Deactivation Furnace (SEAD 17)

14. Engineering Estimate Assumptions:

Well Abandonment /Site Closeout Documentation (LTM phase):

Well Abandonment:

1. Number of wells: 12
2. Depth: 15 feet
3. Diameter: 2"
4. Formation type: Unconsolidated
5. Method: Overdrill/removal

Site Completion Documentation: Well Abandonment:

1. Site Closeout is moderate complexity
2. Kick-off, review and regulatory meetings included
3. Work Plans and reports--all RACER default values
4. Documents will be stored for 30 years

15. Cost Summary: SEAD-001-R-01 (SEAD-16/17)

Ground Water sampling FY16 (Encl 4) CLIN 0007a= $23,146.49 (Rounded to $23,150)	$ 23,150
Cost to Owner for Contract Mgt: $184.50 x 15 hours = $2,767.50(Rounded $2,768)	$ 2,768
Well Abandonment/Site Closeout $123,221.33 (Rounded to $123,221)	$123,221
Total Site Cost	**$149,139**

Material Change: The CTC for FY17 was $149,139 the CTC for FY16 was $125,114. The calculated percentage change was 19%. This is a Material Change. LTM costs for specific groundwater monitoring were included in FY16, and are shown in the CTC for those specific sites. There is an additional year of groundwater monitoring due to EPA concurrence. There is a material change due to the technical and project management oversight rate calculation and escalation rate.

$$\text{Material Change} = \frac{\text{absolute value (escalated prior year CTC – current CTC – current obligations)}}{\text{Escalated prior year CTC}}$$

MC = (($149,139 * 1.0338) – $125,114K – 0) / ($149,139 * 1.0338) = 18.8%
(Rounded to 19%

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Prepared by: Randall Battaglia
Cost Estimator

Signature Date

Reviewed by: William W. Millar
Cost Estimate Reviewer

Signature Date

ESTIMATOR EXPERIENCE

ESTIMATOR NAME: Randall Battaglia	**POSITION: Project Manager**
LOCATION: USACE NY Seneca Proj. Ofc	**YEARS OF EXPERIENCE: 31 years**
EMAIL: Randy.W.Battaglia@usace.army.mil	**PHONE NUMBER:607-869-1532**

DESCRIPTION: (Insert description of experience here, such as educational background, training, etc.)
B.S. Chemical Engineering, 1982; Certified Project Manager, 2007

Work Experience: Project Manager, USACE, 1995-Present: Prepare and manage Life-Cycle Cost for HTRW projects; executes the COE project management business process & establishing a project management plan with a project development team consisting of interdisciplinary, regional or other agencies teams to execute & ensure all projects meet customer, budgetary, safety, scope and schedule requirements during the life cycle of the project, under changing management parameters. Represents the Army as an Alternate for the installation manager in all customer/sponsor, congressional, public contacts, including public meetings, organizations, property transfers with the state, EPA, county, & independent organizations interested in the projects. Served also as the BRAC Environmental Coordinator, 2016-Present.

Environmental Coordinator, Seneca Army Depot, 1985-1995; performed all program management, cost estimation, budget regulatory, permitting, and other management for the environmental program at the active Seneca Army Depot for hazardous waste, TSDF, air, wetlands, CERCLA, RCRA, engineering projects, etc.

Process Engineer, IEC Electronics, 1983-1985 Process engineering for production, product development, personnel, process & Quality

Relevant Continuing Education: Network Systems Analysis; Project Management for Military Projects & HTRW projects; Environmental Auditing; Economic Assessment; Various Project Management & environmental remediation courses; Cost Estimating

SITE TYPE REVIEWED: Insert site number(s) at which experience gained for each site type to the maximum extent possible.

	SITE TYPE	SITE NUMBER		SITE TYPE	SITE NUMBER
	Above Ground Storage Tank	SEAD 5,59,71		Open Burn	SEAD 23, 24, 006-R-01, 003-R-01, 007-R-01
	Burn Area	SEAD 24,45,25,26		Plating Shop	
	Chemical Disposal	SEAD 13,72,4		POL (Petroleum/Lubricant Lines	SEAD 9
	Contaminated Buildings	SEAD 12, 16,17, 3		Radioactive Waste Area	SEAD 012,48,72, 63, NRC License closeout
	Contaminated Fill	SEAD 3, 9,4		Sewage Treatment Plant	SEAD 20,21
	Contaminated Groundwater	SEAD 025,006, 001-R-01, 023, 064B&D, 041		Small Arms Range	SEAD 57, 46, 120B,122A,122B
	Contaminated Sediments	SEAD 4, 3,		Soil Contamination After Tank Removal	SEAD 59,
	Contaminated Soil Piles	SEAD 5		Spill Site Area	SEAD 122
	Dip Tank			Storage Area	SEAD 123
	Disposal Pit/Dry Well			Surface Disposal Area	
	Explosive Ordnance Disposal Area	SEAD 23, 24, 006-R-01, 003-R-01, 007-R-01		Training and Maneuver Area	
	Fire/Crash Training Area	SEAD 025,026		Underground Storage Tank	SEAD 27
	Firing Range			Underground Tank Farm	
	Incinerator	SEAD 006, 001-R-01,019, 018		Unexploded Munitions/Ordnance	SEAD 115
	Industrial Discharge			Wash rack	
	Landfill	SEAD 006, 064 A,B&D, 011,		Waste Lines	
	Maintenance Yard	SEAD 122		Waste Treatment Plant	SEAD
	Oil Water Separator	SEAD 27			

Enclosure 1

US Army Corps of Engineers®

Certificate of Completion

Randall Battaglia

has successfully completed

Environmental Liability (EL)/Cost to Complete (CTC) Training

Jan 18, 2017 - Web/Audio Teleconference

Sandra M. Zebrowski

Sandi Zebrowski, P.E.
Director, USACE Environmental and Munitions Center of Expertise,

FUDS Training Services
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FINAL

RECORD OF DECISION

FOR

THE ABANDONED DEACTIVATION FURNACE (SEAD-16) AND THE ACTIVE DEACTIVATION FURNACE (SEAD-17)

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

Prepared for:

SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

and

UNITED STATES ARMY CORPS OF ENGINEERS
4820 UNIVERSITY SQUARE
HUNTSVILLE, ALABAMA

Prepared By:

PARSONS
150 Federal St.
4th Floor
Boston, Massachusetts

Contract Number: DACA87-95-D-0031
Delivery Order 003
USEPA Site ID: NY0213820830; NY Site ID: 8-50-006

March 2006

ENCL 2

1.0 DECLARATION OF THE RECORD OF DECISION

Site Name and Location

The Abandoned Deactivation Furnace (SEAD-16) and the Active Deactivation Furnace (SEAD-17
Seneca Army Depot Activity
CERCLIS ID# NY0213820830
Romulus, Seneca County, New York

Sites

Statement of Basis and Purpose

This decision document presents the U.S. Army's (Army's) and the U.S. Environmental Protecti Agency's (USEPA's) selected remedy for SEAD-16 and SEAD-17, located at the Seneca Arm Depot Activity (SEDA or the Depot) near Romulus, New York. The decision was developed accordance with the Comprehensive Environmental Response, Compensation, and Liability Act 1980 (CERCLA) as amended, 42 U.S.C. §9601 et seq., and, to the extent practicable, the National O and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. The Bas Realignment and Closure (BRAC) Environmental Coordinator, the Director of the National Capita Region Field Office, and the USEPA Region II have been delegated the authority to approve thi Record of Decision (ROD). The New York State Department of Environmental Conservatior (NYSDEC) and the New York State Department of Health (NYSDOH) have concurred with the selected remedy.

This ROD is based on the Administrative Record that has been developed in accordance with Section 113(k) of CERCLA. The Administrative Record is available for public review at the Seneca Army Depot Activity, 5786 State Route 96, Building 123, Romulus, NY 14541. The Administrative Record Index identifies each of the items considered during the selection of the remedial action. This index is included in **Appendix A.**

The State of New York, through the NYSDEC and NYSDOH, has concurred with the selected remedy. The NYSDEC Declaration of Concurrence is provided in **Appendix B** of this ROD.

Site Assessment

The response action selected in this ROD is necessary to protect human health or the environment from actual or threatened releases of hazardous substances into the environment or from actual or threatened releases of pollutants or contaminants from SEAD-16 and SEAD-17, which may present an imminent and substantial endangerment to public health or welfare.

Description of the Selected Remedy

The selected remedy for SEAD-16 and SEAD-17 addresses contaminated soil, building debris, and groundwater. The selected remedy will result in the removal of soil and groundwater as a pathway

The elements that compose this remedy include:

- Conduct additional sampling as part of the pre-design sampling program to further delinea areas of excavation;
- Remove, test, and dispose of the SEAD-16 building debris off-site;
- Excavate approximately 275 cubic yards (cy) of ditch soil to a depth of 1 foot (ft.) with concentrations greater than 1250 mg/Kg until cleanup standards are achieved;
- Excavate approximately 1760 cy of surface soils to a depth of 1 ft. at SEAD-16 with concentrations greater than 1250 mg/Kg, and polycyclic aromatic hydrocarbon (PAH) and m concentrations greater than risk-based derived cleanup standards listed below and in Table 1-1
- Excavate approximately 67 cy of subsurface soils to a depth of 2 ft. to 3 ft. at SEAD-16 (ar around SB16-2, SB16-4, and SB16-5) with lead concentrations greater than 1250 mg/Kg, a PAH and metal concentrations greater than risk-based derived cleanup standards listed below a in Table 1-1 (Figure 1-1);
- Excavate approximately 2590 cy of surface soils to a depth of 1 ft. at SEAD-17 with le concentrations greater than 1250 mg/Kg and metal concentrations greater than risk-based deriv cleanup standards listed below (Table 1-1) (Figure 1-2);
- Stabilize excavated soils from SEAD-16 and SEAD-17 and building debris from SEAD- exceeding the toxicity characteristic leaching procedure (TCLP) criteria in order to attain Lar Disposal Restrictions (LDR);
- Dispose of the excavated material in an off-site landfill;
- Backfill the excavated areas with clean backfill;
- Conduct groundwater monitoring at SEAD-16 and SEAD-17 until concentrations are below th GA criteria;
- Remediate material potentially presenting an explosive hazard and munitions and explosives o concern to meet the Department of Defense Explosive Safety Board (DDESB) requirements for unrestricted use or to put into place land use restrictions as may be required by DDESB;
- Submit a Completion Report following the remedial action;
- Establish and maintain land use controls (LUCs) to prevent access to or use of the groundwater and to prevent residential use until cleanup standards are met; and
- Complete a review of the selected remedy every 5 years (at minimum), in accordance with Section 121(c) of the CERCLA.

GW monitoring

LUC

5 year review

COMPOUNDS	SOIL CLEANUP GOAL
Polycyclic Aromatic Hydrocarbons (PAHs)	
Benzo(a)anthracene (µg/Kg)	20,417
Benzo(a)pyrene (µg/Kg)	2,042
Benzo(b)fluoranthene (µg/Kg)	20,417
Benzo(k)fluoranthene (µg/Kg)	50,000
Chrysene (µg/Kg)	50,000
Dibenz(a,h)anthracene (µg/Kg)	2,042
Indeno(1,2,3-cd)pyrene (µg/Kg)	20,417
Metals	
Antimony (mg/Kg)	29
Arsenic (mg/Kg)	20
Cadmium (mg/Kg)	14
Copper (mg/Kg)	331
Lead (mg/Kg)	1250
Mercury (mg/Kg)	0.54
Thallium (mg/Kg)	2.6
Zinc (mg/kg)	773

To complete Resource Conservation and Recovery Act (RCRA) closure of the deactivation furnace a SEAD-17, the Army will either further decontaminate or demolish and dispose off-site the structures that failed to meet closure standards during the interim closure (i.e., concrete slabs and block walls).

SEAD-16 AND SEAD-17 Land Use Control (LUC) Performance Objectives

The LUC performance objectives for SEAD-16 and SEAD-17 are to:

- Prevent access to or use of the groundwater until cleanup levels are met; and
- Prevent residential housing, elementary and secondary schools, childcare facilities and playgrounds activities.

The LUCs would be implemented over the area bounded by the boundary at SEAD-16 (Figure 1-1) and SEAD-17 (Figure 1-2). The boundary of SEAD-16 is defined as the fence; SEAD-17 is bounded by the fence to the east and by natural boundaries, such as ditches. It should be noted that land within the Planned Industrial/Office Development (PID) area, which includes SEAD-16 and SEAD-17, is also subject to a separate Proposed Plan and ROD that include institutional controls (ICs) ["Final ROD for Sites Requiring Institutional Controls in the Planned Industrial/Office Development or Warehousing Areas" (Parsons, 2004)]. Groundwater use restrictions will continue until groundwater constituent concentrations have been reduced to levels that allow for unlimited exposure and unrestricted use. With USEPA approval, once groundwater cleanup standards are achieved, the groundwater use restrictions may be eliminated.

for SEAD-16 and SEAD-17 will be prepared which satisfies the applicable requirement Paragraphs (a) and (c) of Environmental Conservation Law (ECL) Article 27, Section 1 Institutional and Engineering Controls. In addition, the Army will prepare an environme easement for SEAD-16 and SEAD-17, consistent with Section 27-1318(b) and Article 71, Title 3 ECL, in favor of the State of New York and the Army, which will be recorded at the time of property's transfer from federal ownership. A schedule for completion of the draft SEAD-16 SEAD-17 LUC Remedial Design Plan (LUC RD) will be completed within 21 days of the R signature, consistent with Section 14.4 of the Federal Facilities Agreement (FFA).

The Army shall implement, inspect, report, and enforce the LUCs described in this ROD accordance with the approved LUC RD. Although the Army may later transfer these responsibiliti to another party by contract, property transfer agreement, or through other means, the Army sha retain ultimate responsibility for remedy integrity.

State Concurrence

NYSDOH forwarded a letter of concurrence regarding the selection of a remedial action to NYSDEC and NYSDEC, in turn, forwarded to USEPA a letter of concurrence regarding the selection of remedial action in the future. This letter of concurrence has been placed in Appendix B.

Declaration

CERCLA and the NCP require each selected remedy to be protective of human health, public welfare, and the environment; be cost effective, comply with other statutory laws; and use permanent solutions, alternative treatment technologies, and resource recovery options to the maximum extent possible. CERCLA and the NCP also state a preference for treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The selected remedy is consistent with CERCLA and the NCP and is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions. This remedy also reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants.

Because this remedy may result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure for an indeterminate period, a statutory review will be conducted every 5 years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

unrestricted use. With USEPA approval, once groundwater cleanup standards are achieved groundwater use restrictions may be eliminated.

To implement the Army's remedy, which includes LUCs, a LUC RD for SEAD-16 and SEAD will be prepared which satisfies the applicable requirements of Paragraphs (a) and (c) of ECL Ar 27, Section 1318: Institutional and Engineering Controls. In addition, the Army will prepare environmental easement for SEAD-16 and SEAD-17, consistent with Section 27-1318(b) and Art 71, Title 36 of ECL, in favor of the State of New York and the Army, which will be recorded at time of SEAD-16's and SEAD-17's transfer from federal ownership. A schedule for completion the draft SEAD-16 and SEAD-17 LUC RD will be completed within 21 days of the ROD signatu consistent with Section 14.4 of the FFA.

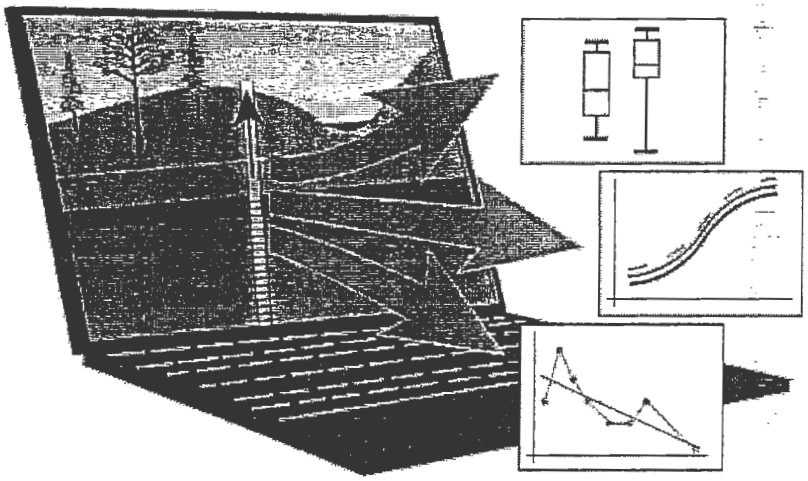
The present worth cost of this alternative is $3,109,400. The capital cost and the present worth O& cost of Alternative 4 are $1,699,900 and $1,409,500, respectively.

In comparison to other remedies considered in the FS, Alternative 4 has the highest overall rankin While it does not rank highest for any single evaluation criterion, as Alternatives 2 and 6 do, neith does it rank the lowest for any evaluation criteria considered, which each of the other intrusiv alternatives did. Alternative 4 ranks second of all the alternatives for long-term effectiveness an permanence and reduction of mobility of contaminants. It also ranks highest of the three alternative (2, 4, and 6) for technical feasibility and overall cost. The preferred alternative will eliminate source soils from further impacting SEAD-16 and SEAD-17 by preventing contact with receptors and migration of contaminants to surface water and groundwater. It is a cost-effective, readily available alternative that does not require long-term maintenance aside from groundwater monitoring and maintenance of LUCs, such as groundwater restrictions, and residential/daycare land use restrictions; and, the alternative can be implemented quickly to provide short-term effectiveness. Finally, it is a permanent solution that would significantly reduce the mobility of the contaminants and potential for exposure at SEAD-16 and SEAD-17.

Guidance Document

Groundwater Statistics and Monitoring Compliance

Statistical Tools for the Project Life Cycle



December 2013

Prepared by
The Interstate Technology & Regulatory Council
Groundwater Statistics and Monitoring Compliance Team

ENCL 3

ENCL 3

- If you suspect outliers, examine the data using a probability plot, Dixon's test, Rosner's test, or another appropriate method.
- See Section 5.7 for information regarding the handling of nondetects.
- Use of 8 to 10 measurements is recommended, a larger data set may be required if the data are skewed or contain nondetects.

Strengths and Weaknesses

- This method is relatively simple to implement and interpret (when assumptions are met).
- Use on lognormal data which are transformed is not recommended.

Further Information

Additional information on the Pooled Variance t-test, including examples of how to perform the test can be found in Chapter 16.1.1, Unified Guidance.

5.11.3 Wilcoxon Rank-sum Test

The Wilcoxon rank-sum test is a nonparametric two-sample test that may be used to compare two populations when the groundwater data are not normally-distributed and cannot be normalized by transformation. The Wilcoxon rank-sum test is equivalent to the Mann-Whitney U-test. Requirements for the Wilcoxon rank-sum test include the assumption of equal variances, the assumption of a common (unknown) distribution, a lack of spatial variability, and temporal stability. The Wilcoxon rank-sum test can handle data sets with a limited number of nondetects (10-15%) with uniform reporting limits.

As the name implies, the Wilcoxon rank-sum test is performed by ordering the combined data from smallest to largest and ranking the values from 1 to N. Tied values receive a midrank which is the average of the ranks they would receive were they not tied. The resulting numerical ranks of the background samples are denoted as B_i and the compliance samples are C_i. The Wilcoxon statistic (W) is computed as the sum of the compliance ranks and the result is standardized to compute a Z-score for comparison to a tabulated critical statistic. Calculations for W, the expected value E(W), standard deviation SD(W), and the test statistic Z, for data with no ties are available in most statistical references and the Unified Guidance.

A computed Z is greater than the tabulated critical Z at the selected significance level, indicates that the compliance well concentrations are statistically different from the background at the significance level.

The Wilcoxon rank-sum test is available in most statistical software packages as a default selection for nonparametrically-distributed data; however, most packages do not automatically evaluate for compliance with the necessary underlying requirements or assumptions.

Applications and Relevant Study Questions

- Study Question 2: Are concentrations greater than background concentrations?

- Study Question 5: Is there a trend in contaminant concentrations?

Assumptions

Although there is no assumption of normality, violations of the requirements listed below may invalidate the results of the test. Always verify that the data comply with the requirements.

Requirements and Tips

- Equal population variances
- Common (shared) distribution between populations
- Absence of naturally-occurring spatial variability
- Samples are spatially and temporally independent
- Temporal stability
- The number of nondetects should be minimal (typically, less than 10 to 15%) and should be treated as tied data.
- Use of 8 to 10 measurements is recommended, a larger data set may be required if the data are skewed or contain nondetects.

Strengths and Weaknesses

- no requirement for normality
- can accommodate nondetects, but a large number of nondetects may decrease the usefulness of the result.

Further Information

Additional information on the Wilcoxon Rank-Sum test including examples of how to perform the test can be found in Chapter 16.2, Unified Guidance.

5.11.4 Sign or Signed Rank Test

The signed rank test is used to evaluate differences between groups of "paired" data such as analytical results from a group of wells before and after remediation efforts. The signed rank test evaluates whether a statistically significant difference exists between the medians of two groups by evaluating the difference between each pair of observations. The pairs are ranked in ascending order of the absolute value of their difference, and each rank is multiplied by the sign of the paired difference. The sum of those products is the test statistic W, which is compared to a tabulated critical value that is based on the selected statistical significance of the test and the number of sample pairs (differences). A computed test statistic W greater than the tabulated critical W at the selected significance level, indicates that the two groups of data are statistically different at the selected significance level. The signed rank test is available in some statistical software packages and is relatively straightforward to implement in spreadsheet software.

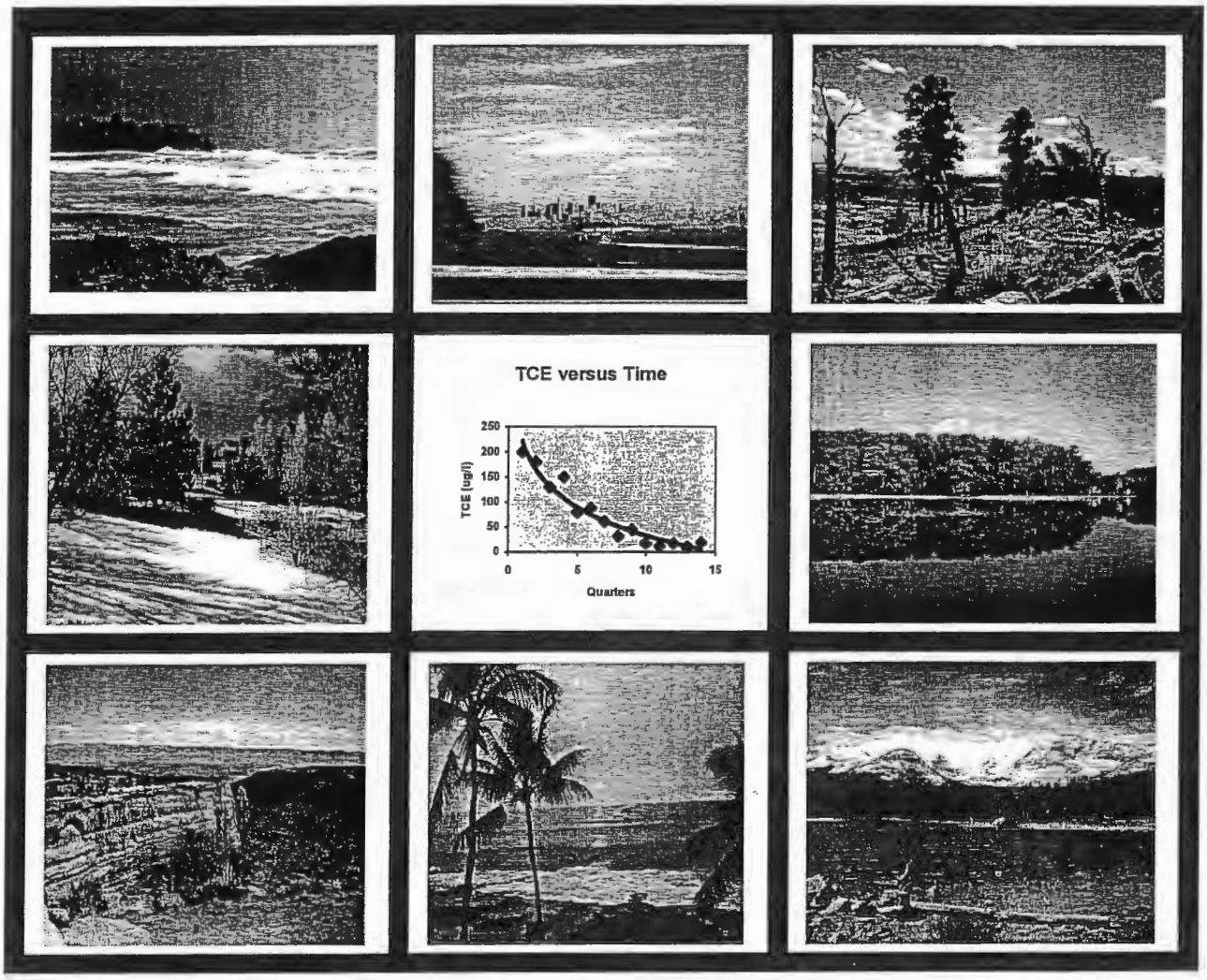
Applications and Relevant Study Questions

Study Question 5: Is there a trend in contaminant concentrations?

STATISTICAL ANALYSIS OF GROUNDWATER MONITORING DATA AT RCRA FACILITIES

UNIFIED GUIDANCE MARCH 2009

EPA 530/R-09-007



ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF RESOURCE CONSERVATION AND RECOVERY

ENCL 4

ENCL 4

chosen, and the frequency of background versus compliance well testing. The number of compliance wells and annual frequency of testing also affect overall costs, but are generally site-specific considerations. By limiting the number of constituents and ensuring adequate background sample sizes, it is possible to select certain statistical tests which help minimize future compliance (and total) sample requirements.

Selection of an appropriate number of detection monitoring constituents should be dictated by the knowledge of waste or waste leachate composition and the corresponding groundwater concentrations. When historical background data are available, constituent choices may be influenced by their statistical characteristics. A few representative constituents or analytes may serve to accurately assess the potential for a release. These constituents should stem from the regulated wastes, be sufficiently mobile, stable and occur at high enough concentrations to be readily detected in the groundwater. Depending on the waste composition, some non-hazardous organic or inorganic indicator analytes may serve the same purpose. The guidance suggests that between 10-15 formal detection monitoring constituents should be adequate for most site conditions. Other constituents can still be reported but not directly incorporated into formal detection monitoring, especially when large simultaneously analyzed suites like ICP-trace elements, volatile or semi-volatile organics data are run. The focus of adequate background and future compliance test sample sizes can then be limited to the selected monitoring constituents.

The RCRA regulations do not consistently specify how many observations must be collected in background. Under the Part 265 Interim Status regulations, four quarterly background measurements are required during the first year of monitoring. Recent modifications to Part 264 for Subtitle C facilities require a sequence of at least four observations to be collected in background during an interval approved by the Regional Administrator. On the other hand, at least four measurements must be collected from each background well during the first semi-annual period along with at least one additional observation during each subsequent period, for Subtitle D facilities under Part 258. Although these are minimum requirements in the regulations, are they adequate sample sizes for background definition and use?

Four observations from a population are rarely enough to adequately characterize its statistical features; statisticians generally consider sample sizes of $n \leq 4$ to be insufficient for good statistical analysis. A decent population survey, for example, requires several hundred and often a few to several thousand participants to generate accurate results. Clinical trials of medical treatments are usually conducted on dozens to hundreds of patients. In groundwater tests, such large sample sizes are a rare luxury. However, it is feasible to obtain small sample sets of up to $n = 20$ for individual background wells, and potentially larger sample sizes if the data characteristics allow for pooling of multiple well data.

Sample Number

The Unified Guidance recommends that a minimum of at least 8 to 10 independent background observations be collected before running most statistical tests. Although still a small sample size by statistical standards, these levels allow for minimally acceptable estimates of variability and evaluation of trend and goodness-of fit. However, this recommendation should be considered a temporary minimum until additional background sampling can be conducted and the background sample size enlarged (see further discussions below).

Small sample sizes in background can be particularly troublesome, especially in controlling statistical test false positive and negative rates. False negative rates in detection monitoring, *i.e.*, the

ORDER FOR SUPPLIES OR SERVICES

PAGE 1 OF 58

1. CONTRACT/PURCH. ORDER/ AGREEMENT NO.	2. DELIVERY ORDER/ CALL NO.	3. DATE OF ORDER/CALL (YYYYMMMDD)	4. REQ./ PURCH. REQUEST NO.	5. PRIORITY
W912DY-09-D-0062	0023	2016 Mar 30	W31RYO00838003	

6. ISSUED BY CODE W912DY
US ARMY ENGINEERING & SUPPORT CENTER
CEHNC-CT
4820 UNIVERSITY SQUARE
HUNTSVILLE AL 35816-1822

7. ADMINISTERED BY *(if other than 6)* CODE W912DY
DIRECTORATE OF CONTRACTING - HNC
ATTN: MICHELLE BLACKMON
256-895-2531
HUNTSVILLE AL 35816

8. DELIVERY FOB
[X] DESTINATION
[ ] OTHER
(See Schedule if other)

9. CONTRACTOR CODE 1BVK6 FACILITY
NAME AND ADDRESS
PARSONS GOVERNMENT SERVICES INC.
MICHELLE SMITH
100 W WALNUT ST
PASADENA CA 91124-0001

10. DELIVER TO FOB POINT BY (Date) *(YYYYMMMDD)*
SEE SCHEDULE

11. MARK IF BUSINESS IS
[ ] SMALL
[ ] SMALL DISADVANTAGED
[ ] WOMEN-OWNED

12. DISCOUNT TERMS
Net 30 Days

13. MAIL INVOICES TO THE ADDRESS IN BLOCK
See Item 15

14. SHIP TO CODE W912DY
SEE SCHEDULE
SEE SCHEDULE
SEE SCHEDULE
SEE SCHEDULE AA

15. PAYMENT WILL BE MADE BY CODE 964145
US ARMY ENG & SUP CENTER - FINANCE OFFIC
US ARMY CORPS OF ENGRS FINANCE CTR
5722 INTEGRITY DRIVE
MILLINGTON TN 38054-5005

MARK ALL PACKAGES AND PAPERS WITH IDENTIFICATION NUMBERS IN BLOCKS 1 AND 2.

16. TYPE OF ORDER			
	DELIVERY/ CALL	X	This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.
	PURCHASE		Reference your quote dated Furnish the following on terms specified herein. REF:

ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.

NAME OF CONTRACTOR	SIGNATURE	TYPED NAME AND TITLE	DATE SIGNED (YYYYMMMDD)
Parsons Gov't Services		Don Silverman, VP	3/30/16

[X] If this box is marked, supplier must sign Acceptance and return the following number of copies: 3/30/16

17. ACCOUNTING AND APPROPRIATION DATA/ LOCAL USE
See Schedule

18. ITEM NO.	19. SCHEDULE OF SUPPLIES/ SERVICES	20. QUANTITY ORDERED/ ACCEPTED*	21. UNIT	22. UNIT PRICE	23. AMOUNT
	SEE SCHEDULE				

* *If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.*

24. UNITED STATES OF AMERICA
TEL:
EMAIL:
BY: MULLADY.RICHARD.J.1090040282
Digitally signed by MULLADY.RICHARD.J.1090040282
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=MULLADY.RICHARD.J.1090040282
Date: 2016.03.30 15:39:53 -05'00'
CONTRACTING / ORDERING OFFICER

25. TOTAL	$637,951.83
26. DIFFERENCES	

27a. QUANTITY IN COLUMN 20 HAS BEEN
[ ] INSPECTED [ ] RECEIVED [ ] ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED

b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE	c. DATE (YYYYMMMDD)	d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE	28. SHIP NO.	29. DO VOUCHER NO.	30. INITIALS
	[ ] PARTIAL [ ] FINAL	32. PAID BY	33. AMOUNT VERIFIED CORRECT FOR
f. TELEPHONE NUMBER / g. E-MAIL ADDRESS	31. PAYMENT [ ] COMPLETE [ ] PARTIAL [ ] FINAL		34. CHECK NUMBER
36. I certify this account is correct and proper for payment.			35. BILL OF LADING NO.
a. DATE (YYYYMMMDD) / b. SIGNATURE AND TITLE OF CERTIFYING OFFICER			

37. RECEIVED AT	38. RECEIVED BY	39. DATE RECEIVED (YYYYMMMDD)	40. TOTAL CONTAINERS	41. S/R ACCOUNT NO.	42. S/R VOUCHER NO.

Section A - Solicitation/Contract Form

AWARD NARRATIVE

Task Order 0023, which contains Firm Fixed-Price (FFP) tasks, is being issued to Parsons Government Services, Inc for Remedial Action at Seneca Army Depot Activity, Romulus, NY, EPA Site ID# NY0213820830, NY Site ID# 8-50-006 in accordance with Performance Work Statement Revision 2, dated March 24, 2016.

The period of performance is date of award through March 30, 2018.

US Department of Labor Wage Determination Number 15-2381, Revision 1, dated March 1, 2016 shall be used with project task order.

The Terms and Conditions of the basic contract, W912DY-09-D-0062 takes precedence in the case of any ambiguity or conflict.

This task order is awarded in the amount of $1,211,190.20 of which $637,951.83 is being funded at the time of award.

Task	Description	Type	Amount	Total
1	UFP-QAPP and QASP	FFP	7,063.20	7,063.20
2	GIS	FFP	3,908.96	3,908.96
2a	Optional, Additional GIS per FY	FFP	1,525.90	
3	Long Term Monitoring of The OB Grounds	FFP		
3a	(FY17) First Annual Groundwater Monitoring	FFP	21,453.84	21,453.84
3b	Optional, (FY18) Second Annual Groundwater Monitoring	FFP	21,457.76	
3c	Optional, (FY19) Third Annual Groundwater Monitoring	FFP	21,461.68	
3d	Optional, (FY20) Fourth Annual Groundwater Monitoring	FFP	21,465.59	
3e	Optional, (FY21) Fifth Annual Groundwater Monitoring	FFP	21,469.51	
4	Long Term Monitoring of the Fire Training and Demonstration Pad Area	FFP		
4a	(FY17) First Annual Groundwater Monitoring	FFP	26,049.47	26,049.47
4b	Optional, (FY18) Second Annual Groundwater Monitoring	FFP	26,080.17	
4c	Optional, (FY19) Third Annual Groundwater Monitoring	FFP	26,110.87	
4d	Optional, (FY20) Fourth Annual Groundwater Monitoring	FFP	26,141.57	
4e	Optional, (FY21) Fifth Annual Groundwater Monitoring	FFP	26,172.27	
5	Long Term Monitoring of the Ash Landfill Operable Unit	FFP		
5a	(FY17) First Annual Groundwater Monitoring	FFP	51,594.03	51,594.03
5b	Optional, (FY18) Second Annual Groundwater Monitoring	FFP	51,686.28	
5c	Optional, (FY19) Third Annual Groundwater Monitoring	FFP	51,778.54	
5d	Optional, (FY20) Fourth Annual Groundwater Monitoring	FFP	51,870.79	
5e	Optional, (FY21) Fifth Annual Groundwater Monitoring	FFP	51,963.04	
6	Ash Landfill Operable Unit Biowall Recharge	FFP	440,038.65	440,038.65
7	Long Term Monitoring of the Deactivation Furnaces Operable Unit	FFP		
7a	(FY17) First Annual Groundwater Monitoring	FFP	23,146.49	23,146.49
7b	Optional, (FY18) Second Annual Groundwater Monitoring	FFP	23,178.47	
7c	Optional, (FY19) Third Annual Groundwater Monitoring	FFP	23,210.46	
7d	Optional, (FY20) Fourth Annual Groundwater Monitoring	FFP	23,242.44	
7e	Optional, (FY21) Fifth Annual Groundwater Monitoring	FFP	23,274.43	
8	Monitoring of LUCs at Various Sites	FFP		
8a	(FY17) First Annual Monitoring Event	FFP	17,934.42	17,934.42

8b	Optional, (FY18) Second Annual Monitoring Event	FFP	17,934.42	
8c	Optional, (FY19) Third Annual Monitoring Event	FFP	17,934.42	
8d	Optional, (FY20) Fourth Annual Monitoring Event	FFP	17,934.42	
9	Monitoring of LUCs at Various Munition Sites	FFP		
9a	(FY17) First Annual Monitoring Event	FFP	5,895.00	5,895.00
9b	Optional, (FY18) Second Annual Monitoring Event	FFP	5,895.28	
9c	Optional, (FY19) Third Annual Monitoring Event	FFP	5,895.28	
9d	Optional, (FY20) Fourth Annual Monitoring Event	FFP	5,895.28	
10	Five-year Review	FFP	27,488.41	27,488.41
11	Community Relations Support	FFP	13,379.36	13,379.36
11a	Optional, Additional Meetings	FUP	8,646.02	
12	Optional, Administrative Record	FFP	1,013.48	
	Totals		$1,211,190.20	$637,951.83

ESCALATION RATES

Constant Year (FY17) Dollars

The CTC estimates shall be reported on a current cost basis (unadjusted for inflation). The following factors should be used to bring previous year costs to the current year.

Base Fiscal Year	Escalation Rate*
FY12	1.0897
FY13	1.0736
FY14	1.0578
FY15	1.0463
FY16	1.0338

* Rates based on FY18 Joint Inflation Calculator (weighted index) – 9 Mar 2017

Encl 4

Estimate Summary Table
Site # SEAD-001-R-01

Site Number	Phase	CTC Subtotal ($K)	Estimate Type	Assumption	Basis of Assumption	Basis of Assumption Document Name	Location of Basis of Assumption Document
SEAD 001-R-01 (SEAD 16/17)	LTM	23	Contract Price	Contract for GW monitoring	TO 0023, CLIN 0007a	Contract #: W912DY-09-D-0062, D.O. 0023 dated 30 June 2016	HNC
							1600 University Square
							Huntsville Al
	Close out	123	IGE	Engineering Estimate	Engineering Estimate	W912DY-08-D-0008	USACE NY
					FY11 Contract Amounts		5786 State Route 96
					Escalation Factor FY16		Romulus, NY 14541
					Escalation Factor FY17		
	LTM	3	IGE	COE Oversight of Contract	Engineering Estimate	Army Management System rates	USACE NY
							5786 State Route 96
							Romulus, NY 14541
Total cost to complete		149					
Does the CTC estimate include work through site closure? (Yes/No)		yes					

Enclosure 5

Seneca Army Depot Cost Estimate
Site Closeout and Well Abandonment
SEAD 001-R-01

TASK	UNITS	UNIT COST (FY11)	NO. WELLS	Amount	ESCALATION FACTOR	FY16 Estimate= Amt x Esc	FY17 ESCALATION FACTOR	FY17 Estimate =FY16 X Esc	BASIS/DOCUMENTATION
WELL ABANDONMENT	LS	$ 5,223.00	12 WELLS	$ 62,796.00	1.0666	$ 66,978.00	1.0338	$ 69,241.86	W912DY-08-D-0003, TASK ORDER 0008, FY11; 6 wells @ $31,398= $5,223
Closeout Report	LS	$ 18,206.00			1.0666	$ 19,419.00	1.0338	$ 20,075.36	
Assembly No.	**Assembly Description**		**FY17 Labor Rate**	**HRS**					
33220101	Senior Project Manager		$ 110.73	10				$ 1,107.30	FY17 Data Call Memorandum
33220102	Project Manager		$ 101.83	40				$ 4,073.20	FY17 Data Call Memorandum
33220105	Project Engineer		$ 70.33	80				$ 5,626.40	FY17 Data Call Memorandum
33220106	Staff Engineer		$ 92.60	80				$ 7,408.00	FY17 Data Call Memorandum
33220108	Project Scientist (Geologist)		$ 76.57	80				$ 6,125.60	FY17 Data Call Memorandum
33220110	QA/QC Officer		$ 72.61	80				$ 5,808.80	FY17 Data Call Memorandum
33220112	Field Technician		$ 46.94	80				$ 3,755.20	FY17 Data Call Memorandum
								$ 123,221.72	

ENCL 6

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

October 18, 2016

Mr. Randy Battaglia, BEC
Seneca Army Depot Activity (SEDA)
5786 State Route 96
PO Box 9
Romulus, NY 14541-0009

Re: Draft Annual Report – Year 8: Abandoned Deactivation Furnace (SEAD-16) and Active Deactivation Furnace (SEAD-17)
Seneca Army Depot, Romulus, NY

Dear Mr. Battaglia:

Presented below are review comments for the subject document dated August 2016 (Annual Report). EPA recommends a modification to the sampling frequency as response to your sampling discontinuing recommendation. We recommend two additional rounds of sampling within the next five years, but prior to the next five year review. One round should be done during Spring and the other one during Autumn.

GENERAL COMMENTS

1. All monitoring wells were sampled during 1996 before the RA. The results of the sampling should be included on "time lines" for each well so that a comparison can be readily made with the results from post RA monitoring. It is noted that additional constituents were analyzed for as part of the RI.

2. Tables 1 and 2 provide information regarding the monitoring well measuring point elevations and the measurements used to establish groundwater table elevations. A review of the survey data reveals issues with the accuracy and precision of the elevation survey data. As an example, Monitoring Well MW16-7 was assigned a top of PVC elevation of 734.42 feet (NAVD 88) – the survey date is not provided, and a re-survey using GPS RTK equipment in Nov 2012 identified the top of PVC casing elevation as 732.96 feet. This is a difference of over half a foot. Similarly, the revised measuring point elevation for MW16-4 from the two surveys also exceeds half a foot. Note that the revisions are not consistent for each well. The tables indicate previous instances where a specific monitoring well elevation was re-surveyed due to damage. These factors are mentioned as there appears to be an uncertainty regarding the actual groundwater table and flow directions, (Figure 5 and text). The water table groundwater gradient appears very "flat" in this area and a need for better accuracy, precision and number of measuring points is apparent. I suggest the installation of piezometers be considered so that more representative water level measurements can be obtained for use on the LTM program. Further, it appears the specific well water levels were measured as part of each well purging and sampling event.

ENCL 7

For better accuracy, it would be appropriate to take a synoptic round of water level measurements at all wells and then initiate and conduct the purging and sampling event.

3. It is noted that the monitoring well network age exceeds 20 years. I suggest it is time to redevelop the wells to remove potential silt and materials to ensure good connection between the screen and aquifer.

4. There have been a number of exceedances reported for more than one constituent of concern at both SEAD 16 and SEAD 17, with only a limited database available to enable long term trends and monitoring of the groundwater quality to conclude LTM. The discussion on increasing sodium concentrations is noted, but the impacted area should be provided on a map with the suspected source located. An additional monitoring point may be appropriate between the SEAD areas and the source to provide a more technical foundation for the allegation of the DOT as the source.

SPECIFIC COMMENTS

1. Figure 6C, Concentration of Iron Over Time at SEAD 16, and Figure 6D, Concentration of Iron Over Time at SEAD 17: The Y-axis on the graphs presented in these figures is labeled "Lead Concentration (ug/L)." However, these figures should present iron results. Revise these figures to include "Iron Concentration (ug/L)" as the label on the Y-axis.

2. Annual Report Appendix F, Data Validation: The data validation report for metals analysis by SW846 Method 6020A indicates that only the parent sample was impacted due to exceedances of matrix spike/matrix spike duplicate (MS/MSD) recovery limits for potassium and antimony. The data validation report for metals analysis by SW846 Method 6020A also indicates that only the parent sample was impacted due to exceedances of serial dilution recovery limits for barium, calcium, potassium, magnesium, sodium, and antimony. However, the MS/MSD and serial dilution are batch quality control (QC) samples, and all associated samples within the analytical batch should be qualified when recoveries of metals MS/MSDs and serial dilutions exceed the acceptance criteria, since the accuracy of each sample is not checked for metals analyses. Revise the Annual Report to qualify all samples within the analytical batch due to these metals QC exceedances, or provide sufficient justification to clarify how it was determined that only the parent sample was impacted.

3. Annual Report Appendix F, Data Validation: The data validation report for metals analysis by SW846 Method 6020A indicates that precision results for sample 16LM20055 (the field duplicate sample of 16LM20054) were considered acceptable with the exception of barium, calcium, potassium, magnesium, manganese, sodium, lead, and antimony, and that the results for these analytes were considered estimated and qualified "J". However, the data validation report does not indicate which samples were qualified. Revise the data validation report to clarify that only the sample (16LM20054) and the associated field duplicate (16LM20055) were qualified as estimated.

If you have any questions or comments regarding the above, please contact me at (212) 637-4323.

Sincerely,

Julio F Vazquez

Remedial Project Manager
Federal Facilities Section

cc: M. Sweet, NYSDEC
M. Sergott, NYSDOH
T. Heino, Parsons

SEAD - 001-R-01 **2017**

Phase	2017	2018	2019	2020	2021	2022	2023	2024	Outyears
LTM			23						
LTM (OVERSIGHT COST)			3						
						123			
CLOSE OUT									
			26			123			149

AES

FYR 10

SSC site closeout 23

Prof Labor .3

GW well [illegible] 23

Well Abandon 80 90

149