50-11

May 11, 1999

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

Dear Ms. Struble and Mr. Quinn:

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

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

REMAINING UNRESOLVED ISSUES

ISSUE #1 - Ecological Risk to Plants and Mallards

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

In developing a response to the EPA comment, we have reviewed the ERA and believe that the ecological condition at the site is protective of ecological receptors. The ecological risk assessment identified both the deer mouse and the mallard as two potential ecological endpoint receptors for soil and sediment. The deer mouse was selected as the terrestrial endpoint receptor and the mallard was selected as the sediment endpoint receptor. The exposure concentration for the deer mouse was derived from on-site surface soil. Sediment from on-site wetland areas and Kendaia Creek were combined and used as the exposure concentration for the mallard. The combination of on-site and off-site sediment is considered conservative since there are no on-site surface water bodies at the Ash Landfill and it is unlikely that mallards would utilize the on-site wetlands.

Soil and sediment screening concentrations for chronic toxicity were derived for the deer mouse and the mallard by back-calculation. The concentration for protection of the terrestrial receptor, the deer mouse, from exposure to lead in soil for was derived at 800 mg/kg. The lead exposure concentration for the deer mouse was determined to be 265 mg/kg, which is below the 800 mg/kg value. The concentration for protection of the mallard from lead in sediment was derived at 139 mg/kg. The sediment exposure concentration for lead in all sediment was determined to be 96 mg/kg, which is below the 139 mg/kg value. Since the habitat of the mallard is aquatic, not terrestrial, the soil exposure concentration value, of 265 mg/kg, should not be compared to the sediment-derived value for protection of the mallard, which is 139 mg/kg. Based upon this, the ecological risks from lead to aquatic bird and terrestrial mammal species are acceptable.

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

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

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

ISSUE #2 - Clean-up Criteria

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

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

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

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

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

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

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

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

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

ISSUE #3 - Vegetative Cover

The proposed plan for source control identified in the March 17, 1997 Draft PRAP proposes to remove several debris piles to an off-site landfill and maintain the current vegetative cover that exists at the Ash Landfill and the Non-Combustible Fill Landfill (NCFL). The October 17, 1997 USEPA comment letter, Page 2, to the Draft PRAP recommends that a one-foot minimum vegetative cover be placed over the Ash Landfill, the NCFL, the excavated debris piles, if following removal surface soil concentrations exceed the proposed EPA target clean-up levels, and the areas where the Interim Removal Measure (IRM) action was performed (Area A and Area B). This should be performed to protect wildlife that may use the area for hunting, feeding and nesting. The letter also recommends that "clean fill" be placed over the existing surface soil concentrations equal to or greater than 60 ppm lead, 2 ppm cadmium, 200 ppm for zinc and 0.1 ppm for acenaphthene. These values were adopted from the U.S. Fish and Wildlife Service publication, *Evaluating Soil Contamination, Biological Report 90,(2), July 1990.*

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

In addition, there is no need for a vegetative cover over the area where soil was removed, treated via Low Temperature Thermal Desorption (LTTD) and replaced in the removal area. The removal action involved heating soil to approximately 900°F and was successful in eliminating Volatile Organic Compounds (VOC)s from soil and reducing the levels of Polynuclear Aromatic Hydrocarbons (PAH)s to either non-detect or levels that range from 100 to 500 ug/kg. Approximately 156 analyses were performed of the post-treatment soils, prior to placement back into the excavation pit. Our review of these data indicates that none of the five (5) target VOCs, trichloroethene, 1,2-dichloroethene, vinyl chloride, toluene and xylene, were detected in any sample above the soil clean-up values adopted from the New York State Technical Administrative Guidance Memorandum (TAGM), Number 4046. For example, trichloroethene were detected in approximately 13% of the post-treatment samples, the maximum detected value was 46 ug/kg. Ten (10) semi-volatile organic compounds were also analyzed in the post-treatment soils. The compound acenaphthene, identified by EPA as a target site clean-up compound, was not one of the ten targeted semi-volatile organic compounds during the LTTD soil treatment program. The ten (10) semi-volatile compounds that were targeted during the soil treatment program was selected from the human health risk assessment. Acenaphthene was dropped as a chemical of concern during the human health risk assessment during the screening portion of the risk assessment. Since it was not a chemical of concern (COC) in the human health risk assessment, this compound was not identified as a targeted compound for the LTTD soil treatment program. However, it was included in the ecological risk assessment as an indicator of potential phytotoxic effects to vegetation. The derived value for acenaphthene shown in the ecological risk assessment was 500 ug/kg, not the value of 100 ug/kg presented by EPA as the target clean-up value. The mean concentration of the post treatment soils for the ten (10) semi-volatile organic compounds is presented below. For this analysis, it is assumed that all non-detected compounds are equal to one-half of the detection limit. Where detected values are provided, the actual value provided by the laboratory was used whether the qualifier was an estimated value or a non-qualified value. Since the laboratory reported any detected values, which were lower than one-half of the detection limit, as estimated values, the mean concentrations calculated by this analysis is probably higher than what the true mean value actually is. This is because if a non-detected value was present at one-half the detection limit the laboratory would have reported it as a qualified value. Since the laboratory did not report the value as a qualified value the true sample value is likely to be lower than one-half the detection limit. Table 2 provides an indication of the average concentration of semi-volatile organics in the area where the LTTD treatment process was conducted. Acenaphthene is not included in the table as it was not a targeted PAH compound. As mentioned, these concentrations are likely higher than what would be expected as the true mean since the value used for this calculation assumed the concentration for non-detect values at one-half the detection limit. The detection limit was generally at 660 ug/kg.

Table 2
Concentrations of PAH Compounds in the Area of the LTTD Treatment

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

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

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

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

Sincerely,

Donald Olson

cc: Mr. Kevin Healy, CEHNC
Mr. Randall Battaglia, CENAN
Mr. Keith Hoddinott, USACHPPM (Prov.)
Mr. John Buck, USAEC
Mr. Michael Duchesneau, Parsons Engineering Science, Inc.
Mr. Thomas Enroth, CENAN,
Ms. Janet Fallo, CENAN,
Mr. Randall Nida, HQUSAIOC

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

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

April 28, 1999

Ms. Carla Struble
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Mr. James Quinn
New York State Department of Environmental Conservation
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Division of Hazardous Waste Remediation
50 Wolf Road
Albany, NY 12233-7010

SUBJECT: Status of the Ash Landfill Site

Dear Ms. Struble and Mr. Quinn:

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

BACKGROUND

In response to the requirements of CERCLA, the US Army initiated the Remedial Investigation (RI) and the Feasibility Study (FS) process at the Ash Landfill site in 1992. The Ash Landfill site is located within the area designated for conservation/recreation use in the western portion of the Seneca Army Depot Activity (SEDA). The Ash Landfill site encompasses five (5) smaller sites designated in the RCRA Part B Permit application as Solid Waste Management Units (SWMU)s. These SWMUs are: the Incinerator Cooling Water Pond (SEAD-3), the Abandoned

Ash Landfill (SEAD-6), the Non-Combustible Fill Landfill (NCFL) (SEAD-8), the Refuse Burning Pits (SEAD-14), Building 2207-the Abandoned Solid Waste Incinerator (SEAD-15). Due to the proximity of the sites to the Ash Landfill, all five (5) SWMUs were investigated as one Operational Unit (OU), the Ash Landfill site,. which Iinitially the investigation covered comprised approximately 130 acres. The 130-acre area included all five SWMUs and a larger area surrounding the SWMUs. where it was initially suspected that additional waste disposal may have occurred. However, the results of the investigation demonstratedsuggested that the area of concern was related to the more immediate area of the five SWMUs, that comprises approximately 50 acres. Numerous soil, groundwater, surface water and sediment samples were collected and analyzed during the RI. The RI field tasks included: geophysical surveys, a soil gas survey, soil borings, a bedrock fracture trace analysis, installation of numerous overburden and bedrock monitoring wells, aquifer slug testing and an ecological survey, that included fish and small mammal trapping.

The human health risk assessment considered exposure to current off-site residents, current and future on-site hunters, future on-site construction workers and future on-site residents. The results of the human health and ecological risk assessment indicated that site conditions are within the EPA target risk range of $1x10^{-4}$ and $1x10^{-6}$ for human health risk, with the exception of risk associated from residential exposure. The risk from residential exposure was due primarily from ingestion of groundwater for drinking. Although evaluated during the risk assessment, the future use of the site for residential purposes was considered unlikely and was not considered to be the criteria that would be used for site clean-up.

An extensive ecological evaluation at the Ash Landfill site was also conducted during the RI. This effort included: fish trapping and counting, benthic macroinvertibrate sampling and counting, small mammal species trapping and counting. In addition, a vegetation survey was performed, identifying major vegetation and understory types. The field ecological survey identified a diverse and healthy population of ecological species. No overt acute toxic impacts were evidenced during the field evaluation. Elevated levels of metals was identified as providing possible long term chronic impacts.

Groundwater concentrations at several locations on-site exceeded the New York State Department of Environmental Conservation (NYSDEC) GA standards for groundwater considered being a source of potable water. A plume of chlorinated organic compounds, predominantly trichloroethene (TCE) and the breakdown product cis1,2-dichloroethene (DCE) was delineated during the RI. The plume originated near the Ash Landfill and extends approximately 1250 feet to the boundary of the depot. Although there are no on-site groundwater wells used for drinking purposes, an off-site farmhouse does obtain drinking water from three (3) groundwater wells and has been identified as a potential receptor of contaminated groundwater. Continuous testing of the farmhouse wells since 1982 has not detected the presence of any site contamination and the use of groundwater at the farmhouse has been on-going. The end of the plume is approximately 1250 feet from the farmhouse drinking water wells.

Between September, 1994 and June, 1995, the Army implemented a soil treatment Interim Remedial Measure (IRM) that successfully treated approximately 34,000 tons of soil contaminated with chlorinated solvents and other petroleum residuals in an area known as the "bend-in-the-road". This area included a portion of the Ash Landfill and was considered to be largely responsible for the groundwater plume. This source removal action was undertaken to avoid any further leaching of chlorinated solvents into the groundwater. Reductions of groundwater concentrations in the area of the excavation of over 100 have been observed as an indication of the positive benefits that the IRM has had. The remaining groundwater plume has been evaluated and the Army has implemented a full-scale demonstration study to evaluate the effectiveness of an in-situ reactive barrier wall technology using zero-valent iron. A 650-foot long permeable reactive barrier wall was placed along the site boundary, perpendicular to the flow of groundwater. We expect based upon previous applications of this technology that this action will chemically reduce the dissolved chlorinated organic compounds to levels below the allowable GA groundwater standards. Once this study is complete and the technology has been shown to effective, we expect to integrate this technology into a plan that will address the groundwater.

Table 1 is a summary table highlighting the Ash Landfill RI/FS deliverables submitted to date, as well as the recent correspondence pertaining to the site. Following the completion of the FS, Parsons ES prepared the Draft Project Remedial Action Plan (PRAP). The PRAP is the first decision document to document and summarize the remedial actions that will be taken to alleviate any unacceptable site condition. Currently, we have received regulatory comments on the Draft PRAP but have not responded to these comments, as we have not reached an agreement for the final remedy. We hope to get some general agreement regarding the plan to move the process forward, thereby avoiding future delays in achieving a ROD. We would like to obtain resolution of the issues outlined below prior to submitting the revised PRAP document.

Following the recommendations provided by the Peer Review Team (PRT) and a review of the October 17, 1997 USEPA comments on the Draft PRAP, the SEDA submitted a July 30, 1998 response letter to the USEPA comments disagreeing with the requirement to implement any source control activities. This was a change from the recommendations proposed in the March 17, 1997 Draft PRAP, which had proposed to maintain a vegetative cover the Ash Landfill and the Non-Combustible Fill Landfill (NCFL). The change was based upon the lack of observable ecological risk and an ecological protection level in soil that was derived for species identified at the Ash Landfill.

Table 1

Key Documents and Dates

Deliverables to Date	Submittal Date	EPA Comments	NYSDEC Comments
Final RI with Final Inserts	10/4/94	Complete	Complete
Final FS	5/8/97	Complete	Complete
Final Action Memorandum	5/12/94	Complete	Complete
Draft PRAP	3/17/97	10/17/97	4/25/97 & 10/9/97
Army Peer Review Team, Meeting (4/1/97-4/4/97); Recommendations Report	4/11/97	Not Required; (Internal Army Document)	Not Required; (Internal Army Document)
Army Peer Review Team, Meeting (5/18/98-5/22/98); Recommendations Report	8/7/98	Not Required; (Internal Army Document)	Not Required; (Internal Army Document)
SEDA "Valued Ecological Receptors" Letter	7/30/98		9/11/98
SEDA Clarification Letter to the 7/30/98 Letter	9/24/98	10/23/98; (Includes 10/19/98 EPA Memorandum)	10/15/98
SEDA Memo regarding Peer Review "Ecological Risk Assessment Policy"	10/29/98	Not Required; (Internal Army Document)	Not Required; (Internal Army Document)
Draft ROD	To Be Determined	Not Applicable	Not Applicable

The PRT also recommended that recent EPA guidance, May 18, 1998, be followed. This guidance recommends that valued ecological resources must be identified as the first step in determining the ecological risk that a site may pose. The PRT recommended that the process of identifying valued ecological resources should involve the regulatory agencies, the SEDA, local farmers, local citizens and other future land users. The PRT had recommended that until such resources were identified there was little justification to warrant funding a remedial action.

The concept of "valued ecological receptors" and the application to the Ash Landfill site was commented on by both the NYSDEC and the USEPA. An October 15, 1998 NYSDEC letter in response to the SEDA September 24, 1998 letter states that "The Fish, Wildlife and Marine Resources Division of the NYSDEC does its impact analyses at the individual level regardless of whether the species is endangered or threatened, and feels that necessarily determining which ecological receptor is valuable enough to warrant protection is inconsistent with our mandate to protect the environment. The NYSDEC is not necessarily bound by the methodology used to satisfy a feral agency's concerns." An October 23, 1998 USEPA letter regarding the applicability of the May 14, 1998, *Guidelines for Ecological Risk Assessment, Federal Register Notice,* states that "This guidance only applies to EPA programs which currently have no program-specific guidance and therefore, does not apply to SEDA."

Given the complexities associated with establishing clean-up values based upon ecological risk assessment and the agency position, the Army proposes to revisit the previous Draft PRAP with the intent of identifying and resolving the remaining issues.

REMAINING UNRESOLVED ISSUES

ISSUE #1 - Ecological Risk to Plants and Mallards

The EPA comment letter indicates that the Ecological Risk Assessment for the site revealed that cadmium, lead, zinc and acenaphthene, in surface soils, pose a risk to plant life; their concentrations are above values considered to be phytotoxic. The letter also states that lead in surface soils may pose a risk to mallards.

The ecological risk assessment identified both the deer mouse and the mallard as two potential ecological endpoint receptors for soil. Soil and sediment screening concentrations for chronic toxicity were derived for the deer mouse and the mallard. The derived concentration for protection of ecological receptors from exposure to lead in soil for the deer mouse was 800 mg/kg. The concentration for lead in sediment for the mallard was 139 mg/kg. The soil exposure concentration was determined to be 265 mg/kg, which is below the 800 mg/kg value. The sediment exposure concentration for lead in sediment was determined to be 96 mg/kg, which is below the 139 mg/kg value. Since the habitat of the mallard is aquatic, not terrestrial, the soil exposure concentration value, of 265 mg/kg, should not be compared to the sediment derived value for protection of the mallard, which is 139 mg/kg. Based upon this, the ecological risks from lead to aquatic and terrestrial species are acceptable.

The ecological evaluation included fish trapping and counting, benthic macroinvertibrate sampling and counting and small mammal species sampling and counting. In addition, a vegetative survey was performed. The conclusions, from these field efforts, indicated a diverse and healthy aquatic and terrestrial environment. Field observations were considered a significant indicator of the overall ecological health at the site. Acute effects of chemicals should be easily observable during the field inspection, as should long-term chronic effects since however, long-term chronic effects may be less noticeable. However, such effects may be noticeable since the disposal activities occurred approximately 20 years ago. The incinerator was destroyed by fire in 1979.

To further consider chronic effects, a comparison of site concentrations to available guideline values was also performed. Allowable chronic concentrations of chemicals in soil were either derived or obtained from a literature search. These values are not site-specific and were intended to be used as further evidence in support of site field observations. The exposure concentration of cadmium in surface soils for plants was determined to be 5.5 mg/kg. This is 10 % over the reported range of concentrations considered to be phytotoxic in plants, which is between 2.5 mg/kg to 5.0 mg/kg. The exposure concentration of lead in surface soils was determined to be 265 mg/kg. This is within the reported range of concentrations considered to be phytotoxic, which is between 150 mg/kg to 1,000 mg/kg. The exposure concentration of zinc in surface soils was determined to be 1,580 mg/kg. This is within the reported range of concentrations considered to be phytotoxic, which is between 500 mg/kg to 2,000 mg/kg. The exposure concentration of acenaphthene in surface soils was determined to be 538 ug/kg. This is above the upper range concentrations considered to be phytotoxic, which was estimated to be 500 ug/kg, by less than 10%. A screening concentration value for acenaphthene was derived from a literature search. The literature reference, Hulzebos et al, 1993, suggested that a value of 2% of the EC50 for the lettuce could be adopted for protection of vegetation from acenaphthene in surface soils. Lettuce is not a plant that is grown at the site. The site, including areas over the Ash Landfill and the NCFL, is completely vegetated with numerous grass types. It would appear that chronic phytotoxicity concentration levels, obtained or derived from the literature review, have not been expressed in the vegetative community at the site as the vegetative community appears healthy and diverse.

Overall, the site ecological risks appear limited to slight exceedances of a derived screening value for protection of plants. Additionally, Since the field observations do not confirm that vegetative species are adversely impacted. it is possible that the site exposure concentrations are within the uncertainties associated with the derivation of the protective values.

ISSUE #2 - Clean-up Goals

While the ecological risks at the site appear to be minimal, the Army has agreed to cover areas where heavy metals have been determined to be present at the highest concentrations. There are concerns regarding the clean-up goals that were proposed by the EPA in their comment letter. The EPA comment letter recommends that "clean fill" and cover of the existing surface soil concentrations equal to or greater than 60 ppm lead, 2 ppm cadmium, 200 ppm for zinc and 0.1

ppm for acenaphthene. These values were adopted from the U.S. Fish and Wildlife Service publication, *Evaluating Soil Contamination, Biological Report 90,(2), July 1990.*

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

Since the intended future use of this parcel of land within the depot has been designated as conservation/recreational use, not agricultural we believe that the ~~more appropriate~~ correct criteria from Table 3 should be obtained from the column heading labeled as residential/parkland. Although residential development is not a future land use, parkland does more closely match the intended future land use. The values listed in Table 3 as clean-up criteria for metals at parklands are: 4 mg/kg for cadmium, 500 mg/kg for lead and 800 mg/kg for zinc. Adoption of these values as the criteria for placing the cover would limit the cover to the Ash Landfill and the NCFL only. The removal of the debris piles will eliminate the presence of cadmium and no further cover would be required.

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

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

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

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

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

ISSUE #3 - Vegetative Cover

The proposed plan for source control identified in the March 17, 1997 Draft PRAP proposes to remove several debris piles to an off-site landfill and maintain the current vegetative cover that exists at the Ash Landfill and the Non-Combustible Fill Landfill (NCFL). The October 17, 1997 USEPA comment letter, Page 2, to the Draft PRAP recommends a one-foot minimum vegetative cover be placed over the Ash Landfill, the NCFL, the excavated debris piles, if following removal surface soil concentrations exceed the proposed EPA target clean-up levels, and the areas where the Interim Removal Measure (IRM) action was performed (Area A and Area B). This should be performed to protect wildlife that may use the area for hunting, feeding and nesting. The letter also recommends that "clean fill" and cover of the existing surface soil concentrations equal to or greater than 60 ppm lead, 2 ppm cadmium, 200 ppm for zinc and 0.1 ppm for acenaphthene. These values were adopted from the U.S. Fish and Wildlife Service publication, *Evaluating Soil Contamination, Biological Report 90,(2), July 1990.*

Although the alternative clean-up values are still potential considerations, the Army has agreed to provide a vegetative cover for the Ash Landfill and the NCFL. The debris piles would be removed to an off-site landfill. As the piles would no longer exist, any risk posed by the piles would also no longer exist and there should be no need to cover the location where the former pile would have been. There is no need for a vegetative cover over the area where soil was removed, treated via Low Temperature Thermal Desorption (LTTD) and replaced back to the site. The removal action involved heating soil to approximately 900°F and was successful in eliminating Volatile Organic Compounds (VOC)s from soil and reducing the levels of Polynuclear Aromatic Hydrocarbons (PAH)s to either non-detect or levels that range from 100 to 500 ug/kg. Approximately 156 analyses were performed of the post-treatment soils, prior to placement back into the excavation. Our review of this data indicates that none of the five (5) target VOCs, trichloroethene, 1,2-dichloroethene, vinyl chloride, toluene and xylene, were detected in any sample above the soil clean-up values adopted from the New York State Technical Administrative Guidance Memorandum (TAGM), Number 4046. For example, trichloroethene was detected in approximately 13% of the post-treatment samples, the maximum detected value was 46 ug/kg. Ten (10) semi-volatile organic compounds were also analyzed in the post-treatment soils. The compound acenaphthene, identified by EPA as a target site clean-up compound, was not one of the ten targeted semi-volatile organic compounds during the LTTD soil treatment program. The ten (10) semi-volatile compounds that were targeted during the soil treatment program was selected from the human health risk assessment. Acenaphthene was dropped as a chemical of concern during the human health risk assessment during the screening portion of the risk assessment. Since it was not a chemical of concern (COC) in the human health risk assessment, this compound was not identified as a targeted compound for the LTTD soil treatment program. However, it was included in the ecological risk assessment as an indicator of potential phytotoxic effects to vegetation. The derived value for acenaphthene shown in the ecological risk assessment was 500 ug/kg, not the value of 100 ug/kg presented by EPA as the target clean-up value. The mean concentration of the post treatment soils for the ten (10) semi-volatile organic compounds is presented below. For this analysis assumes that all non-detected compounds are at one-half of the detection limit. Where detected values are provided the actual value provided by the laboratory was used whether the qualifier is an estimated value or a non-qualified value. Since the laboratory reported detected values at lower than one-half of the detection values as estimated values, the mean concentrations are probably higher than what the true value actually is. Table 2 provides an indication of the average concentration of semi-volatile organics in the area where the LTTD treatment process was conducted. Acenaphthene is not included in the table as it was not a targeted PAH compound. As mentioned, these concentrations are likely higher than what would be expected as the true mean since the value used for this calculation assumed the concentration for non-detect values at one-half the detection limit. The detection limit was generally at 660 ug/kg.

Table 2
Concentrations of PAH Compounds in the Area of the LTTD Treatment

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

We recognize that the LTTD treatment process would have minimal affect on the concentrations of metals in soil but we also note that only limited amounts of metals were present in the soil to begin with. The unavoidable mixing of soil during the excavation and thermal treatment process has undoubtedly reduced the concentration of metals in these locations. Post treatment confirmation sampling for the LTTD treatment program did not include total metals and therefore no post treatment concentrations for the soil placed back into the excavation are available. Assuming the treatment process did not reduce the concentration of metals in the soil that was treated, it is possible to calculate, from the previous RI data collected where soil was treated, the concentration of these three (3) metals. We believe that the mean of the RI data will provide a reasonable representation of what the current conditions are at the site, since the treatment process involved a rotating soil through a heated eight (8) foot diameter drum. This process produced a soil that is thoroughly mixed. Fifteen (15) soil borings were performed during the RI in the areas that were excavated and treated. These borings include: B-2, B-15, B-

27, B-28, B-29, B-30, B-31, B-32, B-36, B-37, B-38, B-39, B-46, B-47 and B-48. Soil samples were collected and analyzed from the several depths including the surface, 0-2', 2'-4', 4'-6' and 6'-8'. A total of 49 soil samples, corresponding to 61 analyses, were collected from these sample boring locations and analyzed for organic and inorganic contaminants. The increased numbers of analyses were due to duplicates and laboratory required reanalysis of samples. Our analyses included averaging each location where either a duplicate or reanalysis was performed. We have tallied these data and have determined that the mean of the concentration of lead in these samples to be 30 ppm, for cadmium the mean is 1.5 ppm, for zinc the mean is 75.9 ppm. Table 3 provides a summary of all the metals data evaluated. This data suggests that the soil in this area is below the EPA target levels for protection of ecological receptors. As a result, there does not seem to be a justification to place an additional 1-foot of vegetative cover over an area that has been treated to reduce or eliminate the organic compounds and has reduced the inorganic components of concern. The treatment process also involved establishing a vegetative cover of 6 inches. Our last inspection of the Ash Landfill area indicated that this vegetative is established. A review of the above data indicates that concentrations for cadmium, lead and zinc in the area of treatment are below the EPA proposed criteria for concentrations equal to or greater than 60 ppm lead, 2 ppm cadmium, 200 ppm for zinc. Therefore, a vegetative cover over the area should not be requirement.

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

Sincerely,

SENECA ARMY DEPOT ACTIVITY

Mr. Stephen Absolom
Base Environmental Coordinator

cc: Mr. Kevin Healy, CEHNC
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Table 3

Concentrations of Metals in the Area of the LTTD Treatment

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