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October 31, 2007

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. Kuldeep K. Gupta, P.E.
NYSDEC
Division of Environmental Remediation
Remedial Bureau A, Section C
625 Broadway
Albany, NY 12233-7015

Mr. Mark Sergott
Bureau of Environmental Exposure Investigation, Room 300
New York State Department of Health
Flanigan Square, 547 River Street
Troy, NY 12180

Subject: **Submittal of Streamlined Revised Draft Final Proposed Plan for Five SWMUs – SEADs 1, 2, 5, 24 and 48; Seneca Army Depot Activity; EPA Site ID# NY0213820830, NY Site ID# 8-50-006**

Dear Mr. Vazquez/Mr. Gupta/Mr. Sergott:

Parsons Infrastructure & Technology Group, Inc., (Parsons) is pleased to submit the Revised Draft Final Proposed Plan for Five Solid Waste Management Units, SEADs 1, 2, 5, 24, and 48 at the Seneca Army Depot Activity located in Seneca County, New York for your review. The contents of this Proposed Plan have been streamlined in accordance EPA's requests.

Should you have any questions about the material presented and summarized in this document, please do not hesitate to call me at (617) 449-1570 to discuss them.

Sincerely,

Jeffrey W. Adams
Project Manager

Enclosures

cc: Mr. S. Absolom, SEDA
Mr. K. Hoddinott, USACHPPM (PROV)
Mr. J. Nohrstedt, CENHC
Mr. R. Battaglia, CENAN
Mr. C. Boes, USAEC
Mr. M. Heaney, Techlaw

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October 31, 2007

Mr. John Nohrstedt
U.S. Army Corps of Engineers
Engineering and Support Center, Huntsville
Attn: CEHNC-FS-IS
4820 University Square
Huntsville, Alabama 35816-1822

Subject: **Submittal of Streamlined Revised Draft Final Proposed Plan for Five SWMUs – SEADs 1, 2, 5, 24 and 48**
Seneca Army Depot Activity; File No. 1017A

Dear Mr. Nohrstedt:

Parsons Infrastructure & Technology Group, Inc., (Parsons) is pleased to submit the streamlined Revised Draft Final Proposed Plan for Five Solid Waste Management Units, SEADs 1, 2, 5, 24, and 48 at the Seneca Army Depot Activity located in Seneca County, New York for your review. The work was performed in accordance with the Scope of Work (SOW) for Task Order 33 under Contract DACA87-02-D-0005.

Parsons appreciates the opportunity to provide the Army with this document. Should you have any questions about the material presented and summarized in this document, please do not hesitate to call me at (617) 449-1570 to discuss them.

Sincerely,

Jeffrey W. Adams
Project Manager

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Mr. M. Heaney, Techlaw

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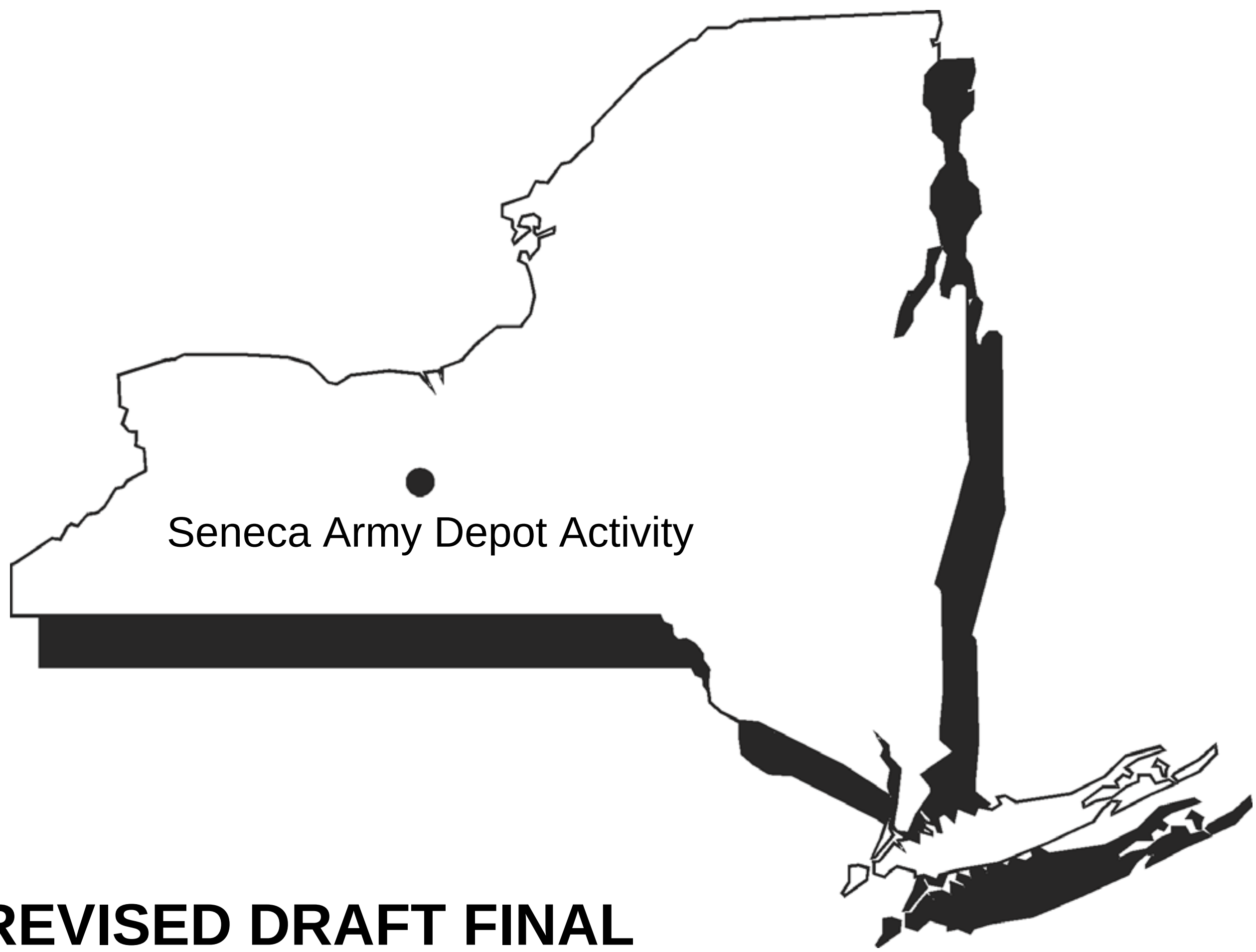
US Army, Engineering & Support Center
Huntsville, AL

Seneca Army Depot Activity
Romulus, NY



REVISED DRAFT FINAL
PROPOSED PLAN

FOR FIVE FORMER SOLID WASTE MANAGEMENT UNITS
SEAD-1, 2, 5, 24, & 48
SENECA ARMY DEPOT ACTIVITY

EPA Site ID# NY0213820830
NY Site ID# 8-50-006
CONTRACT NO. DACA87-02-D-0005
DELIVERY ORDER NO. 0033

PARSONS
November 2007

##

Proposed Plan – Revised Draft Final

FIVE FORMER SOLID WASTE MANAGEMENT UNITS (SWMUs) –
SEADs 1, 2, 5, 24, and 48
SENECA ARMY DEPOT ACTIVITY (SEDA)
ROMULUS, NEW YORK

November 2007

##

PURPOSE OF THE PLAN

This Proposed Plan describes the remedial alternatives selected for five areas of concern (AOCs), SEAD 1 (the former Hazardous Waste Container Storage Facility, Building 307), SEAD 2 (the former PCB Transformer Storage Facility, Building 301), SEAD 5 (the former Sewage Sludge Piles), SEAD 24 (the Abandoned Power Burn Pit), and SEAD 48 (Row 0E800 Pitchblende Storage Igloos) at the Seneca Army Depot Activity (SEDA or Depot) Superfund Site, located in Seneca County, New York. This Proposed Plan was developed by the U.S. Army (Army) and the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Environmental Conservation (NYSDEC). The Army and the EPA are issuing this Proposed Plan as part of their public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Action (CERCLA) of 1980, as amended, and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the contamination remaining at the five AOCs is described in greater detail in the following documents:

- "*RCRA Closure Report: Building 307, Hazardous Waste Container Storage Facility; Building 301, Transformer Storage Building*";
- Letter to Mr. James Dolen, Jr. from Todd Heino dated September 9, 2005 regarding "Response to Comments on the Draft Closure Plan dated September 4, 2003, Building 307, Hazardous Waste Storage Facility and Building 301, PCB Transformer Storage Building, Seneca Army Depot Activity, Romulus, New York, NYSDEC Site No.: 8-50-006";
- Letter to Mr. Stephen Absolom from James Dolen, Jr. dated September 29, 2005 regarding "SEDA – Facility EPA I.D. No. NY0213820830, Building 307, Hazardous Waste Storage Facility & Building 301, PCB Transformer Storage Building, Closure Certification Approval";
- "*Industrial Waste Site (Sludge Piles) – SEAD 5 Time-Critical Removal Action Final Completion Removal Report*";
- "*Time Critical Removal Action, Metal Sites – SEAD 24 Final Completion Removal Report*"; and,
- "*Final Status Survey Report, E0800 Row Pitchblende Ore Storage Igloos (SEAD-48)*" (Parsons, 2006).

The Army, EPA, and NYSDEC encourage the public to review these documents to gain a more comprehensive understanding of the AOCs, the site and the Superfund activities that have been completed.

This Proposed Plan is being provided as a supplement to the aforementioned documents to inform the public of the Army's, EPA's and NYSDEC's preferred remedies for the AOCs and to solicit public comments pertinent to the selected remedies. The preferred remedy for three of the AOCs (i.e., SEADs 1, 2, and 5) is to formally impose and implement Land Use Controls (LUCs) that prohibit the use of the designated land and buildings for residential activities, and to prohibit access to and use of groundwater. The preferred remedy for SEAD 24 and SEAD 48 is No Further Action.

The identified LUCs selected for SEADs 1, 2, and 5 were previously established for three other AOCs (i.e., SEADs 27, 64A, and 66) that are located in proximity to the three subject AOCs. At the time of the Army's, EPA's and NYSDEC's final determination for SEADs 27, 64A, and 66, all parties agreed that the identified LUCs should be imposed on all land within the Planned Industrial / Office Development and Warehousing (PID) Area at the former Depot due to the anticipated future use of the land and the similarity of its known past uses by the Army and predecessors.

The remedies described in this Proposed Plan are the preferred remedies for each of the identified AOCs. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedies will be made after the Army and the EPA have taken all public comments into consideration. The Army and the EPA are soliciting comments because the Army, EPA and NYSDEC may select a remedy other that the preferred remedy for either or both of the AOCs.

MARK YOUR CALENDAR

[Date] – [Date]:

Public comment period related to this Proposed Plan.

[Date] at 7:00 P.M.: Public meeting at the Seneca County Office Building, Village of Waterloo New York.

COMMUNITY ROLE IN SELECTION PROCESS

The Army, EPA, and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI Report and this proposed plan have been made available to the public for a public comment period which begins on Date and concludes on Date 2.

A public meeting will be held during the public comment period at the Seneca County Office Building on Date 3 at 7:00 p.m. to present the conclusions of the RI, to elaborate further on the reasons for selecting the preferred remedy, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document that formalizes the selection of the remedy.

Written comments on the Proposed Plan should be addressed to:

Mr. Stephen M. Absolom
BRAC Environmental Coordinator
Seneca Army Depot Activity
Building 123, P.O. Box 9
5786 State Route 96
Romulus, NY 14541-0009

SCOPE AND ROLE OF ACTION

The primary goal of the proposed actions is to enable the Army to transfer or lease the land occupied by the identified AOCs to other private or public parties for beneficial reuse. Prior to transfer or lease of any property at the SEDA, the Army is required to ensure that the property is suitable for release and reuse.

Historically SEADs 1, 2, and 5 were used as temporary storage facilities for solid waste, hazardous waste or toxic (i.e., polychlorinated biphenyl) materials prior to off-site disposal or recycle. The area including SEAD-5 was also historically used as the Army's version of a Department of Public Works (DPWs) supply and staging area and equipment storage yard. The planned future use for land encompassing and surrounding SEADs 1, 2, and 5 is Planned Industrial / Office Development or Warehousing.

SEAD 24 was previously used for destruction of black powder, solid propellants and explosive contaminated trash. The planned future use for land surrounding and encompassing SEAD 24 is Development Reserve/Ethanol Plant construction.

The historic use of the igloos at SEAD 48 involved storage of pitchblende ore as part of the Manhattan Project, and later the igloos were used for ammunition storage; the planned future use of this area is Training.

Information exists for SEADs 1, 2, 5, that indicates that chemical contaminants are still present in the soil at these three AOCs at levels that pose potential risks to selected populations. Risk assessments based on exposure scenarios that are consistent with the planned future use of the land in these AOCs indicate that such uses are possible and appropriate given the residual levels of hazardous substances that remain at the AOCs. Therefore, the Army has determined that LUCs prohibiting residential activities, and access to and use of groundwater are needed to minimize any potential future health and environmental impacts at these three AOCs.

Information also exists for SEAD 24 that indicates that residual concentrations of chemicals are generally consistent with background and no further action is required.

Finally, information developed for radiological constituents at SEAD 48 indicate that residual radiation levels present are consistent with background concentrations and no further action is required.

SITE BACKGROUND

Site and AOC Descriptions

The SEDA previously occupied approximately 10,600 acres of land located in the Towns of Varick and Romulus in Seneca County, New York. The former military facility was owned by the U.S. Government and operated by the Army between 1941 and approximately 2000, when SEDA's military mission ceased. Prior to the Army's development of the land as an Ordnance Depot, this land was used for farming, agricultural and residential purposes. The SEDA's historic military mission included receipt, storage, distribution, maintenance, and demilitarization of general supplies, conventional ammunition, explosives and special weapons.

SEDA is located in an uplands area, which forms a divide separating two of New York's Finger Lakes; Cayuga Lake on the east and Seneca Lake on the west. Ground surface elevations are generally higher along the eastern and southern borders of the Depot, and lower along the northern and western borders. The approximate elevation at the southeastern corner of the SEDA site is 740 feet (ft), while the approximate elevation at the southwestern and northeastern corners is 650 ft. The approximate elevation at the southwestern corner of the Depot is 590 ft. Given this topographic profile, the primary direction of surface water flow throughout the SEDA is to the west towards Seneca Lake. Isolated portions of the Depot drain to the northeast (Seneca-Cayuga Canal) and east (Cayuga Lake). Primary surface water flow conduits to Seneca Lake are Reeder, Kendaia, Indian, and Silver Creeks, while Kendig Creek flows to the northeast and an unnamed creek flows away from the southeast corner of the Depot towards the east. Comparably, the predominant groundwater flow direction is to the west and southwest, although local variations exist at specific location throughout the Depot.

SEADs 1, 2, and 5 are all located in the east-central portion of the former SEDA, within the greater Planned Industrial / Office Development and Warehousing (PID) Area. SEAD 24 is located in the west-central portion of the former depot; land in this area is designated for future Development Reserve and is proposed as part of the planned Ethanol Plant site. SEAD 48 is located in the south-central portion of the former Depot in the area where the future land use is described as Training.

SEAD 1, Hazardous Waste Container Storage Facility

SEAD-1, Building 307, is located in the east-central portion of SEDA, approximately 3,500 feet southwest of the Depot's main entrance off State Route 96.

Building 307 was constructed in 1981 and it was used for temporary storage of hazardous waste prior to shipment offsite for disposal. Hazardous wastes stored at SEAD 1 included spent solvents; still bottoms; sludge from oil/grease separations; cleaning compounds; paper filters; and, spent battery acids. Most wastes stored within the building were stored in 55-gallon drums, but 5-gallon pails were also occasionally used.

Building 307 is 40 feet wide by 50 feet long, with rafters located approximately 10 feet above the floor, while the peak of the roof is 18 feet above the floor. The building's floor is a 6-inch thick, monolithic reinforced concrete slab, surrounded by an integral, 6-inch thick and high concrete curb. The floor and containment curb are coated with chemical-resistant sealant and are level, except at the location of a sloped access/egress ramp at the main entrance on the south side of the structure. The floor and curb are surrounded by an exterior mounted, wooden-framed, pole barn structure, and the exterior walls and roof are constructed of zinc-coated, corrugated metal sheets. The building's roof is fabricated of single sheets of metal that extend from the ridge beyond the edge of the wooden frame. Walls that run parallel to the roof line begin 1 foot below the building's headers and continue to a point that is 6 inches below the top of the containment curb. The wall/roof air gaps provide passive ventilation for the building.

During Building 307's active life, the ground surrounding the building was kept clear of vegetation. Currently, the land located immediately exterior to the building is a mixture of gravel and dirt, sparsely covered with vegetation. The gravel and dirt perimeter extends outwardly from the building for distances varying between 2 to 15 feet on all sides. Evidence of soil erosion is present along the exterior eastern and western sides of the building, where storm water run-off from the walls and the roof drops to the ground. Lesser erosion impacts are evident along the northern and southern faces of the building. The soil and gravel located between the building's exterior walls and the erosion gullies are discolored. North of the building, the ground shows evidence of wear from vehicular and pedestrian traffic that enters/leaves the building.

On December 30, 1991, the Army submitted a RCRA Part A and Part B Permit Application for the Depot which included storage operations at Building 307. The Army's permit application was not processed or approved, and operations performed at Building 307continued under Interim Status until September 2005 when NYSDEC accepted the Army's Closure Certificate.

In April 1991, the Army reported a spill (Spill Number 9100990) inside Building 307 totaling approximately 45 gallons of material, which may have included PCB-containing oil. The spill was contained within the building's monolithic concrete floor and curb. The spill was cleaned up using a speedy-dri adsorbent followed by a soap and water wash of the floor. Recovered adsorbent and liquids were containerized and disposed off-site as hazardous waste. The NYSDEC indicated that no further action was needed and closed the incident once the cleanup was completed.

SEAD-2, PCB Transformer Storage Facility

SEAD-2, Building 301, is located in the east-central portion of SEDA, roughly 6,000 feet west, southwest of the Depot's main entrance off of State Route 96. The building is located near the former munitions igloo storage area, on land where the future land use is designated as planned industrial / office development (PID Area).

Building 301 was originally constructed in 1942. It was upgraded in 1986 to meet hazardous waste storage requirements required by RCRA. Building 301 was used as a PCB Transformer Storage Facility beginning in 1980 and continuing until the Depot closed.

During its period of operations, Building 301 was used for the storage of materials associated with unserviceable transformers or other electrical equipment that were known, or suspected, to contain PCBs. Subsequent to their delivery to Building 301, the pieces were inspected, and if they were found to be leaking, they were placed into an overpack drum and surrounded by absorbent material to prevent the spread of contaminants. Any spilled material from the equipment was captured via application of absorbent that was swept-up, containerized in a drum or similar suitable receptacle, and sent to Building 307 (SEAD-1) for storage pending disposal.

Non-leaking units were placed on pallets and stored, pending subsequent sampling of the fluid for determination of the concentration of PCBs contained. Units containing PCB fluids were stored in Building 301 pending their final disposal by the Army.

Building 301 is 35 feet 4 inches long by 23 feet 4 inches wide. The structure is partially bounded on its east and west sides, and completely on its north side, by a raised loading dock and ramp. The loading dock ramps to the ground surface on the west, and a stairway provides pedestrian access along the east side of the building. The loading dock's and ramp's surface were coated with a gravel/asphalt mixture to improve traction; the coating was removed during decontamination operations performed as part of the RCRA closure of this building. However, inspection of the vertical edge of the loading dock and ramp structure show numerous locations where the asphalt/gravel mix extended over the side and onto the adjacent soil.

Building 301's roof is constructed of pre-cast concrete planks supported by steel trusses. A gravel and tar coating covers the roof's concrete planks. Evidence exists that indicates that roofing material dripped over the edge of the roof at the time it was applied. The roof is pitched to promote precipitation runoff away from entrance doors, ramp, stairway and loading dock.

Access into the building is provided through two 8-foot by 8-foot overhead doors; one door is located on the north side, while the second is located on the east side of the building. When Building 301 was first constructed, it did not include secondary containment within the building. This design inadequacy was corrected in 1986 during the Building 301 Upgrade Program when ramps were installed outside both access doors, and inside the building on the north side of the building. Additionally, a new 6-inch thick, monolithic concrete slab floor with integral 6-inch curbs were added to the building. Once the improvements were completed, the estimated secondary containment volume within Building 301 was approximately 2,500 gallons.

Hard packed, fractured asphalt, gravel and dirt parking areas are adjacent to and exterior to the northern, western and southern faces of Building 301. Beyond the parking area to the west is Fayette Road, a major north-south running access road within the former munitions storage area. The northern parking area extends a distance of approximately 35 to 50 feet, before being bordered by grass, trees and shrub vegetation. Sporadic weeds are seasonally evident in the northern parking area. Land immediately east of the building is gravel covered, and this open area immediately abuts two north-south running railroad lines underlain by track bed ties and ballast. One of the rail lines is located close enough to the eastern wall of the Building 301 to allow it to be used for delivery and shipment of goods by rail. The land to the south of Building 301 is inconsistently vegetated with weeds and native grasses, but is generally open for a distance of approximately 35 to 50 feet before becoming wooded and shrub covered. The grass and weeds are emerging through a surface predominated by gravel and shale.

SEAD-5, Sewage Sludge Waste Piles

SEAD-5 is located in the east-central portion of SEDA, approximately 3,000 ft west-southwest of the Depot's main entrance off State Route 96. SEAD-5 encompassed an area measuring approximately 150 ft by 150 ft in size. Between 1980 and roughly June 1992, sewage sludge from two on-site wastewater treatment plants was stockpiled at this SWMU. The AOC previously contained five or six sewage sludge piles that ranged from 5 to 10 feet in height and were covered with non-stressed vegetation.

The northern boundary of SEAD-5 is defined by an east-west oriented, unnamed dirt road that runs from the intersection of South Avenue and Administration Avenue towards Building 311 in SEAD-16. A small wooded area is located to the west of the AOC and a grassy area is located to its south. Buildings 130 and 128 are located in the areas north and northeast of SEAD-5, respectively.

The topography surrounding SEAD-5 suggests a planned man-made variable terrain. An intermittent drainage ditch originates at the northwestern corner of SEAD-5 (south of the unnamed dirt road) and slopes to the west towards SEAD-59. This ditch intersects a large drainage ditch running north-south along the western boundary of SEAD-59. South of the AOC, the local terrain remains flat and grassy, interrupted by an intermittent east-west trending drainage ditch located roughly 250 ft south of the AOC. South of this drainage ditch, the area remains flat and grassy until it is interrupted by railroad tracks that provide access into the southern PID and Warehousing areas of the Depot.

SEAD-24: Abandoned Powder Burning Pit

SEAD-24 was previously located in the west-central portion of SEDA Depot where the planned future land use is Development Reserve. The former location of this AOC is midway between North-South Baseline

Road and West Patrol Road on the southern side of West Kendaia Road. The former Abandoned Powder Burning Pit encompassed an area measuring approximately 325 feet by 150 feet in size that was bounded on the east, south and west by a U-shaped, earthen berm that was approximately 4 feet in height. The berm was partially vegetated with native grasses and weeds.

The AOC was bounded by West Kendaia Road to the north and by areas of open grassland and low brush to the east, south and west. Railroad tracks are located approximately 400 feet east of the former U-shaped berm. Kendaia Creek is located approximately 150 feet north of West Kendaia Road. Generally, the local topography slopes gently to the west; however, north of West Kendaia Road, the land slopes more steeply to the north-northwest and the creek.

SEAD-24 was active during the 1940s and 1950s. The Army reports that black powder, M10 and M16 solid propellants, and explosive trash were disposed here by burning. It is presumed that petroleum hydrocarbon fuel was used to initiate the burn.

SEAD-48, Row E0800 Pitchblende Ore Storage Igloos

SEAD-48 consists of 11 ammunition storage bunkers (igloos) identified as Igloos E0801 though E0811, which are located in the southern part of the former Depot in land where the planned future land use is for training activities. The SEAD-48 igloos are located along the southern side of Igloo Road No. 39 (E0800 Row) and are bounded on the east by Fayette Road and to the west by Seneca Road.

Each igloo was constructed of reinforced concrete that is shaped like a half-cylinder. Each igloo measures 26.8 feet wide by 81 feet long by 13 feet high. The semi-cylindrical shape is visible on the Igloo's northern facing six-sided, concrete wall where the entry door is located. Each igloo's entry door opens outwards over a concrete entrance pad that then connects with an asphalt parking pad that merges with the access road.

The eastern, southern, western and top sides of each igloo are covered with a minimum of 2 feet of soil, starting at a point immediately behind the northern reinforced wall. This soil covering is graded from the peak of the igloo off to the east, south and west. The top and three soil covered sides of each igloo are further covered with growths of native grasses and weeds, and small shrubs. The area surrounding the igloos is field grass.

Inside, each igloo has a vent located at the upper rear (i.e., southern) wall that discharges to the outside through a concrete stack protruding above the soil and vegetation that overlies the unit. Two drainage troughs that are integral components of the igloo's concrete floor traverse its entire length along its eastern and western edges. The troughs discharge to outlets located in the northern face of the igloo near the northeastern and northwestern corners of the structure.

The following is a brief summary of the history of events that occurred at SEAD-48:

- During the 1940s, 1,823 barrels of pitchblende, a uranium containing ore, were stored in the igloos for approximately three months.
- Upon the removal of the pitchblende, the igloos became a storage site for non-radioactive munitions through the late 1970s.
- Licensed radioactive commodities were stored Igloos E0801 and E0802 until the late 1970s.

INVESTIGATIONS AND STUDIES PERFORMED AT THE AOCs

SEAD-1, Hazardous Waste Container Storage Facility

RCRA Closure

All interior floor and wall surfaces and the entrance ramp to Building 307 were decontaminated during April 2003. All surfaces were high-pressure washed with a detergent and water solution and then tripled-rinsed with clean water. Residual waste solutions from each step were recovered and containerized, pending characterization and final disposal determinations.

Once all surfaces were cleaned, randomly selected locations on the floor and walls were sampled for Target Compound List (TCL) Volatile Organic Compounds (VOC), Semi-Volatile Organic Compounds (SVOC), Polychlorinated Biphenyls (PCBs) and heavy metals to verify the efficacy of the decontamination process. Samples collected from Building 307's floor surfaces were analyzed for VOC, SVOC, PCB and metal constituents. Samples collected from the interior walls of the building were only analyzed for PCBs. All interior building samples collected for PCBs were collected as wipe or swipe samples[1]. In addition, twelve soil samples from locations immediately exterior of the building were collected and analyzed for VOCs, SVOCs, PCBs and metals.

Results obtained for decontamination process verification samples collected from the walls and floor of Building 307 for VOCs, SVOCs, and metals were compared to State of New York GA Groundwater Standards. Interior building PCB results were compared to a set limit of 10 micrograms per filter. Exterior soil samples were originally compared to NYSDEC's soil cleanup objectives that are defined in their Technical and Administrative Guidance Memorandum #4046[2]. Individual soil sample results were subsequently compared NYSDEC's recently issued Title 6 New York Code or Rules and Regulations (6 NYCRR) Subpart 375 soil cleanup objectives and to the EPA Region IX Industrial Soil Preliminary Remediation Goals (PRGs). The 95th Upper Confidence Limit of the sample population's mean was also compared to the identified reference values for each compound having individual sample results above reference values.

[1] Wipe or swipe samples were collected by rubbing an area of known size (10 centimeters [cm] by 10 cm) with a water-wetted filter paper disk that is submitted for analysis.
[2] NYSDEC Division of Hazardous Waste Remediation, "Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-4046, Jan 24, 1994.

Building Decontamination Verification Samples

A summary of the building decontamination process verification samples is provided in **Table 1**, below.

Table 1

Building 307 (SEAD 1) – Building Decontamination Verification Sample Result Summary

Compound	NYSDEC GA AWQSΦ (µg/L)	Maximum Sample Concentration (µg/L)*	Average Sample Concentration (µg/L)*	Number of Sample Exceedances / Samples Collected
Toluene	5	8.4	2.4	2 / 17
Bis(2-ethylhexyl) phthalate	5	10.8	5.9	5 / 17
Pentachlorophenol	1	8.9	5.5	2 / 17
Arsenic	25	30.1	10.8	5 / 18
Cadmium	5	7.18	2.0	2 / 18
Iron	300	3880	1427	13 / 18
Lead	25	165	41.1	13 / 18

Notes:
Φ GA AWQS = 6 NYCRR Part 702 Class GA Ambient Water Quality Standards
* µg/L = micrograms per Liter.

Two VOCs, 12 SVOCs, and 28 metals, and no PCBs were found in the interior building decontamination verification samples collected. Of these, only seven compounds were identified at any concentration that exceeded defined cleanup objective values.

Subsequent to its review of the draft closure report, the NYSDEC issued the following comment about the decontamination of Building 307 (SEAD-1) and 301 (SEAD-2).

> "Additional decontamination is needed for the inside of both buildings because the lead levels exceeded the standard in most samples."[3]

The Army found it unlikely that the decontamination process successfully removed numerous organic and inorganic contaminants that had been stored in the

[3] Letter received from James W. Dolen, Jr. of NYSDEC's Division of Solid and Hazardous Materials to Mr. Steven Absolom of SEDA dated October 2, 2003.

building, but was unsuccessful in effectively removing residual lead. Thus, before beginning additional decontamination sequences, possible alternative sources of lead (e.g., composition of building materials and finishes, wind blown debris, etc.) contamination were evaluated. Based on this evaluation it was determined that the entry doors at both buildings had been coated with a lead-based paint, which was aged and flaking.

Prior to performing the second round of decontamination, doors covered with lead paint were encased in plastic or removed and encased in plastic to insure that flaking paint did not bias the decontamination results. All surfaces were then HEPA-vacuumed to collect settled dust and debris and then the surfaces were high-pressure washed with a detergent and water solution and then tripled-rinsed with clean water. Residual waste solutions from each step were recovered and containerized, pending characterization and final disposal determinations.

Confirmatory sampling was then repeated at 17 randomly selected locations on the floor surface, and the results of the analysis are shown in **Table 2**.

Table 2

Building 307 (SEAD 1) – Building Decontamination Verification Sample Result Summary

Compound	NYSDEC GA AWQSΦ (µg/L)Φ	Maximum Sample Concentration (µg/L)*	Average Sample Concentration (µg/L)*	Number of Sample Exceedances / Samples Collected
Lead	25	29.5	10.3	3 / 19

Notes:
Φ GA AWQS = 6 NYCRR Part 702 Class GA Ambient Water Quality Standards
* µg/L = micrograms per Liter.

These results were then used to substantiate the Army's closure certification for Building 307, Hazardous Waste Container Storage Facility that was issued in a letter dated September 28, 2005.

The NYSDEC approved the Closure Certification prepared for Building 307 on September 29, 2005 in a letter:

> "The authority to operate these buildings for the management of hazardous waste under Part 373 is hereby terminated. These buildings are now closed under Part 373."[4]

Exterior Soil Samples

Twelve samples of soil located outside of Building 307 were also collected and analyzed for VOC, SVOC, PCB and metal contaminants as part of the original decontamination work sequence at SEAD-1. Summary data are presented in **Table 3** for compounds detected at SEAD-1 in which measured concentrations in individual samples were observed to exceed one of the identified comparative reference values.

Table 3

Building 307 (SEAD 1) – Exterior Soil Sample Result Summary

Compound	95th UCL of the Mean (mg/Kg)*	NYSDEC Restricted Industrial Use Objective (mg/Kg)*	Region IX Industrial Soil PRGs (mg/Kg)*
Benzo(a)pyrene	0.339	1.1	0.211
Arsenic	6.32	16	1.59
Zinc	8114	10000	100000

Notes:
* mg/Kg = milligram per Kilogram.

Review of the detailed soil sample results for SEAD-1 indicate that four VOCs, 17 SVOCs, three PCBs and 32 metals were detected in one or more of the individual soil samples characterized. Of the detected compounds, only the three compounds listed above were found in samples at concentrations that

[4] Letter received from James W. Dolen, Jr. of NYSDEC's Division of Solid and Hazardous Materials to Mr. Steven Absolom of SEDA dated September 29, 2005.

exceeded on or more of the comparative reference values.

Even though benzo(a)pyrene, arsenic and zinc were identified in the exterior soils at this AOC, Army analytical testing records from sample collected and characterized prior to off-site disposal indicate that they were not present in at elevated levels in the wastes managed at SEAD-1 under interim status. Therefore, the Army believes that they do not result from a release that is associated with the historic interim status RCRA activities conducted at SEAD-1.

In the NYSDEC's approval letter for the Closure Certification prepared for Building 307 Mr. James Dolen, Jr further wrote:

> "Although these buildings are now considered closed under Part 373, both buildings exhibit some levels of contamination both inside and outside of the buildings,… The contamination is unrelated to their use under Part 373. These buildings should be restricted to industrial-type usage. In our September 28, 2005 conversation you stated that these buildings are in the area designated with an industrial land use restriction in the ROD, and that any future use would be legally limited so as to not allow residential, child care, schools, and similar usage."[5]

This communiqué indicates that the NYSDEC agrees with the Army's position on the benzo(a)pyrene, arsenic and zinc identified in the soils surrounding SEAD-1.

SEAD-2, PCB Transformer Storage Facility

Building Upgrade

In 1986, Building 301 was upgraded to comply with hazardous waste storage requirements. As part of this work, surface soil samples were collected from each of the exterior corners of the building and analyzed to determine total PCB content. The results of this sampling show that each of the four samples contained less than 1 ppm of total PCBs.

RCRA Closure

The initial decontamination of Building 301 (SEAD-2) was performed concurrent to, and in an equivalent manner to the decontamination of SEAD-1 (Building 307, Hazardous Waste Container Storage) which is discussed above. Similarly, decontamination process and exterior soil samples were also collected concurrently and evaluated in a similar manner. Due to the presence of the asphalt and gravel traction enhancing coating on the loading dock portion of Building 301, samples collected for PCB analysis were collected as chip samples instead of wipe sample. A sample of the asphalt/gravel coating was chipped off the loading platform and sent directly to the laboratory for analysis of PCBs. PCB samples collected inside Building 301 were collected as wipe samples.

Building Decontamination Verification Samples

Two VOCs, 23 SVOCs, and 26 metals were found in the interior building decontamination verification samples collected. PCBs were not detected in any of the wipe samples collected inside Building 301, but aroclor 1254 was detected in one of the seven chip samples collected from the loading dock. Only six compounds were identified at any concentration that exceeded defined cleanup objective values. Table 4 presents a summary of the building decontamination process.

[5] [5] Letter received from James W. Dolen, Jr. of NYSDEC's Division of Solid and Hazardous Materials to Mr. Steven Absolom of SEDA dated September 29, 2005.

Compound	NYSDEC GA AWQSΦ	Maximum Sample Concentration (µg/L)*	Average Sample Concentration (µg/L)*	Number of Sample Exceedances / Samples Collected
1,1'-Biphenyl	5	7.7	6.22	1 / 13
3 or 4 Methylphenol	1	3.4	7.6	1 / 13
Bis(2-ethylhexyl) phthalate	5	12.7	7.5	2 / 13
Cadmium	5	6.23	1.1	1 / 16
Iron	300	2930	607	6 / 16
Lead	25	1050	237	12 / 16

Table 4

Building 301 (SEAD 2) – Building Decontamination Verification Sample Result Summary

Notes:
Φ GA AWQS = 6 NYCRR Part 702 Class GA Ambient Water Quality Standards
* µg/L = micrograms per Liter.

Subsequent to its review of the draft closure report, the NYSDEC issued the following comment about the decontamination of Building 307 (SEAD-1) and 301 (SEAD-2).

> "Additional decontamination is needed for the inside of both buildings because the lead levels exceeded the standard in most samples."[6]

Prior to performing the second round of decontamination, doors covered with lead paint were removed and encased in plastic to insure that flaking paint did not bias the decontamination results. All surfaces were then HEPA-vacuumed to collect settled dust and debris and then the surfaces were high-pressure washed with a detergent and water solution and then tripled-rinsed with clean water. Residual waste solutions from each step were recovered and containerized, pending characterization and final disposal determinations.

Confirmatory sampling was then repeated at 15 randomly selected locations on the floor surface, and the results of the analysis are shown in **Table 5**.

Table 5

Building 307 (SEAD 2) – Building Decontamination Verification Sample Result Summary

Compound	NYSDEC GA AWQSΦ (µg/L)*	Maximum Sample Concentration (µg/L)*	Average Sample Concentration (µg/L)*	Number of Sample Exceedances / Samples Collected
Lead	25	519	48.5	5 / 17

Notes:
Φ GA AWQS = 6 NYCRR Part 702 Class GA Ambient Water Quality Standards
* µg/L = micrograms per Liter.

These results were then used to substantiate the Army's closure certification for Building 307, Hazardous Waste Container Storage Facility that was issued in a letter dated September 28, 2005.

The NYSDEC approved the Closure Certification prepared for Building 307 on September 29, 2005 in a letter:

> "The authority to operate these buildings for the management of hazardous waste under Part 373 is hereby terminated. These buildings are now closed under Part 373."[7]

Exterior Soil Samples

Twelve samples of soil located outside of Building 301 were also collected and analyzed for VOC, SVOC, PCB and metal contaminants as part of the original decontamination work sequence at SEAD-2. Summary data are presented in **Table 6** for compounds detected at SEAD-2 in which measured concentrations in individual samples were observed to

[6] Letter received from James W. Dolen, Jr. of NYSDEC's Division of Solid and Hazardous Materials to Mr. Steven Absolom of SEDA dated October 2, 2003.

[7] Letter received from James W. Dolen, Jr. of NYSDEC's Division of Solid and Hazardous Materials to Mr. Steven Absolom of SEDA dated September 29, 2005.

exceed one of the identified comparative cleanup objective values.

Table 6 Building 301 (SEAD 2) – Exterior Soil Sample Result Summary			
Compound	**95th UCL of the Mean (mg/Kg)***	**NYSDEC Restricted Industrial Use Objective (mg/Kg)***	**Region IX Industrial Soil PRGs (mg/Kg)***
Benzo(a)anthracene	31.8	11	2.11
Benzo(a)pyrene	27.5	1.1	0.211
Benzo(b)fluoranthene	43.9	11	2.11
Dibenz(ah)anthracene	18.3	1.1	0.211
Indeno(123cd)pyrene	11.3	11	2.11
Arsenic	12.4	16	1.59
Copper	41.8	10000	40.9
Lead	390	3900	800

Notes:
* mg/Kg = milligram per Kilogram.

Review of the detailed soil sample results for SEAD-2 indicate that four VOCs, 26 SVOCs, one PCB and 32 metals were detected in one or more of the individual soil samples characterized. Of the detected compounds, only the eight compounds listed above were found in individual samples at concentrations that exceeded on or more of the comparative reference values.

Even though PAHs, arsenic and copper were identified in the exterior soils at this AOC, Army analytical testing records from sample collected and characterized prior to off-site disposal indicate that they were not present in at elevated levels in the wastes managed at SEAD-2 under interim status. Therefore, the Army believes that they do not result from a release that is associated with the historic interim status RCRA activities conducted at SEAD-2. Furthermore, while lead was found in historic waste characterization samples collected prior to off-site disposal of waste oils, its present is believed to be associated with the lead paint found on surfaces of the building.

In the NYSDEC's approval letter for the Closure Certification prepared for Building 307 Mr. James Dolen, Jr further wrote:

> "Although these buildings are now considered closed under Part 373, both buildings exhibit some levels of contamination both inside and outside of the buildings,… The contamination is unrelated to their use under Part 373. These buildings should be restricted to industrial-type usage. In our September 28, 2005 conversation you stated that these buildings are in the area designated with an industrial land use restriction in the ROD, and that any future use would be legally limited so as to not allow residential, child care, schools, and similar usage."[8]

This communiqué indicates that the NYSDEC agrees with the Army's position on the PAHs, arsenic, copper and lead identified in the soils surrounding SEAD-2.

SEAD-5, Sewage Sludge Waste Pile

Site investigations and removal actions performed at SEAD-5 included sludge sampling and analysis in 1985, sludge characterization and removal in 1992, an expanded site inspection (ESI) performed in 1994, and a Time-Critical Removal Action (TCRA) conducted between 2003 and 2006. The results of the investigations and actions are summarized and presented below.

Sludge Characterization – 1985

Samples of the sewage sludge were collected by the State of New York in February of 1985, and separately by the Army in October, November and December of 1985. The State analyzed the sludge samples for selected metals, classical parameters (i.e., ammonia – nitrogen, nitrate – nitrogen, nitrite – nitrogen, total and volatile solids, total Kjeldahl nitrogen, total

[8] Letter received from James W. Dolen, Jr. of NYSDEC's Division of Solid and Hazardous Materials to Mr. Steven Absolom of SEDA dated September 29, 2005.

phosphorous), polychlorinated biphenyls and extractable volatile and total organic halogens. The Army's analyses were limited to percent solids, total organic halogens and copper. Both the Army's and the State's data indicated that elevated concentrations of copper were present in the sewage sludge.

Sludge Characterization and Removal – 1992

Samples were taken from the sewage sludge piles in January 1992. TCLP analyses for metals, organic extractable pesticides, VOCs, organic extractable base neutrals and acids were performed on the two samples. Cadmium was the only constituent detected in either sample at concentrations above the analytical detection limits. In June of 1992, approximately 560 tons of sludge from SEAD-5 was removed and disposed at an offsite landfill.

Expanded Site Inspection - 1994

Test pits were advanced through five sewage sludge piles in 1994. In each case, the test pit bisected the entire pile allowing for a complete visual inspection of the material. One soil/sludge sample was collected from each test pit. Three groundwater monitoring wells were installed and groundwater samples were collected from each well. All soil and groundwater samples were submitted for VOC, SVOC, pesticides/PCBs, metals, cyanide, and nitrate analyses.

VOCs were not detected in the soil/sludge samples collected. Six cPAHs [i.e., benzo(a)anthracene, chrysene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k) fluoranthene, and dibenz(a,h)anthracene] were above at concentrations above their respective TAGM #4046 cleanup objective values in one or more of the samples analyzed. Concentrations of 4-chloroaniline and several inorganic compounds (antimony, calcium, copper, lead, magnesium, mercury, silver, sodium, zinc, and cyanide) exceeded their respective TAGM #4046 values in at least one sample. The Army subsequently excavated the sludge piles and disposed of the material at an off-site landfill.

No VOCs, SVOCs, or pesticides/PCBs were detected in the ESI groundwater samples. Eighteen metals were detected in the groundwater samples. Iron, manganese, and sodium were the only metals detected at concentrations above their respective NYSDEC GA AWQSs. The maximum concentrations found for 15 of the metals were observed in MW5-3, but these are believed to be associated with the elevated turbidity (greater than 100 NTUs) observed in this sample.

Time Critical Removal Action – 2003 to 2006

The goal of the SEAD-5 TCRA was to eliminate residual metal (e.g., Cu, Hg, and Zn) and cPAHs contamination found in soils at the AOC. During the performance of the TCRA, Weston Solutions Inc (Weston®) excavated approximately 1,740 yd^3 (i.e., 2,313 tons) of soil during three successive work phases performed between August 2003 and May 2005. The second and third phases of the work were performed after review of confirmatory sampling results indicated that soil contamination remained at the AOC. All of the excavated material was disposed at off-site landfills as non-hazardous soil.

During the Phase I work (August 2003) approximately 900 yd^3 of soil was excavated from SEAD-5. The extent of the Phase I work was directed towards five areas where visual indicators of the historic staging of sewage sludge piles existed. The excavations completed in each subarea were initially limited to a depth of 6 inches, with a depth tolerance of plus or minus (+/-) 2 inches. Confirmatory grab samples were collected from the base and perimeter of the excavations and analyzed for 17 polycyclic aromatic hydrocarbons (PAHs) including the seven cPAHs, the eight RCRA metals (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) and copper and zinc.

The results of the Phase I confirmatory sampling were compared to TAGM #4046 cleanup objectives and indicated that site-wide average concentrations measured for benz(a)anthracene, chrysene, benzo(a)pyrene, dibenzo(a,h)anthracene, copper, mercury, silver and zinc surpassed their respective TAGM #4046 cleanup objectives. Based on these findings, additional soil samples were collected in October 2003 exterior of the excavations to further delineate where additional soil removal was needed to address the residual level of contaminants left in soil at the AOC.

The Army remobilized crews to the AOC in February 2005, and expanded the Phase I excavations both on a vertical (depth) and lateral basis. During the Phase II work, the average excavation depth at selected locations was limited to 12 inches +/- 2 inches. Approximately 640 yd^3 (i.e., 898 tons) more of soil was excavated and transported off-site for disposal as non-hazardous soil at a licensed landfill during Phase II. Grab confirmatory samples were again collected from the perimeter and base of the new excavations and the samples were analyzed for the 17 PAHs and 10 metals.

Phase II confirmatory sample results indicated that cPAH compounds were still present in individual samples at concentrations above their respective TAGM #4046 soil cleanup objectives, but that the average benzo(a)pyrene toxicity equivalent (BTE) concentration[9] computed for the AOC was below 2 ppm. Based on the results of the Phase I and Phase II confirmatory sampling and analysis, the Army concluded that the cleanup objective for cPAHs had been achieved.

Phase II confirmation sample results for mercury indicated that it was present in individual samples at concentrations above its cleanup objective. Further the average concentration measured for mercury and copper across the AOC still exceeded their respective cleanup objectives. Based on these results, the Army decided to perform additional excavations.

In August 2005, Phase III excavations were conducted and approximately 200 yd^3 (i.e., 324 tons) of soil was removed from SEAD 5 and disposed it at an off-site licensed landfill as non-hazardous material. Confirmatory grab samples were collected from the base and perimeter of the new excavations and sent for analysis.

Results of the Phase III confirmatory sampling indicated that there were still isolated samples where measured concentrations of individual cPAH compounds and BTE, copper, mercury, and zinc exceeded desired cleanup objectives, but generally these were infrequent. Further, although the Phase III average sample concentrations for BTEQ, copper and mercury all surpassed their respective cleanup objective levels (i.e., 10 mg/Kg, 29.6 mg/Kg and 0.13 mg/Kg, respectively) each average was significantly impacted by a single, anomalously high sample concentration (i.e., 154.67 mg/Kg, 117 mg/Kg, and 3.1 mg/Kg, respectively). Absent these three unusually high concentrations, each of the Phase III average concentrations was less than the desired cleanup objective.

Data from samples that are indicative of soil left at the AOC have been merged into a data set comprised of 82 samples. Summary results for compounds found in one or more of the individual samples at levels in excess of comparative reference values are provided in **Table 7**.

[9] The aggregated BTE concentration is computed by summing up the weighted, measured concentrations of benzo(a) anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene detected in a single sample. Weighting factors of 1, 0.1, and 0.01 are applied to the individual compounds based on their relative carcinogenicity. The BTE comparative criteria is 10 parts per million (ppm or mg/Kg).

Table 7

SEAD-5 – Post Excavation Soil Sample Result Summary

Compound	AOC Average Concentration (mg/Kg)*	95th UCL of the Mean (mg/Kg)*	NYSDEC Restricted Commercial Use Objective (mg/Kg)*	EPA Region IX Industrial Soil PRGs (mg/Kg)*
Benzo(a)anthracene	3.4	14.69	5.6	2.1
Benzo(a)pyrene	2.65	11.50	1	0.21
Benzo(b)fluoranthene	3.47	14.78	5.6	2.1
Chrysene	2.75	11.6	56	211
Indeno(123-cd)pyrene	1.51	6.03	5.6	2.1
BTE	3.94	16.48	10	NAΦ
Arsenic	9.1	9.85	16	1.59
Mercury	0.12	0.29	2.8	307
Lead	64.3	117	1000	800

Notes:
*mg/Kg = milligrams per Kilogram
Φ NA = Not Applicable

None of the other compounds were found at concentrations that surpassed comparative reference values.

Review of these data indicates that the post-TCRA average concentrations of all contaminants of concern (COCs) except benzo(a)pyrene are below NYSDEC's Restricted Industrial Use cleanup objectives, whereas the average concentration of five of the cPAH compounds and arsenic exceed EPA Region IX Industrial Soil PRGs. Further, the large difference between the average and the 95th UCL values for the cPAH compounds suggests some variability in the dataset, while the limited variability seen for the arsenic values suggests a more uniform dataset.

Subsequently, an additional 84 soil samples were collected from locations located south of the largest excavation area to further delineate and bound the extent of contamination present at the AOC. Summary results for all soil samples remaining at SEAD-5 at presented in **Table 8**, in which only those compounds that had individual samples exceed one or both of the industrial comparative levels are presented.

Table 8

SEAD-5 – Combined Post Excavation and Delineations Soil Sample Result Summary

Compound	Site Average Concentration (mg/Kg)*	95th UCL of the Mean (mg/Kg)*	NYSDEC Restricted Commercial Use Objective (mg/Kg)*	EPA Region IX Industrial Soil PRGs (mg/Kg)*
Benzo(a)anthracene	5.5	21.5	5.6	2.1
Benzo(a)pyrene	4.4	16.8	1	0.21
Benzo(b)fluoranthene	5.7	21.8	5.6	2.1
Benzo(k)fluoranthene	1.8	6.7	56	21
Chrysene	4.7	18.5	56	210
Dibenz(a,h)anthracene	0.88	3.4	0.56	0.21
Fluoranthene	11.75	47.30	500	22000
Indeno(123-cd)pyrene	2.3	8.0	5.6	2.1
Phenanthrene	10.10	44.92	500	NAΦ
Pyrene	9.58	38.76	500	29126
BTE	6.7	25.6	10	NAΦ
Arsenic	8.84	9.24	16	1.59
Mercury	0.12	0.21	2.8	306
Lead	64.3	117.1	1000	800

Notes:
*mg/Kg = milligrams per Kilogram
Φ NA = Not Applicable

Review of these data again indicates that the post-TCRA average concentrations of all contaminants of concern (COCs) except benzo(a)pyrene are below NYSDEC's Restricted Industrial Use cleanup objectives, whereas the average concentration of five of the cPAH compounds and arsenic exceed EPA Region IX Industrial Soil PRGs.

The complete listing of results for samples collected in the area of SEAD-5 is presented in the completion report "*Industrial Waste Site (Sludge Piles) – SEAD 5 Time-Critical Removal Action Final Completion Removal Report*" (Weston, 2006a).

SEAD-24, Abandoned Powder Burning Pit

The investigative work at SEAD-24 included an expanded site inspection (ESI) performed in 1994, and a Time-Critical Removal Action (TCRA) conducted between 2002 and 2006. The results of the investigations are summarized and presented below.

Expanded Site Inspection – 1993 – 1994

An Expanded Site Inspection (ESI) was performed at SEAD-24 in 1993 and 1994. The ESI included performance of seismic refraction, electromagnetic (EM-31) and ground penetrating radar (GPR) surveys to locate potential pits and buried ordnance at the site and characterize the extent of disturbed soil at the AOC. Additionally, five soil borings were advanced and soil three samples were collected from each and analyzed to provide soil quality data. Furthermore, surface soil samples [0 – 2 inches below ground surface (bgs)] were collected from 12 locations surrounding the abandoned pit. Finally, three monitoring wells were installed in the till/weathered shale aquifer to obtain groundwater quality data from locations up- and downgradient of the AOC.

All samples were analyzed for the TCL VOCs, SVOCs, pesticides/PCBs, and TAL metals and cyanide according to the NYSDEC CLP Statement of Work. Explosive compounds were analyzed by USEPA Method 8330, herbicides were analyzed by USEPA Method 8150, nitrates were analyzed by USEPA Method 352.2, and total recoverable petroleum hydrocarbons (TRPH) were analyzed by USEPA Method 418.1.

VOCs, SVOCs, pesticides and PCBs, herbicides, metals, and nitroaromatics analytes, as well as TRPH were detected in the shallow soil at this AOC. Generally, most of the organic analytes were found infrequently, while most of the metals were detected in every sample characterized. Three SVOCs and 14 metals were found at concentrations exceeding their respective TAGM #4046 soil cleanup objective values. Of the 14 metals detected in soil samples, lead, and zinc were found at concentrations above their TAGM #4046 values most frequently. Shallow soil containing compounds at concentrations above TAGM #4046 cleanup levels were subsequently removed during the TCRA, so no data summary for the ESI soil is provided.

The results of the groundwater sampling program are presented in **Table 9**.

Table 9

SEAD-24 – Summary of ESI Groundwater Sample Results

Compound	NYSDEC GA AWQS (μg/L)	Maximum Sample Concentration (μg/L)	Average Sample Concentration (μg/L)	Number of Sample Exceedances / Samples Collected
Iron	300	5500	3423	3 / 3
Manganese	300	5230	1914	2 / 3
Iron + Manganese	500	10730	5338	3 / 3
Sodium	20000	210000	121167	3 / 3

Notes:
GA AWQS = 6 NYCRR Part 702 Class GA Ambient Water Quality Standards
μg/L = micrograms per Liter.

No organic compounds were detected in the samples of groundwater collected. Eighteen metals were found in the groundwater at SEAD-24, but only three (aluminum, iron and manganese) were detected in the groundwater at levels exceeding their respective comparative groundwater reference values. The noted groundwater exceedances for aluminum, iron and manganese are attributable, at least in part, to the elevated turbidity levels found in the samples analyzed.

Time Critical Removal Action – 2002 – 2006

The goal of the SEAD-24 TCRA was to eliminate residual metal and cPAHs contamination found in soils at the AOC. During the performance of the TCRA, Weston® excavated approximately 5,376 yd^3 (i.e., 9,623 tons) of soil during five successive work phases performed between December 2002 and January 2006. The second through fifth phases of the work were performed after review of confirmatory sampling results indicated that soil contamination remained at the AOC. Soil excavated from the AOC included material that originally comprised the "U" shaped berm, and native soils surrounding and underlying the berm. All of the excavated material was disposed at off-site landfills as non-hazardous soil.

During the Phase I excavations (December 2002, the top six inches of soil was removed from three subareas of SEAD-24. Initial excavations encompassed roughly 98,300 square feet (ft^2) of land located within and exterior to the U-shaped berm. Each of the initial excavation areas was subsequently enlarged, either vertically (i.e. to greater depths) or laterally based on the results confirmatory samples (grid-block floor or perimeter) that were collected and analyzed.

Arsenic, lead, and zinc were the primary COCs at SEAD-24, although roughly 20 percent of the confirmatory samples were also analyzed for other Target Analyte List (TAL) metals and Target Compound List (TCL) PAHs.

The final excavation area grew to encompass 136,800 ft^2, with individual 900 ft^2 (30 ft by 30 ft) grid cells being excavated to final depths of 6 inches bgs, 12 inches bgs, 18 inches bgs and 24 inches bgs based on sampling and analysis results. In addition, the "U" shaped berm was completely removed.

The preliminary remediation goals established were to remove soils containing levels of arsenic above 8.24 mg/Kg; lead above 400 mg/Kg; and zinc above 110 mg/Kg. The TAGM #4046 cleanup objectives established for lead and arsenic were met on an AOC-wide basis.

A summary of the final confirmatory sampling results that are representative of soil left at the AOC is provided in **Table 10**, where it is compared to NYSDEC's Unrestricted Use cleanup objectives, EPA Region IX's Residential Soil PRGs and SEDA-specific background concentrations (for metals only). The compounds reported in **Table 10** include only those where individual soil sample concentrations found at the site exceed one of the identified comparative reference values.

Table 10

SEAD-24 – Post Excavation Soil Sample Result Summary

Compound	Site Average Concentration (mg/Kg)*	95^{th} UCL of the Mean (mg/Kg)*	NYSDEC Unrestricted Use Objective (mg/Kg)*	EPA Region IX Residential PRGs (mg/Kg)*	Maximum SEDA-specific Background Soil (mg/Kg)*
Benzo(a)pyrene	0.03	0.069	1	0.062	NAΦ
Dibenz(a,h)anthracene	0.014	0.017	0.33	0.062	NAΦ
BTE	0.089	0.160	10	NAΦ	NAΦ
Arsenic	8.05	8.63	13	0.39	21.5
Lead	42.5	59.9	63	400	266
Nickel	31.6	34.8	30	1564	62.3
Selenium	6.4	8.6	3.9	391	1.7
Zinc	125	161	109	23643	126

Notes:
*mg/Kg = milligrams per Kilogram
Φ NA = Not Applicable

Review of these results indicate that soil remaining at the AOC for most of the identified compounds is consistent with NYSDEC's Unrestricted Use cleanup objectives and typical SEDA-specific background soils. The elevated 95^{th} UCL reported for zinc and benzo(a)pyrene as compared to their average concentrations are indicative of a few isolated high exccedances in selected samples left at the AOC.

SEAD-48, Row E0800 Pitchblende Ore Storage Igloos

Site investigations conducted at SEAD-48 included:

- DOE ERDA surveys in 1976 and 1980.
- a 1985 Radiological Control (RADCON) Survey;
- a 1985 Bunker Survey;
- Decontamination Activities in 1985 by SEDA;
- a 1985 Army Environmental Hygiene Agency (USAEHA) Closeout Survey;
- a 1987 Closeout Inspection by the Nuclear Regulatory Commission (NRC);
- a 1993 survey by NYSDEC Bureau of Radiation Protection (BERP); and
- the Final Status Survey conducted between 2002 – 2006.

1976 DOE Survey and Follow up Survey in 1980

Surveys of Igloos E0801 through E0811 were performed by Oak Ridge National Laboratory (ORNL) and Ford, Bacon & Davis Utah, Inc. (FB&DU). Alpha, beta, and gamma readings were collected both inside and around the igloos and in the soils and surface waters near the igloos. Levels of radon and its progenies were also measured inside the igloos.

Residual contamination was found at eight of the eleven SEAD-48 Igloos (E0804 – E0811). Results indicated that E0804 and E0806 were above NRC guidelines for surface contamination of U-235, U-238 and associated decay products (FB&DU, November 1981). Soil contamination was found that was located within several meters of the entrance of the bunkers. Results from the radon survey indicated that levels were elevated above background in bunkers E0804 to E0811 with the highest concentrations in bunkers E0804 and E0808. Neither team found significant levels of contamination at bunkers E0801 through E0803; these bunkers were considered relatively uncontaminated. Based on the survey results, recommendations were made to decontaminate the affected igloos and soils.

May 1985 Army RADCON Survey

In May 1985, radiological surveys were performed by two RADCON teams at Igloos E0801 through E0811. The survey measured the following:

1) Direct alpha and beta surface contamination;
2) Removable alpha and beta contamination;
3) Interior and exterior gamma radiation levels;
4) Uranium levels in soil and water in the vicinity of the bunkers;
5) Air monitoring for radon and radon progeny; and,
6) Activity levels along the rail spur and loading dock used for transport of the ore.

Based on the surveys, the Army reported that the interior surfaces of eight of the Igloos (E0804 – E0811) were found to be contaminated with uranium and its progeny. Further, the outdoor concrete surfaces and soil at the entry to seven of the bunkers (E0804 – E0806, E0808, and E0180 – E0811) were found to be contaminated with elevated levels of U-238 and Ra-226. Additionally, there were instances in Igloos E0804 and E0806 where the direct reading measuring fixed alpha exceeded 5000 dpm/100cm^2. There were no levels above 1000 dpm/100cm^2 measured for transferable alpha or beta. Additionally, in Igloo E0804 dose rates above 1.0 mrad/hour were detected. Finally, based on the germanium gamma spectrometry analysis of debris collected from interior drains, some degree of activity of U-238 and Ra-226 existed in all bunkers except E0801, E0802 and E0808.

The surveys of the railway spur and the loading area showed no elevated activity.

June 1985 On-Site Lab Setup and Bunker Survey

A portable environmental radiation survey laboratory was set up to support a radiation decontamination activity at Igloos E0802 though E0811, respectively. Two Reuter-Stokes RSS-111 pressurized ionization chambers (PICs), a Canberra Series 10 germanium detector/MCA, and a Ludlum 19 were employed. Clean soil from the site was tested against BRDC soil. Background exposure rate measurements were taken in Building 321 using the PICs averaged 8.3 uR/hr.

Results of the survey indicated that all interior exposure rate readings were in the range of 7-11 uR/hr. This was similar to background and well below the EPA standard of 20 uR/hr over background. Exterior measurements made within 3 meters of the entrance at a height of 1-meter ranged from 57 uR/hr to 4,000 uR/hr. The highest values were recorded outside bunker E0804.

July 1985 SEDA Decontamination Activity

Workers decontaminated igloos by scraping, abrading, and vacuum blasting the floors, gutters, and interior surfaces of the bunkers. Contaminated concrete, asphalt, and soil was pulled away from the entryway of the igloos using chisels, shovels, and jackhammers, and a backhoe is used to place the 90 tons of contaminated material consisting of shale, concrete, asphalt, soil and pitchblende into 30 B-25 transport containers. Continuous field surveys were performed to map contamination during removal. Over 300 radiological samples were collected and analyzed for U-238 and Ra-226. Results from soil samples collected showed levels of U-238 and Ra-226 below the radiological standard of 5 pCi/g. Samples collected from the B-25 shipping containers indicated that residual levels radioactivity were less than 22 dpm/100cm^2, in accordance with standard specified in Title 49 CFR.

1985 Army Environmental Hygiene Agency Survey

The AEHA surveyed SEAD-48 to determine if the radiological decontamination activity performed earlier in the month was successful. The survey evaluated if radioactive contamination still existed within the bunkers and the surrounding areas, and if radioactive contamination was present, the extent of the remaining contamination.

The conclusions of the survey were that the eleven bunkers and the surrounding area were consistent with the requirements for unrestricted use and that SEAD-48 should not be considered a contaminated area.

October 1987 NRC Closeout Inspection

NRC performed an inspection of SEAD-48 to determine if the area could be released for unrestricted use. A visual inspection of the bunkers was completed, site personnel were interviewed, historic records were examined, and random radiological measurements were collected at the AOC.

Twenty-seven wipe samples were collected and analyzed for removable alpha/beta contamination; no removable radioactivity was detected. Two soil and one water sample were collected outside Igloo E0804 and each was analyzed using germanium gamma spectrometry; no elevated gamma radioactivity was detected. The gamma radiation levels, measured with a Micro-R meter, were found to be at background levels.

No violations were observed during the inspection. Igloos E0801 through E0811 were released for unrestricted use.

1993 NYSDEC Bureau of Radiation Protection Survey

Radiological surveys were performed at locations within SEAD-48 and at a background location by NYSDEC and NYSDOH. The purpose of the brief evaluation was to determine if there was evidence that suggested that residual radioactive contamination was present.

The work conducted during this survey consisted of instrument readings at:

- twelve locations at and around Igloo E0804;
- two locations at and around E0806;
- one location at E0808 at both ends of the drain;
- two locations at and around E0809; and,
- one location at the background Igloo E0710.

Further, three soil samples were collected from the vicinity of Igloo E0804; one soil sample was collected from the area surrounding Igloo E0808; and one soil sample was collected from the vicinity of E0710. Finally, two wipes were collected at Igloo E0804 and one was collected at Igloo E0806.

Results indicated that further remediation of radiological contamination was necessary at several areas inside and outside of Igloo E0804 and at one hotspot within the drain inside of Igloo E0808. Readings from other SEAD-48 Igloos did not deviate significantly from background.

Final Status Survey – 2002 – 2006

NRC allows for final closure and unrestricted release of radiological sites once the data are provided that indicated that residual levels of radioactivity present have been reduced below Derived Concentration Guideline Levels (DCGLs). A DCGL is a radionuclide-specific activity concentration that, if uniformly distributed throughout a survey unit (i.e., SEAD-48), would result in a defined total effective dose equivalent (TEDE) to an average member of a critical group. The level of radionuclide-specific activity must be distinguishable from background concentrations. At SEDA, the TEDE selected for development of the DCGLs at SEAD-48 is NYSDEC's TAGM-4003 value of 10 mRem/yr, which is the most conservative value defined by the three regulatory overseers (i.e., EPA, NYSDEC, NRC). Two types of DCGLs were evaluated at SEAD-48, the $DCGL_W$ (wide area) and the $DCGL_{EMC}$ (elevated measurement comparison level).

A Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)-based radiological survey was performed at SEAD-48. The survey was performed to investigate and evaluate the AOC with the goal of achieving its final closure per requirements of both CERCLA and the NRC's current standards for license termination. Interior and exterior igloo measurements were collected during the survey.

Under the MARSSIM process, the interior and exterior surfaces of the storage Igloos were initially classified as Class 1, 2 or 3 survey units based on past operating history, historic survey information and an assessment of their potential for residual radioactive contamination. The Class 1 classification is assigned to units and surfaces having the greatest potential for residual radioactivity, while the Class 2 and 3 values were assigned to units exhibiting lesser potentials for residual radioactivity. Class 1 units and surfaces received the most intensive survey coverage (100%), while Class 2 units received 50% coverage. Class 3 interior surveys consisted of biased measurement and collection of wipe samples at 30 biased locations.

Interior Surface Survey Methods

The survey of igloo interiors included collection of data or samples for the following parameters:

- Alpha and beta radiation surveys;
- Low-energy gamma radiation surveys;
- Exposure rate measurements;
- In-situ gamma spectroscopy and material samples; and,
- Radon testing.

Comparative measurements and samples were obtained for all instruments at background locations outside of SEAD-48 prior to the start of the interior survey.

Interior Surface Survey Protocols

The following survey measurements were collected:

- Alpha, beta, and gamma radiation scanning measurements of each grid;
- Alpha, beta, and gamma radiation one-minute direct measurement at the center of each grid;
- Exposure rate measurement at the center of each grid; and
- Gross alpha, beta, and gamma radiation wipe sample at the center of each grid.

The data collection and analysis flowchart applied to interior surveys is depicted graphically in **Figure 1**. Field flag values were used to determine, in real time, if radioactivity levels measured in any surveyed area were potentially elevated. For each area above the alpha/beta scanning flag value, direct alpha, beta, low-energy gamma, and exposure rate measurements along with a wipe sample were collected at the location with the highest alpha/beta scanning measurement. The additional information was collected so that adequate data would exist for all areas that were possibly elevated; elevated areas would be determined after the fieldwork using statistics.

In-situ gamma spectroscopy measurements were collected at a minimum of two locations in each igloo surveyed; these measurements were collected at locations biased towards potentially elevated survey areas.

Radon measurements were also collected in each of the SEAD-48 Igloos, as well as in background Igloos.

Exterior Igloo Field Methodology

The survey of igloo interiors included collection of data or samples via the following methodologies:

- High-energy direct gamma radiation surveys and scanning measurements;
- Exposure rate measurements;
- In-situ gamma spectroscopy measurements; and,
- Gamma spectroscopy measurements were collected in a field laboratory, prior to soil samples being sent off-site for analysis within a laboratory.

Background survey measurements and samples were also collected at a location outside of SEAD-48 prior to the start of the SEAD-48 exterior surveys.

Exterior Igloo Survey Protocols

All surfaces within a Class 1 survey unit received 100% coverage of the cleared area. Exterior surveys for the Class 2 units were conducted in only 50% of the cleared grids, while Class 3 survey units again received the least intensive survey coverage.

The southern base of each igloo mound was set as the southern boundary of the survey unit and the road served as the northern boundary. The east-west extent for each survey unit was based on where large stands of trees began on either side of the igloo. Areas with lesser vegetation (e.g., grasses, shrubs, small trees) were cleared where possible and included in the survey.

Within each sampling grid, the following survey measurements were collected:

- An exposure rate measurement collected at the center of each grid;
- High-energy gamma radiation scanning measurements; and,
- High and low-energy gamma radiation one-minute direct measurement collected at the center of each sampling grid.

The data collection and analysis flowchart applied to exterior surveys is depicted graphically in **Figure 2**.

Within each sampling grid, the exposure rate measurement was first collected to assess potential worker hazards. The sampling grids were then scanned with high-energy gamma radiation detectors and one-minute high and low-energy gamma direct measurements were collected.

Field flag values were then used to determine, in real time, if radioactivity levels measured in any surveyed area were potentially elevated. At each potentially elevated location, high-energy gamma, low-energy gamma, and exposure rate direct measurements were collected from the area where the highest scanning measurement was obtained. The additional data were collected to provide sufficient data for all areas that were possibly elevated; these data were subsequently statistically evaluated to confirm/reject potential hotspots. The location was flagged and noted so that it could be relocated in the future.

The exterior concrete pads, vents, and igloo drain outlets for all class levels were also fully investigated. The concrete pad was scanned using both the high and low-energy gamma detectors. High-energy and low-energy direct measurement and exposure rate measurements were collected at the location having the highest scanning measurement on each pad. The areas around the rooftop vents were scanned using a high-energy gamma detector. Scanning, high- and low-energy gamma direct measurements and exposure rate measurements were conducted on ground surfaces around the drain outlets for each igloo.

In-situ gamma spectroscopy was performed at five exterior locations for each Class 1 survey unit and at three exterior locations for each Class 2 survey unit. In-situ gamma spectroscopy locations were selected based on scanning measurements. Three measurements from each Class 1 survey unit and two measurements from each Class 2 survey unit were co-located with soil boring locations drilled at those survey units. Collected spectra were compared to an appropriate background spectrum to assess the presence and relative levels of ROCs at the measurement locations.

Soil borings were advanced and samples were collected from location at each igloo based on either historical information or scanning results. At each exterior survey unit, soil boring samples were collected immediately outside the east and west drain outlets. In addition, soil borings were collected at a minimum of three locations at each of the exterior Class 1 survey units and a minimum of two locations at each of the exterior Class 2 survey units based on scanning measurements.

Each soil boring was drilled to bedrock, and split spoons were collected of all intervals of the drilling. The first sample was collected from the surface soil (0 – 0.5 ft). Subsequent samples were collected from depths of 0.5 – 2 ft bgs, and then at 2-foot intervals until bedrock was encountered.

Each split spoon was screened in real-time as it was retrieved. The data was recorded, and then the content of the split-spoon was placed into a uniquely labeled sample bag pending future in-situ gamma spectroscopy measurements.

In-situ gamma spectroscopy and gross gamma count rates measurements made on samples were processed from the top of the borehole downwards, and continued until measurements were undistinguishable from background levels. The spectrum obtained from each successive sample interval was compared to a background spectrum to look for energy peaks different from background. Once background levels were found in a sample interval, deeper samples were not assessed, but were archived. Soil samples found to exhibit levels comparable to or higher than background levels were sent off-site to a laboratory for further analysis using high purity germanium gamma spectroscopy.

Additional soil sampling was performed in November 2004 to further characterize the vertical and lateral extent of areas exhibiting elevated scanning results. The elevated areas were delineated using high-energy gamma radiation surveys, and soil was manually removed from the location in 6-inch lifts. After removal of each lift, the bottom of the excavation was scanned to determine the depth of contamination. This process continued until no contamination was detectable by scanning, or until the excavation reached a depth of 2 feet. A representative soil sample was collected from each lift and from the bottom of the excavation. The samples were screened in the field office to determine which samples should be analyzed offsite using gamma spectroscopy. The remaining samples were archived.

Eight monitoring wells were installed, developed and sampled to investigate levels of ROCs present in groundwater at SEAD-48. Six of these monitoring wells were installed along the southern side of Igloo Road 39 in locations downgradient of the groundwater and surface water flow. The remaining two monitoring wells were installed upgradient and cross gradient of the groundwater flow. Two rounds of groundwater sampling were then completed in October 2003 and again in April 2004.Groundwater samples were submitted for alpha spectroscopy analysis of U-234, U-235, U-238, Ra-226, Ra-228, Th-232, gross alpha, and chemical analysis of total uranium.

Data Analysis and Summary

Both the $DCGL_W$ and the $DCGL_{EMC}$ were used to evaluate the FSS results. Additionally, the concept of As Low as Reasonably Achievable (ALARA) was also employed in the evaluation of interior and exterior survey unit data for survey sites. The data analysis process is depicted on **Figures 1** and **2**.

In terms of radiological implementation, the objective of being ALARA is to maintain all exposures as far below the applicable dose limits as is reasonably achievable. In the FSS process, although a survey unit may pass the site-wide release criteria (i.e., the $DCGL_W$), it may still have measurements that exceed the localized release criteria (i.e., the $DCGL_{EMC}$) or that are indicative of residual contamination. It is necessary to consider if all levels of residual radioactivity are ALARA when evaluating the FSS results.

Results

Statistical tests demonstrated that there were no datasets from either the interior or exterior survey units at SEAD-48 that exceeded the gross activity surface $DCGL_W$ for pitchblende ore.

Small, localized areas of residual radioactivity were identified within the SEAD-48 interior survey units during scanning surveys, but further investigation and characterization demonstrated that these areas met the release criteria and were ALARA. Similarly, small, localized areas of residual radioactivity were identified

Site Risks

Human health risk assessments were conducted for SEADs 1, 2, 5, and 24 to estimate potential effects that could result due to human exposure to conditions identified at the AOCs. Contaminants of concern (COCs) evaluated within the risk assessments were selected because they were observed to exceed regulatory reference values including either the NYSDEC TAGM #4046 values or the USEPA's Region IX PRGs for residential soils.

Exposure point concentrations (EPCs) used within the risk assessments were either the maximum concentration detected in a specific media at the AOC, or the 95th UCL of the data. The reasonable maximum exposure (RME) was evaluated in each case.

The receptors used in the risk assessment at all four of the AOCs included an industrial worker, a construction worker and an adolescent trespasser. In addition, for SEAD-24 a residential risk assessment considering adult, child and lifelong residents was also performed. Exposure pathways evaluated included inhalation of dusts in ambient air, Ingestion and dermal contact to on-site surface soils, and ingestion and dermal contact to on-site surface and subsurface soils (construction worker).

Risk Assessment Methodology

Risk assessments are performed at sites where hazardous substances have been detected to identify if the concentrations of the species found will pose potential adverse threats to current or future human or ecological receptors if they are allowed to remain at the site. Risk assessments are inherently conservative, purposely biased to prompt an action if potential risk is identified.

Human health risk assessments follow a four-step process, which includes hazard identification, exposure assessment, toxicity assessment and risk characterization. These four steps are used to assess potential site-related human health risk for reasonable maximum exposure scenarios that do or could exist at the site no action were taken to eliminate or mitigate them

Hazard Identification: Chemicals of Concern (COCs) in the various media at the site are identified and selected based on factors such as their toxicity, concentrations detected relative to regulatory standards and guidelines, frequency of occurrence, fate and transport in the environment, mobility, persistence and bioaccumulation.

Exposure Assessment: Different exposure pathways through which existing or future receptors might be exposed to the COCs are evaluated. Possible exposure pathways include ingestion, dermal contact, or inhalation. Factors relating to the exposure assessment include concentrations that receptors may encounter, and the duration and frequency of the potential exposure. The reasonable maximum exposure scenario is calculated to estimate the highest level that could be expected to occur at the site.

Toxicity Assessment: The types of adverse effects associated with exposure to COCs, and the relationship between the magnitude of the exposure and the severity of potential effects are determined. Potential effects are COC-specific and may include risks of developing cancer or other changes in normal functions of organs (non-carcinogenic effects).

Risk Characterization: The level of potential risk present is assessed by combining the outputs of the exposure and toxicity assessment components. Carcinogenic and non-carcinogenic risk is estimated. Current guidelines for acceptable individual lifetime excess cancer risk are established as 1 in 10,000 to 1 in 100,000 or less (10^{-4} to 10^{-6}, or less). The non-cancer risk, expressed as a "hazard index" (HI), represents the sum of individual exposure levels to corresponding reference doses. A non-cancer HI threshold level of less than 1 is set as the reference point.

Building 307 (SEAD 1) Risk Results

COCs identified for the soil at SEAD-1 included cPAH and PAH compounds and selected metals. Maximum soil concentrations for COCs were initially used in the risk calculations. A review of the carcinogenic risks for RMEs to the soils surrounding SEAD-1 showed that all receptor levels were within or below the EPA's acceptable range (i.e., 10^{-4} to 10^{-6}). The industrial worker exhibited the highest potential risk at 8 x 10^{-6}, while other potential risk levels were 9 x 10^{-7} or less.

Non-cancer risk levels (HIs) for the industrial worker and the adolescent trespasser are less than 1. The non-cancer HI computed for the construction worker is 1.56.

The elevated HI for the construction worker is driven by the ingestion of soil and the inhalation of dusts containing metals. The predominant contributing metal is manganese (representing 46% of the identified risk), followed by iron (15%), aluminum (11%), zinc (11%) and vanadium (7%). **Table 11** presented below compares the maximum measured concentration found at SEAD-1 for each of the significant contributing metals to varying regulatory reference values.

Table 11

Comparisons of Selected Metals Found in SEAD-1 Exterior Soil Samples to Cleanup Objective Levels

Metal	SEAD-1 Maximum Concentration (mg/Kg)	SEAD-1 95th UCL Concentration (mg/Kg)	NYSDEC Unrestricted Use (6NYCRR375) Concentration (mg/Kg)	NYSDEC Commercial / Industrial Restricted Use Concentration (mg/Kg)	Region IX PRG for Residential Soil Concentration (mg/Kg)
Aluminum	16700	12064	NS*	NS*	76142
Iron	22500	16725	NS*	NS*	23463
Manganese	815	519	1600	10000	1762
Vanadium	33.2	28.2	NS*	NS*	78
Zinc	16200	8114	109	10000	23463

Notes: * NS = None Specified.

As is shown in the above table, the maximum site concentrations measured for the non-cancer risk contributing metals, exclusive of zinc, are all lower than all reference levels listed. Even zinc was found at concentrations that are lower than the USEPA's Region IX PRG for residential soil, and NYSDEC's cleanup objectives for restricted commercial and industrial soils. Furthermore, the concentrations reported for aluminum, iron, manganese and vanadium are all consistent with SEDA-wide background concentrations.

All of the soil samples collected at SEAD-1 came from locations in close proximity to the exterior walls of Building 307 which are constructed of zinc-coated, corrugated metal. There is a noticeable, isolated zone of soil that surrounds the building that has a whitish powdery coating associated with it, and this substance is presumed to be a zinc-oxide powder resulting from the oxidation and weathering of the zinc-coated sheet metal walls and roofing material. Given these considerations, the apparent elevated HI determined for SEAD-1 that is attributed to the identified metals is considered to be generally consistent with background conditions found throughout the Depot.

The construction worker HI decreases to 1.08 if the 95th UCL values for aluminum, iron, manganese, vanadium and zinc are substituted for the maximum detected levels in the RME scenario evaluation. Based on these factors, the Army does not believe that the conditions found at SEAD-1 are indicative of risks arising from the historic operations at the SWMU.

Building 301 (SEAD-2) Risk Results

COCs identified in the soil at SEAD-2 were SVOCs, including cPAH, PAH, and other compounds, and selected metals. Maximum soil concentrations for COCs were initially used in the risk calculations, but subsequently 95th UCL values were evaluated in risk calculations.

The non-cancer risks for the industrial worker and the adolescent trespasser are less than 1. The HI computed for the construction worker is 1.48. This elevated HI is driven by the ingestion of soil and the inhalation of dusts containing metals. The predominant contributing metal is manganese (representing 29% of the identified risk), followed by iron (19%), arsenic (13%), aluminum (8%) and vanadium (8%). **Table 12** compares the maximum measured concentration found at SEAD-2 for each of the significant contributing metals to varying reference values.

Table 12

Comparisons of Selected Metals Found in SEAD-2 Exterior Soil Samples to Cleanup Objective Levels

Metal	SEAD-2 Maximum Concentration (mg/Kg)	SEAD-2 95th UCL Concentration (mg/Kg)	NYSDEC Unrestricted Use Concentration (mg/Kg)	NYSDEC Commercial / Industrial Restricted Use Concentration (mg/Kg)	Region IX PRG for Residential Soil Concentration (mg/Kg)
Aluminum	16800	8828	NS	NS	76142
Arsenic	17.6	12.4	13	16	0.39
Iron	26300	20188	NS	NS	23463
Manganese	522	413	1600	10000	1762
Vanadium	36.4	24.2	NS	NS	78

Notes: NS – none specified.

As is shown in the above table, the maximum site concentrations measured for aluminum, manganese and vanadium are all lower than all reference levels. Arsenic and iron are the only metals found at levels above listed reference values, but the maximum concentrations identified for both are consistent with SEDA background levels.

The construction worker HI decreases to 0.91 if the 95th UCL values for aluminum, arsenic, iron, manganese, and vanadium are substituted for the maximum detected levels. Therefore, given these two latter determinations, the non-cancer risks identified at SEAD-2 are considered to be an over-estimate of the potential risk present at the site.

The cancer risk calculated at SEAD-2 for the construction worker and adolescent trespasser were found to be within the USEPA's recommended range (1×10^{-4} to 1×10^{-6}) based on the maximum detected concentration of the COCs and a RME exposure scenario. The maximum concentration cancer risk identified for the industrial worker at SEAD-2 was 5×10^{-4}, while the 95th UCL concentration cancer risk is 2×10^{-4}, both of which exceed the USEPA's recommended range. The identified cancer risk for the industrial worker results primarily due to dermal contact with, and ingestion of soil containing cPAHs, principally benzo(a)pyrene, benzo(b)fluoranthene, and dibenz (a,h)anthracene. The elevated results for these compounds at SEAD-2 are associated with the presence of a hardpack parking area around three sides of the building, the historic use of asphalt/tar traction aid on the loading dock and ramp, the use of a tar coating on the roof of the building, and the presence of vehicular and rail traffic in close proximity to the AOC.

SEAD-5 Risk Results

COCs identified in the soil at SEAD-5 included cPAH and PAH compounds, and selected metals. Maximum soil concentrations for COCs were initially used in the risk calculations, but subsequently 95th UCL values were evaluated in risk calculations.

The non-cancer risk HIs for the industrial worker, construction worker, and the adolescent trespasser are all less than 1. The cancer risk calculated at SEAD-5 for the construction worker (1×10^{-5}) and adolescent trespasser (2×10^{-6}) receptors are within the USEPA's recommended range (1×10^{-4} to 1×10^{-6}). The calculated cancer risk for the industrial worker is slightly above the USEPA's recommended range at a level of 1.3×10^{-4}.

The majority (55%) of the identified RME cancer risk results from the ingestion of soil, while the balance (45%) results from the industrial worker's dermal contact to the soil. The principal contaminant contributing to the cancer risk determined for SEAD-5 is benzo(a)pyrene, which contributes more than 61% of the risk associated with soil ingestion and 65% of the dermal contact risk. Analytical results from historic sludge pile samples indicated that the cPAH compounds were not significant contaminants within the sludge. SEAD-5 is located in an area where heavy equipment and railroad operation use and idling cycles have historically occurred and it likely that these other activities contribute to the levels of cPAHs noted at the AOC.

SEAD-24 Risk Results

COCs identified in the soil at SEAD-24 included cPAH and PAH compounds, and selected metals. Maximum soil concentrations for COCs were initially used in the risk calculations, but subsequently 95th UCL values were evaluated in risk calculations. Although groundwater samples were collected during the ESI, these data were not used in the risk assessment because all of the samples were collected using bailers and showed elevated levels of turbidity.

The non-cancer risks for the industrial worker and the adolescent trespasser at SEAD-24 are less than 1. The non-cancer HI computed for the construction worker is 2.95. The cancer risks calculated at SEAD-24 for all receptors (i.e., industrial worker, construction worker, and adolescent trespasser) are within, or below the USEPA's recommended range (1×10^{-4} to 1×10^{-6}).

This elevated HI for the construction worker is driven principally by the inhalation of dusts containing the metals aluminum and manganese. The inhalation exposure pathway accounts for 74% of the total non-cancer risk found for the construction worker, and of this total, manganese represents 78% of the identified risk. Aluminum represents the remaining 22% of risk calculated for the construction worker via the inhalation pathway at SEAD-24.

The concentrations of aluminum and manganese measured in the soils remaining at SEAD-24 are consistent with the SEDA-background data set, and they are also below reference values, as is shown in **Table 13**.

Table 13

Metals Contributing to Non-Cancer Risks Compared to Regulatory Reference Levels at SEAD-24

Metal	SEAD-24 95th Upper Confidence Limit of the Mean (mg/Kg)	NYSDEC Unrestricted Use (6NYCRR375) Concentration (mg/Kg)	Region IX PRG for Residential Soil Concentration (mg/Kg)
Aluminum	16290	NS*	76142
Manganese	563	1600	1762

Notes: * NS – None Specified.

As is shown in the above table, the maximum site concentrations measured for the non-cancer risk contributing metals are both lower than all reference levels. Therefore, the Army believes that the HI computed for the construction worker at this site is an exaggeration of the risk that is likely to exist at the AOC.

The results of the residential scenario risk assessment indicate that non-cancer risk for the adult resident is less than 1. The non-cancer HI computed for the child resident assuming is 3.39. The cancer risk calculated at SEAD-24 for all residential receptors (i.e., adult, child, and lifetime resident) are within, or below the USEPA's recommended range (1×10^{-4} to 1×10^{-6}).

The elevated HI determined for the child is driven by the ingestion of soil containing metals which represents nearly 86% of the total non-cancer found (Ingestion HI of 2.9 out of 3.39 total). A listing of the metals that contribute to the risk, compared to reference values and SEDA-specific background concentrations are summarized in **Table 14**, below.

Table 14

Metals Contributing to Non-Cancer Risks Compared to Reference Levels at SEAD 24

Metal	SEAD-24 95th Upper Confidence Limit of the Mean (mg/Kg)	Maximum SEDA-specific Background Concentration (mg/Kg)	NYSDEC Unrestricted Use (6NYCRR375) Concentration (mg/Kg)	Region IX PRG for Residential Soil Concentration (mg/Kg)
Aluminum	16290	20500	NS*	76142
Antimony	7.4	6.55	NS*	31.3
Arsenic	8.6	21.5	13	0.389
Iron	28384	38600	NS*	23463
Manganese	563	2380	1600	1762
Thallium	12.2	1.2	NS*	5.16
Vanadium	25.6	32.7	NS*	78.2

Notes: * NS = Not Specified

Concentrations measured for five of the metals at SEAD-24 are lower than those found at background locations at the Depot, yet exposure to these metals at the AOC accounts for more than 85% of the overall child's non-cancer risk at the site. Comparably, both arsenic and manganese are below NYSDEC's Unrestricted Use cleanup objective, while aluminum, antimony, manganese and vanadium are all below EPA Region IX PRGs for residential soil.

Therefore, the Army contends that the risk associated with ingestion of soil by a child resident at SEAD-24 is consistent with or less than the risk that they experience based on exposure to background conditions.

SEAD-48, E0800 Row Pitchblende Ore Storage Igloos

Based on the FSS performed in accordance with the MARSSIM guidance, it is recommended that SEAD-48 in its entirety be released for unrestricted use as it has been demonstrated that the site meets the 10 mrem/year maximum dose requirement set forth by NYSDEC TAGM-4003. No further actions are recommended for SEAD-48.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA § 121(b)(1), 42 U.S.C. § 9621(b)(1) mandates that remedial actions must be protective of human health and the environment, cost effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. The goal of NYSDEC's remedial program at Inactive Hazardous Waste Sites is "to restore that site to pre-disposal conditions, to the extent feasible."

Remedial Alternatives

The discussion below presents and discusses potential remedial alternatives that have been considered for SEAD-1 (former Hazardous Waste Container Storage Facility), SEAD-2 (former PCB Transformer Storage Facility) and SEAD-5 (former Sewage Sludge Piles). No Alternatives were considered for SEAD-24 (Abandoned Powder Burn Pit) or SEAD-48 (Row E0800 Pitchblende Storage Igloos) as the Army believes that the data summarized above an in the referenced documents indicates that all environmental concerns have been previously addressed.

Alternative 1: No Action

The Superfund program requires that the "no action" alternative be considered and serve as the baseline by which other alternatives evaluated are compared. The "no action" remedial alternative for soil does not include the design or implementation of any physical remedial measures to address types of contamination identified at the AOCs.

Consideration of the "no action" alternative (Alternative 1) is identical for work that might be considered for SEADs 1, 2, or 5. Application of this alternative would result in contamination at levels that could cause potential risks to human health and the environment, under certain land use scenarios, remaining in the soils at all three of the AOCs. As such, CERCLA requires that the AOCs be reviewed periodically to assess whether changes in conditions are found at the

AOCs. If justified by the periodic reviews, subsequent remedial actions may be implemented to remove, treat, or contain the contaminated soils.

The upper, overburden aquifer present in the PID area of the SEDA is characterized as poor yielding, and subject to significant seasonal, climatic groundwater level variation. Groundwater in portions of the greater PID area is known to be contaminated with metals and other contaminants in excess of New York GA groundwater standards. However, a municipal potable water distribution system, which derives its raw water from a non-groundwater source off the Depot, is present within the PID Area. The presence of this supply of water system eliminates any reason to consider use of groundwater at SEADs 1, 2, or 5 for domestic purposes.

As part of another CERCLA action completed for the Depot and approved by the EPA and NYSDEC, LUCs that prohibit use of land within the greater PID area for residential activities, and that prohibit access to and use of groundwater have been imposed. SEADs 1, 2, and 5 are all located within the greater PID area, and thus the identified LUCs are applicable.

SEAD-1, Alternative 1 Costs

Capital Cost	$0
Annual OM&M Cost (soil)	$3,000
Annual OM&M Cost (groundwater)	$3,000
Present Worth Cost	$74,460
Construction Time	0 Month
Completion Time	1 Month

SEAD-2, Alternative 1 Costs

Capital Cost	$0
Annual OM&M Cost (soil)	$3,000
Annual OM&M Cost (groundwater)	$3,000
Present Worth Cost	$74,460
Construction Time	0 Month
Completion Time	1 Month

SEAD-5, Alternative 1 Costs

Capital Cost	$0
Annual OM&M Cost (soil)	$3,000
Annual OM&M Cost (groundwater)	$3,000
Present Worth Cost	$74,460
Construction Time	0 Month
Completion Time	1 Month

Alternative 2: Excavation of Contaminated Soil to Achieve Unrestricted Use Cleanup Objectives, Off-Site Treatment/Disposal and Soil Backfill

The second alternative evaluated individually for SEADs 1, 2, and 5 involved the excavation of soil at the SWMUs that contained concentrations of contaminants in excess of NYSDEC's Unrestricted Use cleanup objectives. The PID-wide restriction prohibiting access to and use of the groundwater would continue to be applied to all AOCs within the PID Area.

SEAD-1, Alternative 2 (Unrestricted Use)

Table 15 summarizes analytical results for 12 exterior soil samples that were collected during the SEAD-1 RCRA Closure Activity versus NYSDEC's Unrestricted Use cleanup objectives.

Table 15

Summary of NYSDEC Unrestricted Use Soil Cleanup Objective Exceedances – SEAD-12 Soil

Compound [1]	95th UCL Soil Concentration [2] (mg/kg)	NYSDEC 's Unrestricted Use Value (mg/kg)	Number of Sample Concentrations Above Cleanup Objective	Is 95th UCL Concentration [2] Above Objective (Y/N)?
Benzo(b)fluoranthene	0.68	1	1	N
Lead	110	63	8	Y
Nickel	26.4	30	1	N
Zinc	8144	109	13	Y

1. Only compounds with NYSDEC Unrestricted Use Soil Cleanup Objective Exceedances are presented.
2. EPA ProUCL Recommended UCL Concentration.
Key: mg/kg = milligrams per kilogram.

One cPAH compound and three metals exceed their respective Unrestricted Use cleanup objectives, one or more times in the soil surrounding Building 307. Of the contaminants found zinc is the most prevalent, present at elevated concentrations in all samples characterized. Further, the 95th UCLs computed from the available data for each of the compounds indicates that lead and zinc are present at levels that exceed NYSDEC's Unrestricted Use cleanup objectives.

The most probable source for the zinc is oxidation of the zinc coated corrugated-metal walls and roof panels that are integral components of the structure. To eliminate the possibility of recontamination of the area with zinc, the Army would expect that the building would need to be demolished. Additionally, the Army expects that the minimum extent of soil excavation that would be needed would be 80 ft. by 90 ft. by 1 foot. The actual extent of the excavation is uncertain, and likely to be greater, because the existing data set does not contain samples that bound the extent of the contamination that is present at the AOC. Confirmatory sampling and analysis would be used to confirm the final extent of the excavation. Nevertheless, conservatively 267 yd^3 of soil would be excavated and disposed of at a licensed, off-site landfill. Estimated construction costs would also include building demolition and disposal ($25,000). Due to the limited data that is available quantity of

All excavated soil and demolition debris would be characterized, stabilized as needed, and transported for disposal at licensed off-site landfills. Storm event water captured in the excavated area would be collected, characterized, and treated on-site, as necessary. It would then be discharged to the Seneca County Wastewater Treatment Facility in conformance with their requirements.

Once the excavation was completed and its extent confirmed by the collection and analysis of confirmatory samples, the area of the excavation would need to be backfilled, compacted, and graded.

Once this action was completed, the land excavated would be appropriate for unrestricted use and unlimited exposures. However, due to the existing agreement associated with all land within the PID Area, the land encompassing would still be subject to land use controls that prohibit residential use and access to and use of groundwater.

SEAD-1, Unrestricted Use (Alternative 2) Costs

Capital Cost (minimum):	$51,700
Annual OM&M Cost (soil):	$3,000
Annual OM&M Cost (groundwater):	$3,000
Present Worth Costs (minimum):	$126,160
Construction Time:	1 Month
Completion Time:	12 Months

SEAD-2, Alternative 2 (Unrestricted Use)

Table 16 summarizes analytical results for 12 exterior soil samples that were collected during the SEAD-2 RCRA Closure Activity versus NYSDEC's Unrestricted Use cleanup objectives.

Table 16

Summary of NYSDEC Unrestricted Use Soil Cleanup Objective Exceedances – SEAD-2 Soil

Compound [1]	95th UCL Soil Concentration [2] (mg/kg)	NYSDEC 's Unrestricted Use Value (mg/kg)	Number of Sample Concentrations Above Cleanup Objective	Is 95th UCL Concentration [2] Above Objective Y/N)?
Benzo(a)anthracene	31.8	1	12	Y
Benzo(a)pyrene	27.5	1	12	Y
Benzo(b)fluoranthene	43.9	1	12	Y
Benzo(k)fluoranthene	11.5	0.8	7	Y
Chrysene	31.8	1	12	Y
Dibenz(a,h)anthracene	18.3	0.33	2	Y
Fluoranthene	71.3	100	1	N
Indeno(123-cd)pyrene	11.3	0.5	12	Y
Naphthalene	14.8	12	1	Y
Phenanthrene	72.0	100	1	N
Phenol	4.0	0.33	2	Y
Pyrene	72.8	100	1	N
Aroclor-1254	0.068	0.1	1	N
Arsenic	12.4	13	2	N
Cadmium	3.1	2.5	3	Y
Chromium	31.3	30	4	Y
Copper	41.8	50	2	N
Lead	391	63	5	Y
Nickel	35.0	30	2	Y
Zinc	253.5	109	4	Y

1. Only compounds with NYSDEC Unrestricted Use Soil Cleanup Objective Exceedances are presented.
2. EPA ProUCL Recommended UCL Concentration.
Key: mg/kg = milligrams per kilogram.

Twelve SVOCs, one PCB congener, and seven metals exceed their respective Unrestricted Use cleanup objectives one or more times. Further, the 95th UCLs computed from the available data for each of the compounds indicates that 14 of the contaminants are present at levels that exceed NYSDEC's Unrestricted Use cleanup objectives. Of these compounds, five cPAH compounds exceed their Unrestricted Use cleanup objectives in every sample collected, and each is present at significant levels.

The most probable sources for the identified cPAH compounds is asphalt associated with the hard-pack parking area surrounding the building, rail and vehicular traffic around the building and roofing and traction aid materials that were applied to the roof and loading dock at the building. To eliminate these contaminants, the Army conservatively anticipates that the parking area surrounding Building 301 will need to be excavated and removed. Further, since excavation of the parking area surrounding the former PCB Transformer Storage Facility is likely to compromise the structural integrity of the building, Building 301 will need to be demolished. Finally, railroad tracks and bedding located east of the building will also need to be removed to allow for excavation of soil that is anticipated to be contaminated with the same compounds as found around Building 301. These tracks would subsequently be reinstalled to continue rail connection to businesses.

Based on these anticipations, the Army estimates that an area of soil measuring 100 feet by 150 feet will need to be excavated to a minimal depth of 1 foot. Approximately 560 yd^3 of soil would be excavated and disposed of at a licensed, off-site landfill. Estimated remedial action costs would also include building demolition and disposal ($25,000), and railroad track removal and reinstallation ($75,000).

All excavated soil and demolition debris would be characterized, stabilized as needed, and transported for disposal at licensed off-site landfills. Storm event water captured in the excavated area would be collected, characterized, and treated on-site, as necessary. It would then be discharged to the Seneca County Wastewater Treatment Facility in conformance with their requirements.

Once the excavation was completed and its extent confirmed by the collection and analysis of confirmatory samples, the area of the excavation would need to be backfilled, compacted, and graded.

Once this action was completed, the land excavated would be appropriate for unrestricted use and unlimited exposures. However, due to the existing agreement associated with all land within the PID Area, the land encompassing would still be subject to land use controls that prohibit residential use and access to and use of groundwater.

SEAD-2 Alternative 2 (Unrestricted Use) Costs

Capital Cost (minimum):	$156,000
Annual OM&M Cost (soil):	$3,000
Annual OM&M Cost (groundwater):	$3,000
Present Worth Costs (minimum):	$230,460
Construction Time:	2 Month
Completion Time:	15 Months

SEAD-5, Alternative 2 (Unrestricted Use)

Table 17 summarizes the post-TCRA soil data for SEAD-5 versus NYSDEC's Unrestricted Use cleanup objectives.

Table 17

Summary of NYSDEC Unrestricted Use Soil Cleanup Objective Exceedances – SEAD-5 Soil

Compound [1]	95th UCL Soil Concentration [2] (mg/kg)	NYSDEC 's Unrestricted Use Value (mg/kg)	Number of Sample Concentrations Above Cleanup Objective	Is 95th UCL Concentration [2] Above Objective (Y/N)?
Acenaphthene	4.1	20	1	N
Anthracene	14.7	100	1	N
Benzo(a)anthracene	21.5	1	61	Y
Benzo(a)pyrene	16.8	1	61	Y
Benzo(b)fluoranthene	21.8	1	65	Y
Benzo(ghi)perylene	7.6	100	1	N
Benzo(k)fluoranthene	6.7	0.8	39	Y
Chrysene	18.5	1	61	Y
Dibenz(a,h)anthracene	3.4	0.33	36	Y
Fluoranthene	47.3	100	2	N
Fluorene	7.0	30	2	N
Indeno(123-cd)pyrene	8.0	0.5	64	Y
Naphthalene	2.1	12	1	N
Phenanthrene	44.9	100	2	N
Pyrene	38.8	100	2	N
Arsenic	9.2	13	9	N
Chromium	22.0	30	7	N
Copper	26.6	50	3	N
Lead	117.1	63	31	Y
Mercury	0.2	0.18	17	Y
Selenium	19.0	3.9	125	Y
Silver	1.3	2	7	N
Zinc	88.3	109	18	N

1. Only compounds with NYSDEC Unrestricted Use Soil Cleanup Objective Exceedances are presented.
2. EPA ProUCL Recommended UCL Concentration.
Key: mg/Kg = milligrams per kilogram.

Concentrations measured for 14 PAH and eight metal compounds in individual samples exceeded the Unrestricted Use cleanup objectives one or more times. Selenium was the compound observed to surpass its cleanup objective most frequently, followed by the seven cPAHs.

Soil contaminated by compounds above the unrestricted use cleanup objectives exists within the footprint of the TCRA excavated areas, as well as areas exterior to the excavation sites. Data from the TCRA excavation areas show that residual levels of selenium are the predominant concern in the former excavation areas, while concentrations of chemical in sampling locations exterior to the excavation sites show that selenium and the cPAH compounds have roughly equal numbers of locations where one predominates over the other.

Based on the location and depth of the contaminants found at SEAD-5, the Army conservatively estimates that an additional 4,676 yd^3 of soil would need to be excavated at SEAD-5. The initial, additional excavations required would include sites where shallow (6 inch) excavations are likely, and locations where deeper excavations (24 inches) would be anticipated. Again, the full extent of the final excavations could increase based on confirmatory sampling and analysis

All excavated soil would be characterized, stabilized as needed, and transported for disposal at licensed off-site landfills. Storm event water captured in the excavated area would be collected, characterized, and treated on-site, as necessary. It would then be discharged to the Seneca County Wastewater Treatment Facility in conformance with their requirements.

Once the excavation was completed and its extent confirmed by the collection and analysis of confirmatory samples, the area of the excavation would need to be backfilled, compacted, and graded.

Once this action was completed, the land excavated would be appropriate for unrestricted use and unlimited exposures. However, due to the existing agreement associated with all land within the PID Area, the land encompassing would still be subject to land use controls that prohibit residential use and access to and use of groundwater.

<u>SEAD-5 Alternative 2 Costs</u>

Capital Cost (minimum):	$467,600
Annual OM&M Cost (soil):	$3,000
Annual OM&M Cost (groundwater):	$3,000
Present Worth Costs (minimum):	$542,060
Construction Time:	3 Months
Completion Time:	18 Months

Alternative 3: Excavation of Contaminated Soil to Achieve Restricted Industrial Use Cleanup Objectives, Off-Site Treatment/Disposal and Soil Backfill

The second alternative evaluated individually for SEADs 1, 2, and 5 involved the excavation of soil at the SWMUs that contained concentrations of contaminants in excess of NYSDEC's Restricted Industrial Use cleanup objectives. The PID-wide restriction prohibiting access to and use of the groundwater continues to be applied to all AOCs within the PID Area.

SEAD-1, Alternative 3 (Industrial Use)

Table 18 summarizes analytical results for 12 exterior soil samples that were collected during the SEAD-1 RCRA Closure Activity versus NYSDEC's Restricted Industrial Use cleanup objectives.

Table 18

Summary of NYSDEC Restricted Industrial Use Soil Cleanup Objective Exceedances – SEAD-12 Soil

Compound [1]	95th UCL Soil Concentration [2] (mg/Kg)	NYSDEC 's Industrial Use Value (mg/Kg)	Number of Sample Concentrations Above Cleanup Objective	Is 95th UCL Concentration [2] Above Objective (Y/N)?
Zinc	8144	10000	2	Y

1. Only compounds with NYSDEC Restricted Industrial Use Soil Cleanup Objective Exceedances are presented.
2. EPA ProUCL Recommended UCL Concentration.
Key: mg/Kg = milligrams per kilogram.

Only zinc is found in individual soil samples at concentrations that exceed NYSDEC's restricted Industrial Use cleanup objective; however, the 95th UCL of the dataset is below NYSDEC's Restricted Industrial Use cleanup objective. The Army reiterates that the most likely source of zinc in the soil at SEAD-1 is the scouring or washing of zinc coating off the walls and roof of the building. As such, the only way to prevent soil contamination from reoccurring in the future is to demolish the building. In addition, once the building has been demolished and the debris is removed, soil in locations where data indicates zinc is present at concentrations above the Industrial Use cleanup objective should be excavated and disposed at a licensed, off-site landfill.

Based on the existing data, surface soil at two locations would currently need to be excavated to achieve the Industrial Use cleanup objective. The Army anticipates that soil from two areas (one 10 ft x 15 ft by 1 ft; the second 25 ft x 15 ft x 1ft) around the building would need to be removed, and a minimum of approximately 20 yd^3 of soil would need to be disposed. Confirmatory sampling and analysis would be used to confirm the final extent of the excavation. Estimated remedial costs would also include building demolition and disposal ($25,000).

All excavated soil and demolition debris would be characterized, stabilized as needed, and transported for disposal at licensed off-site landfills. Storm event water captured in the excavated area would be collected, characterized, and treated on-site, as necessary. It would then be discharged to the Seneca County Wastewater Treatment Facility in conformance with their requirements.

Once the building demolition and soil excavation was completed and its extent confirmed by the collection and analysis of confirmatory samples, the area would need to be backfilled, compacted, and graded.

Once this action was completed, the land would be appropriate for restricted industrial use.

SEAD-1 Alternative 3 (Industrial Use) Costs

Capital Cost:	$30,000
Annual OM&M Cost (soil):	$3,000
Annual OM&M Cost (groundwater):	$3,000
Present Worth Costs:	$104,460
Construction Time:	1 Month
Completion Time:	12 Months

SEAD-2, Alternative 3 (Industrial Use)

Table 19 summarizes analytical results for 12 exterior soil samples that were collected during the SEAD-2 RCRA Closure Activity versus NYSDEC's Restricted Industrial Use cleanup objectives.

Table 19 Summary of NYSDEC Restricted Industrial Use Soil Cleanup Objective Exceedances – SEAD-2 Soil				
Compound [1]	**95^{th} UCL Soil Concentration [2] (mg/Kg)**	**NYSDEC 's Restricted Industrial Use Value (mg/Kg)**	**Number of Sample Concentrations Above Cleanup Objective**	**Is 95^{th} UCL Concentration [2] Above Objective (Y/N)?**
Benzo(a)anthracene	31.8	11	5	Y
Benzo(a)pyrene	27.5	1.1	11	Y
Benzo(b)fluoranthene	43.9	11	6	Y
Dibenz(a,h)anthracene	18.3	1.1	1	Y
Indeno(123-cd)pyrene	11.3	11	2	Y
Arsenic	12.4	16	2	N

1. Only compounds with NYSDEC Restricted Industrial Use Soil Cleanup Objective Exceedances are presented.
2. EPA ProUCL Recommended UCL Concentration.
Key: mg/Kg = milligrams per kilogram.

Benzo(a)pyrene is found at concentrations in excess of NYSDEC's Restricted Industrial Cleanup levels at all exterior sampling locations except to the south of the building. The arsenic concentration measured in the sample from the south of Building 301 exceeds its industrial cleanup objective; thus soil from all areas around the building will require excavation. The Army reiterates that the most probable source for the benzo(a)pyrene and the other cPAH compounds found at the AOC is asphalt associated with the hard-pack parking area surrounding the building. As such, the Army anticipates that the parking area surrounding Building 301 will need to be excavated and removed. Further, since excavation of the parking area surrounding the Building 301 is likely to compromise the structural integrity of the building, the building will be demolished. Under this scenario, the Army does not anticipate that it will be necessary to remove the railroad tracks to the east of the building to gain access to the soil that underlies the tracks.

Based on these anticipations, the Army estimates that an area measuring 70 feet by 150 feet will need to be excavated to a minimal depth of 1 foot. It is probable that the excavation volume will expand either laterally or vertically once samples are collected and analyzed to confirm that the remedial action achieves Restricted Industrial Use cleanup objective. Nevertheless, 389 yd^3 of soil would be excavated and disposed of at a licensed, off-site landfill. Estimated remedial action costs would also include building demolition and disposal ($25,000).

All excavated soil and demolition debris would be characterized, stabilized as needed, and transported for disposal at licensed off-site landfills. Storm event water captured in the excavated area would be collected, characterized, and treated on-site, as necessary. It would then be discharged to the Seneca County Wastewater Treatment Facility in conformance with their requirements.

Once the excavation was completed and its extent confirmed by the collection and analysis of confirmatory samples, the area of the excavation would need to be backfilled, compacted, and graded.

Once this action was completed, the land excavated would be appropriate for industrial use.

SEAD-2, Alternative 3 (Industrial Use) Costs

Capital Cost (minimum):	$63,900
Annual OM&M Cost (soil):	$3,000
Annual OM&M Cost (groundwater):	$3,000
Present Worth Costs (minimum):	$138,360
Construction Time:	1 Month
Completion Time:	12 Months

SEAD-5, Alternative 3 (Industrial Use)

Table 20 summarizes analytical results for confirmatory and delineations soil samples that were collected during the SEAD-5 TCRA versus NYSDEC's Restricted Industrial Use cleanup objectives.

Table 20 Summary of NYSDEC Restricted Industrial Use Soil Cleanup Objective Exceedances – SEAD-5 Soil				
Compound [1]	95th UCL Soil Concentration [2] (mg/Kg)	NYSDEC 's Unrestricted Use Value (mg/Kg)	Number of Sample Concentrations Above Cleanup Objective	Is 95th UCL Concentration [2] Above Objective (Y/N)?
Benzo(a)anthracene	21.5	11	10	Y
Benzo(a)pyrene	16.8	1.1	58	Y
Benzo(b)fluoranthene	21.8	11	11	Y
Benzo(k)fluoranthene	6.7	110	1	N
Chrysene	18.5	110	1	N
Dibenz(a,h)anthracene	3.4	1.1	11	Y
Indeno(123-cd)pyrene	8.0	5.6	5	Y
Arsenic	9.2	16	1	N

1. Only compounds with NYSDEC Industrial Use Soil Cleanup Objective Exceedances are presented.
2. EPA ProUCL Recommended UCL Concentration.
Key: mg/Kg = milligrams per kilogram.

Concentrations of benzo(a)pyrene detected in samples are the primary driver of the remedial action that is necessary to achieve NYSDEC's Restricted Industrial Use cleanup objectives at SEAD-5. Seven isolated locations within the bounds of the TCRA excavations still contain concentrations in excess of the industrial cleanup objectives, and 22 locations to the south and east-southeast of the TCRA's largest excavation still show levels of contaminants above desired levels.

Based on the distribution of contaminants in the soil at levels above the industrial cleanup objective, the Army anticipates that a minimum of 1363 yd3 of soil will need to be excavated and disposed at a licensed, off-site landfill. All excavated soil would be characterized, stabilized as needed, and transported for disposal at licensed off-site landfills. Storm event water captured in the excavated area would be collected, characterized, and treated on-site, as necessary. It would then be discharged to the Seneca County Wastewater Treatment Facility in conformance with their requirements.

Once the excavation was completed and its extent confirmed by the collection and analysis of confirmatory samples, the area of the excavation would need to be backfilled, compacted, and graded.

Once this action was completed, the land excavated would be appropriate for industrial use.

SEAD-5, Alternative 3 (Industrial Use) Costs

Capital Cost (minimum):	$136,300
Annual OM&M Cost (soil):	$3,000
Annual OM&M Cost (groundwater):	$3,000
Present Worth Costs (minimum):	$210,760
Construction Time:	2 Month
Completion Time:	15 Months

SEAD-1, Alternative 4 (Land Use Controls, No Action)

At SEAD-1, available data indicates that there are residual levels of selected contaminants in individual samples that exceed NYSDEC's Restricted Industrial Use cleanup objective. However, the 95th UCL concentrations for the AOC's dataset show that all contaminants are present at AOC aggregate concentrations that are consistent with the current and intended future use of the property, which is industrial land. Additionally, the human health risk assessment shows that the carcinogenic risks associated with chemicals found at the AOC are consistent with USEPA recommended range (10^{-4} – 10^{-6}). Although there is an indication that non-cancer risks are above EPA's preferred level of 1 for the construction worker, the risk results from metal contaminants that are present at the site at levels that are consistent with or lower than background concentrations found in the soil at SEDA. The metal contaminant that is found in soil at the highest overall concentration in SEAD-1 is zinc, but this result is not surprising because the walls and roof of Building 301 are fabricated from zinc-coated, corrugated metal sheets, and it is believed that the identified zinc in soil results from the wash off of zinc oxide storm events.

The Army plans to formally apply LUCs that prohibit use of the land for residential activities, and that prohibit access to and use of the groundwater to the land within SEAD-1.

SEAD-1, Alternative 4 (LUCs, No Action) Costs

Capital Cost	$0
Annual OM&M Cost (soil)	$3,000
Annual OM&M Cost (groundwater)	$3,000
Present Worth Cost	$74,460
Construction Time	0 Month
Completion Time	1 Month

SEAD-2, Alternative 4 (Land Use Controls, No Action)

At SEAD-2, available data indicates that there are residual levels of selected contaminants in individual samples that exceed NYSDEC's Restricted Industrial Use cleanup objective. The human health risk assessment shows that the carcinogenic risks for the industrial worker associated with chemicals found at the AOC are above the EPA's recommended range of 10^{-4} – 10^{-6}. However, the principal contaminants contributing to the risk are the cPAHs which are associated with the hardpack parking area and materials of construction used at the building. Therefore, the elevated carcinogenic risk level is believed to be an artifact of the soil sample collection and analysis effort. The non-cancer risk determined for the construction worker also exceeds EPA's preferred level of 1, but like the comparable finding at SEAD-1, this is caused by background levels of metals in the soil.

Given this information, the Army believes it is appropriate to formally apply the LUCs that prohibit use of the land for residential activities, and that prohibit access to and use of the groundwater to the land within SEAD-2.

SEAD-2, Alternative 4 (LUCs, No Action) Costs

Capital Cost	$0
Annual OM&M Cost (soil)	$3,000
Annual OM&M Cost (groundwater)	$3,000
Present Worth Cost	$74,460
Construction Time	0 Month
Completion Time	1 Month

SEAD-5, Alternative 4 (Land Use Controls, No Action)

Available data indicates that there are residual levels of selected contaminants in individual samples that exceed NYSDEC's Restricted Industrial Use cleanup objectives at SEAD-5. Results of the human health risk assessment show that the non-cancer risks anticipated for all likely receptors are lower than EPA's preferred level of 1. The carcinogenic risk for the industrial worker at SEAD-5 is 1.3×10^{-4}, while levels for the other receptors are within EPA's recommended range. The carcinogenic risk at SEAD-5 results primarily from one anomalously high level of benzo(a)pyrene that is found at a location away from the original excavation areas and that is not associated with the former sewage sludge piles

Given this information, the Army believes it is appropriate to formally apply the LUCs that prohibit use of the land for residential activities, and that prohibit access to and use of the groundwater to the land within SEAD-5.

SEAD-5, Alternative 4 (LUCs, No Action) Costs

Capital Cost	$0
Annual OM&M Cost (soil)	$3,000
Annual OM&M Cost (groundwater)	$3,000
Present Worth Cost	$74,460
Construction Time	0 Month
Completion Time	1 Month

COMPARATIVE ANALYSIS OF ALTERNATIVES

The following discussion on comparative analysis of alternatives only pertains to SEADs 1, 2, and 5, as available information and data indicate that conditions remaining at SEADs 24 and 48 make them appropriate for determinations of no further action.

The evaluation criteria used to assess proposed alternatives for SEADs 1, 2, and 5 are described below.

- Overall protection of human health and the environment assesses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced or controlled through treatment, engineering controls or institutional controls.

- Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

- Long-Term effectiveness and permanence refers to the ability of a remedy to maintain reliable protections of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

- Short-Term effectiveness address the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

- Cost includes the estimated capital and OM&M costs and net present-worth costs.

- State acceptance indicates if, based on tits review of the RI/FS and Proposed Plan, the state concurs with the preferred remedy at the present time.

- Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

A comparative analysis of these alternatives based upon the evaluation criteria noted above is presented below. Since the remedial alternatives considered for all sites are identical, the following discussion applies to each of the AOCs, except where AOC-specific variations are noted.

Overall Protectiveness of Human Health and the Environment

Alternative 1 for SEADs 1, 2, and 5 is the least protective alternative with respect to human health and the environment since it does not address or even consider the presence of hazardous substances in the soil or the groundwater at levels that could pose risks to humans.

Alternative 2 for SEADs 1, 2, and 5 is protective of human health and the environment as its objective is to removal all soil that contains hazardous substances in excess of levels that will allow for unrestricted use and unlimited exposures. Alternatives 3 and 4 are protective of future industrial scenario human health for the future site use as an industrial area. Alternative 3 is slightly more protective of human health than 4 since the highest contaminant concentrations identified in the soil would be removed.

Compliance with ARARs

There are currently no promulgated federal standards for hazardous substance levels in soils, and risked based decisions are used to determine if cleanup is warranted or necessary. NYSDEC has issued and enacted cleanup objectives for five categories of future land use (i.e., unrestricted, residential, restricted-residential, commercial, and industrial) at waste sites located within its bounds and these are considered to be "relevant and appropriate" criteria to consider.

For SEADs 1, 2, and 5, Alternative 1 does not comply with the NYSDEC's soil cleanup objectives. Alternatives 2 and 3 comply with NYSDEC's soil cleanup objectives for the future use of the site anticipated under each alternative. Although Alternative 4 does not comply with NYSDEC's industrial use cleanup objectives, risk assessments performed for each site demonstrate that no inordinate human health risk exists for the future use of the site. LUCs will be implemented to maintain that future use.

EPA and the New York State Department of Health (NYSDOH) have promulgated health based protective criteria, which are enforceable standards for drinking water contaminants. Hazardous substances have been identified in the groundwater within the greater PID area. A separate ROD, approved by the Army, EPA, and NYSDEC, imposes a groundwater access and use restriction on all land within the PID area based on the data that is available from SEAD-27. Furthermore, the PID area is serviced by a municipal water supply source that is not directly derived from groundwater. Given these considerations, and the Army's and EPA's prior decision to impose an PID area-wide access and use restriction on groundwater, the current proposed remedy does not consider any form of groundwater treatment.

Reduction in Toxicity, Mobility, or Volume Through Treatment

Alternatives 1 and 4 would provide no reduction in the toxicity, mobility or volume of hazardous substances found in soil at either AOC. Under Alternative 2, soils containing hazardous substances in excess of the Unrestricted Use cleanup objectives would be excavated and transported off-site for disposal. This would reduce the toxicity and mobility of hazardous substances left at the AOCs. Comparably, Alternative 3 would also reduce the toxicity and mobility of hazardous substances left at the AOCs, but not to the same extent as would be achieved under Alternative 2. In either case, if excavated soil needed to be stabilized prior to off site disposal, the volume of the material disposed at the off site facility would increase.

Short-Term Effectiveness

Alternatives 1 and 4 would not pose any additional short term hazards to workers at the AOCs or the community as physical construction is not included in either of these remedies. Alternatives 2 and 3 could both pose some additional short-term hazards to neighboring site workers and the community through dermal contact, ingestion or inhalation of hazardous constituents during the excavation, loading, transporting, and unloading operations that are needed to complete these construction efforts. Further, noise from the heavy equipment used for excavation, loading and hauling could also impact nearby employees of neighboring industries and companies, and local residents. In addition, interim and post remediation sampling activities would pose some risk to site workers. Potential risks to nearby employees of local companies and nearby residents could be controlled by developing and implementing sound engineering controls, health and safety procedures, monitoring practices.

Since soil and debris will be transported off site under alternatives 2 and 3, there will be an increase in traffic on the roads within and surrounding the Depot and the receiving landfills. This could translate into an increased likelihood of vehicular accidents, and potential releases of soil and debris containing hazardous constituents at other locations along the driving routes. Since more material is being excavated and disposed under Alternative 2, there is a greater potential under this option than Alternative 3. Alternatives 2 and 3 also require varying amounts of soil disturbance that could affect the surface water hydrology in the areas being excavated.

The larger excavations that are expected to be required to achieve Unrestricted Use cleanup objective levels (i.e., Alternative 2), has a greater likelihood of impacting the surface water hydrology at each of the AOCs than does Alternative 3. Alternative 2's disturbance of soil across larger surfaces at both AOCs also increases the likelihood of soil erosion and transport, both via surface water flow and as fugitive dusts. Therefore, appropriate silt and dust containment measures will need to be implemented and monitored during the excavation, loading, and hauling activities. Lesser levels of controls would also need to be implemented, maintained and monitored during the work associated with Alternative 3.

Implementability

Alternative 1, the no-action alternative, would be the easiest alternative to implement, since there are no actions to undertake.

Alternative 4 will be slightly more difficult to implement than Alternative 1 because it requires the implementation, maintenance, oversight and annual reporting of the continuing effectiveness of land use controls and the preparation, submittal and approval of a land use control implementation plan.

The excavation, stabilization (as necessary), characterization, transport, and disposal of soil and debris excavated under either Alternatives 2 or 3 are readily available and mature technologies and can be accomplished. The increased volume of soil/debris requiring excavation under Alternative 2 at all AOCs would increase the difficulty of completing this alternative above those anticipated for Alternative 3.

State Acceptance

NYSDEC concurs with the preferred remedial soil and groundwater alternatives

Community Acceptance

Community acceptance of the preferred alternative for SEADs 1, 2, 5, 24, and 48 will be assessed in the ROD following review of the public comments received on the Proposed Plan.

Cost

The present worth cost associated with Alternatives 1-4 is calculated using a discount rate of seven percent (7%) and a 30-year time interval. The estimated capital, operation, maintenance, and monitoring, and the present-worth costs are presented in **Table 21** below.

Table 21

Remedial Alternative Cost Summary

Alternative	**Capital Cost**	**Annual OM&M Costs**	**Total Present Worth Costs**
SEADs 1, 2, and 5, separately			
1 Soil	$0	$3,000	$37,230
1 Groundwater	$0	$3,000	$37,230
SEAD-1 (former Hazardous Waste Container Storage)			
2	$51700	$6,000	$126,160
3	$30,000	$6,000	$104,460
4	$0	$6,000	$74,460
SEAD-2 (former PCB Transformer Storage Facility)			
2	$156,000	$6,000	$230,460
3	$63,900	$6,000	$138,360
4	$0	$6,000	$74,460
SEAD-5 (former Sewage Sludge Piles)			
2	$467,600	$6,000	$542,060
3	$136,300	$6,000	$210,760
4	$0	$6,000	$74,460

Alternative 1 and 4 are the least expensive remedial action alternative at an estimated cost of $74,460. Alternative 2 is the most expensive remedial action alternative with respective AOC costs of $126,160, $230,460, and 542,060 respectively for SEADs 1, 2, and 5.

SUMMARY OF THE REMEDIAL GOALS AND PROPOSED ACTION

The selected remedy for any SWMU or AOC should, at a minimum, eliminate or mitigate all significant threats to the public health or the environment presented by the hazardous substances or hazardous wastes present at the SWMU. Based on the data presented and summarized earlier within this Proposed Plan, the Army and EPA has individually selected preferred remedies for SEADs 1, 2, 5, 24 and 48 that satisfy this objective.

Summary of Prior Actions Performed at SWMUs

SEAD-1: Hazardous Waste Container Storage Facility

Human health risk assessments (HHRAs) indicate that carcinogenic risk for industrial receptors is within or below EPA's acceptable range (10^{-4} – 10^{-6}) at SEAD-1. Risk assessment suggests that there is an elevated hazard index for the construction worker due to the presence of metal contaminants in the soil. However, the reported concentrations for most of the metals identified are consistent with Depot-wide background soil concentrations, and they are also all below NYSDEC and USEPA recommended reference levels. Zinc, however, is present in the soil at concentrations that are above Depot-wide background concentrations and cleanup objective levels. The Army believes that the zinc results from the storm-event scouring of the zinc-coated corrugated metal roofing and siding materials used in the building's constructions.

Groundwater was not characterized at SEAD-1. However, some of the groundwater in the PID-area is known to contain hazardous substances at concentrations above groundwater standards.

Therefore, the Army believes that the land at SEAD-1 is suitable for continued use as industrial land with no further action. To ensure that the land is only used for industrial purposes in the future, and that groundwater is not used for potable purposes within the AOC, the Army further recommends that land use controls that prohibit use of the land for residential activities and prohibits access to and use of the groundwater be formally imposed at the AOC.

SEAD-2: PCB Transformer Storage Facility

At SEAD-2, the HHRA indicates that non-cancer risks at the AOC for industrial receptors are consistent with USEPA guidance. There is an elevated carcinogenic risk for an industrial worker receptor. The elevated cancer risk is caused by the presence of cPAHs within the soil exterior of the building. Much of the ground immediately surrounding the building where the soil samples were collected is used for parking and is covered with a hard-packed mixture of broken asphalt, gravel and dirt. Thus, asphalt from the parking area is likely to be present in the soil that was collected and analyzed, which would have led to the elevated concentrations of cPAHs. Further, the loading dock surrounding the building was coated with an asphalt and gravel traction aide. Finally, the roof of the building is coated with asphalt. Each of these is a likely source of the noted cPAHs that are found in the soil, and that the elevated cancer risk results from the analysis of these materials instead of soil.

Groundwater was not characterized at SEAD-2. However, some of the groundwater in the PID-area is known to contain hazardous substances at concentrations above groundwater standards.

Therefore, the Army believes that the land at SEAD-2 is suitable for continued use as industrial land with no further action. To ensure that the land is only used for industrial purposes in the future, and that groundwater is not used for potable purposes within the AOC, the Army further recommends that land use controls that prohibit use of the land for residential activities and prohibits access to and use of the groundwater be formally imposed at the AOC.

SEAD-5: Sewage Sludge Waste Piles

At SEAD-5, the HHRA indicates that the non-cancer risks for industrial receptors are all within the acceptable range. The HHRA further indicates that the carcinogenic risk for the construction worker and the adolescent trespasser are within EPA's recommended range, but that the carcinogenic risk for the industrial worker is slightly above the EPA's preferred range (1.3×10^{-4}). The elevated cancer risk is driven primarily by the concentration of benzo(a)pyrene found in two isolated soil samples that are significantly different than levels found in more than 160 other soil samples characterized at the site. The Army believes that the elevated cPAH concentrations found in these two samples may have resulted from pieces of asphalt that are associated with the AOCs historic use as a DPW-like storage and supply area and equipment storage yard.

Groundwater was not characterized at SEAD-2. However, some of the groundwater in the PID-area is known to contain hazardous substances at concentrations above groundwater standards.

The Army believes that the land at SEAD-5 is suitable for continued use as industrial land with no further action. To ensure that the land is only used for industrial purposes in the future, and that groundwater is not used for potable purposes within the AOC, the Army further recommends that land use controls that prohibit use of the land for residential activities and prohibits access to and use of the groundwater be formally imposed at the AOC.

SEAD-24: Abandoned Powder Burn Pit

At SEAD-24, the HHRA suggest that there are elevated non-cancer risks for the construction worker and the child resident receptors. The construction workers risk results from identified concentrations of aluminum and manganese in the soil, which are both consistent with SEDA-wide background concentrations and below state and federal reference levels. Similarly, the majority of the non-cancer risk found for the child resident results from metal concentrations reported for soils at the site, which are again generally consistent with SEDA-wide background concentrations and below state and federal reference levels.

The Army believes that the land at SEAD-24 is suitable for unrestricted use with no further action.

SEAD-48: E0800 Row Pitchblende Ore Storage Igloos

The Final Status Survey completed for the former Pitchblende Ore Storage Igloos indicates that the E0800 Row igloos are suitable for unrestricted use.

Proposed Actions

The Army's preferred remedy for two of the identified AOCs (i.e., SEADs 24 and 48) described in this Proposed Plan is no further action (NFA).

The Army's preferred remedy for three of the identified AOCs (i.e., SEADs 1, 2, and 5) described in this Proposed Plan is no further intrusive actions and to establish LUCs. Specifically, the Army remedy for SEADs 1, 2, and 5 will include LUCs that prohibit residential activities and prohibit access to and use of groundwater within the bounds of the AOCs. The recommended LUCs identified for SEADs 1, 2, and 5 already were imposed on all of the land that is located within the PID Area of the former Depot. It is the Army's intention to officially impose and implement these same LUCs on the land occupied by SEADs 1, 2, and 5 by this ongoing remedial action.

No Further Action

Based on the findings of the investigations and risk assessment completed, the Army has selected NFA as the remedy for SEAD-24. This selection is based on the Army's and EPA's determination that the site does not pose a significant threat to human health or the environment.

Furthermore the Army has selected NFA as the remedy for SEAD-48. This selection is based on the Army's determination that the site does not pose a significant threat to human health or the environment. The Final Status Survey performed in conformance with USEPA, NYSDEC and Nuclear Regulatory Commission requirements indicate that the igloos are suitable for unrestricted use.

Residential and Groundwater Restrictions

A ROD signed by the Army and USEPA in 2004 for three AOCs (SEADs 27, 64A, and 66) that are within the Planned Industrial/Office Development (PID) Area of the former Depot imposes LUCs that:

- Prohibit residential housing, elementary and secondary schools, childcare facilities and playgrounds activities.

- Prohibit access to or use of the groundwater until Class GA Groundwater Standards are met.

Although these restrictions were recommended specifically for conditions identified at SEAD-27, SEAD-64A, and SEAD-66, the Army and the USEPA agreed that these LUCs would be imposed on all land within the PID at the time of transfer. The Army now intends to formally impose the LUCs identified for the greater PID Area on the following SWMUs upon transfer of the property:

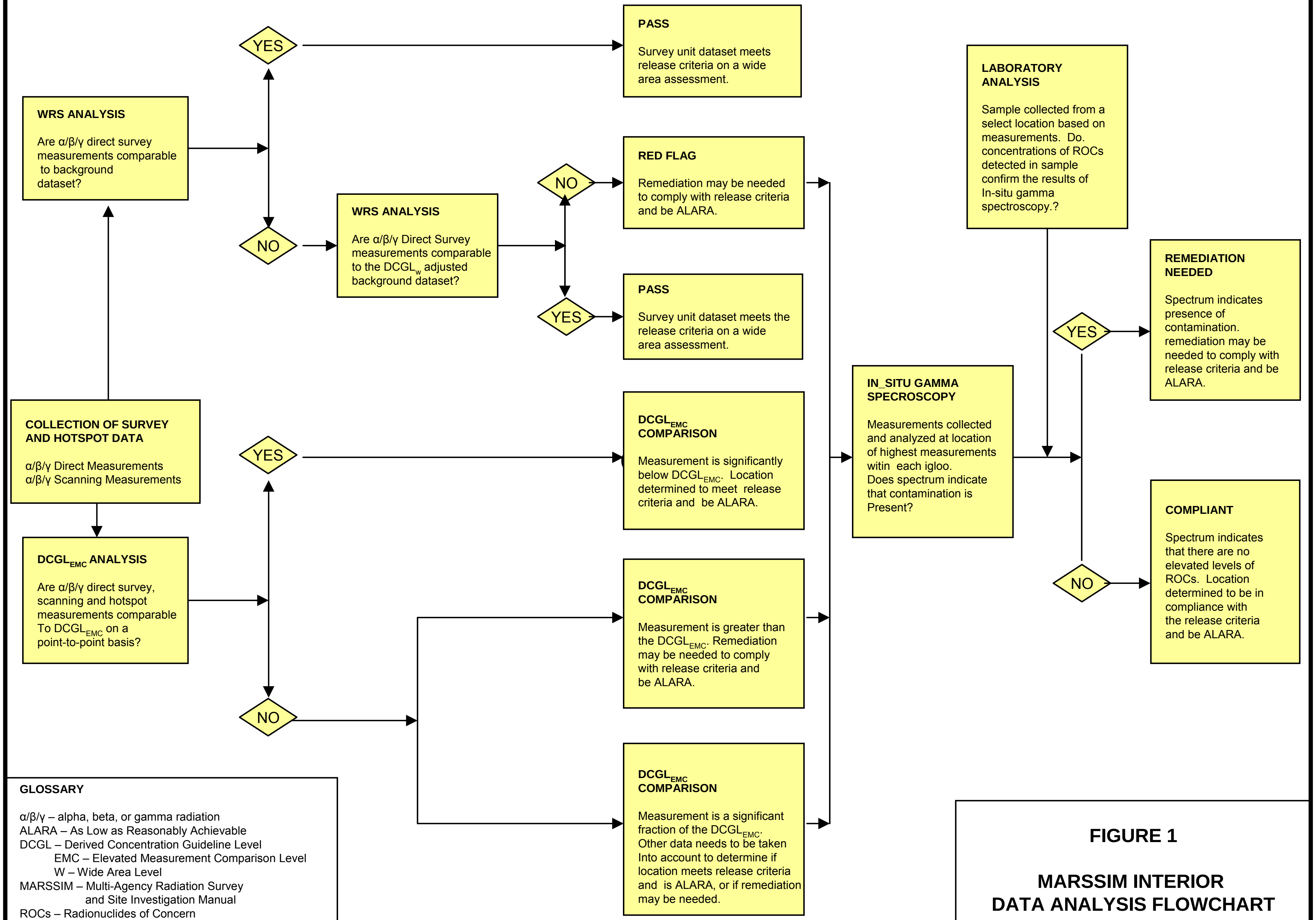
- SEAD-1: Building 307, the former Hazardous Waste Container Storage Building

- SEAD-2: Building 301, the former PCB Transformer Storage Facility

- SEAD-5: the former Sewage Sludge Waste Piles

The LUCs will continue until the concentration of hazardous substances in the soil and the groundwater beneath the three SWMUs have been reduced to levels that allow for unlimited exposure and unrestricted use.

The Army's recommended remedial actions for three AOCs discussed in this Proposed Plan include LUCs. To implement the Army's recommended remedy at the three AOCs (SEADs 1, 2, and 5), a LUC Remedial Design (RD) plan will be prepared to satisfy the applicable requirements of Paragraphs (a) and (c) of ECL Article 27, Section 1318: Institutional and Engineering Controls. The LUC RD Plan will include: a Site Description; the IC Land Use Restrictions, the IC Mechanism to ensure that the land use restrictions are not violated in the future, Reporting/Notification requirements. In addition, the Army will prepare an environmental easement for each of the three former AOCs, consistent with Section 27-1318(b) and Article 71, Title 36 of ECL, in favor of the State of New York and the Army, which will be recorded at the time of transfer of the sites from federal ownership. A schedule for completion of the draft LUC RD covering the individual sites will be completed within 21 days of the ROD signature, consistent with Section 14.4 of the FFA. In accordance with the FFA and CERCLA §121(c), the remedial action (including ICs) will be reviewed no less often than every 5 years. After such reviews, modifications may be implemented to the remedial program, if appropriate



GLOSSARY

α/β/γ – alpha, beta, or gamma radiation
ALARA – As Low as Reasonably Achievable
DCGL – Derived Concentration Guideline Level
    EMC – Elevated Measurement Comparison Level
    W – Wide Area Level
MARSSIM – Multi-Agency Radiation Survey and Site Investigation Manual
ROCs – Radionuclides of Concern
WRS – Wilcoxon Rank Sum

FIGURE 1

MARSSIM INTERIOR DATA ANALYSIS FLOWCHART

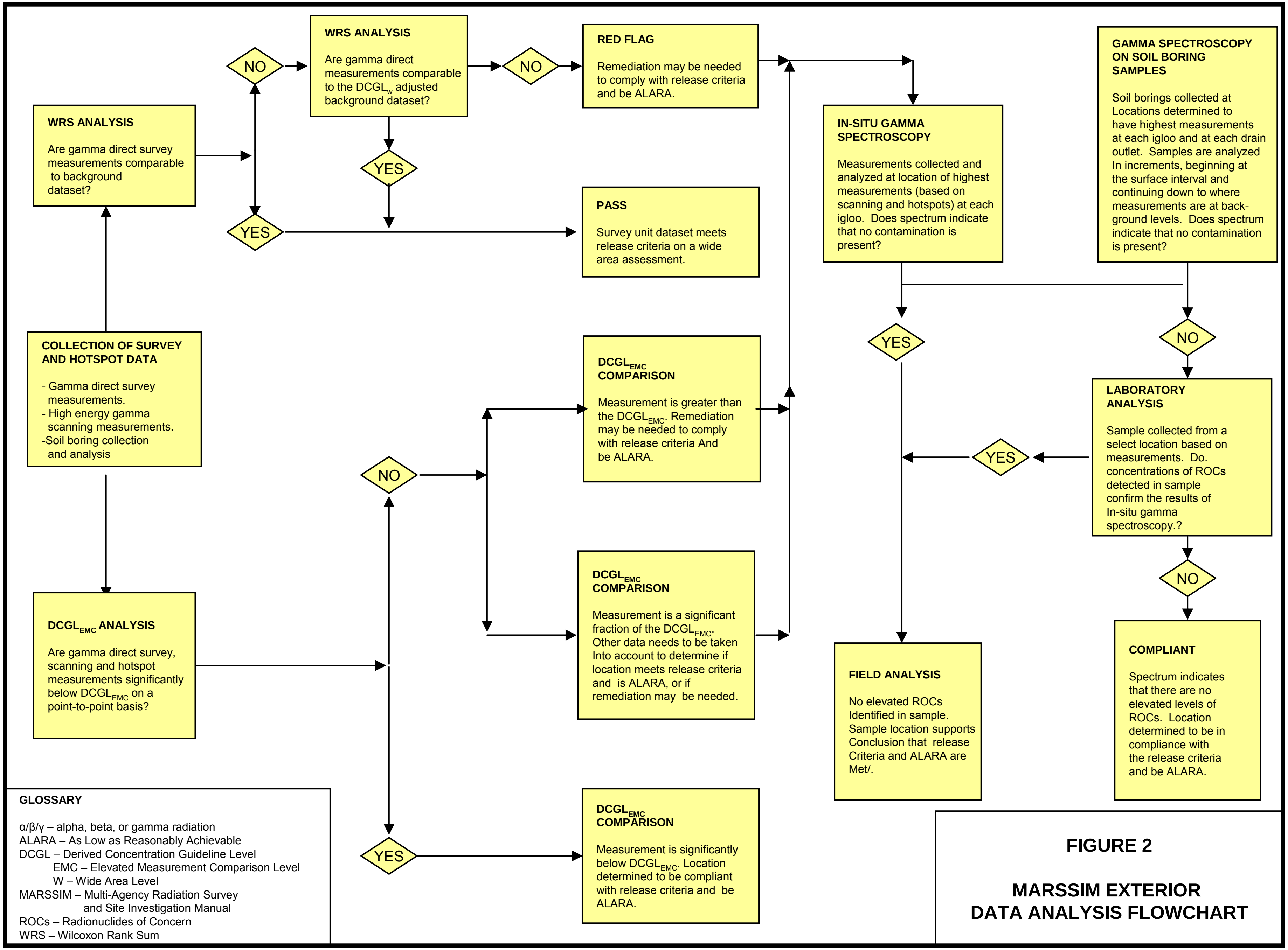


FIGURE 2

MARSSIM EXTERIOR DATA ANALYSIS FLOWCHART