50-06, File
Ash Landfill

PARSONS

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Mr. Julio Vazquez
USEPA Region II
Superfund Federal Facilities Section
290 Broadway, 18th Floor
New York, NY 10007-1866

SUBJECT: Demonstration of the Remedy Operating Properly and Successfully at the Ash Landfill Operable Unit at Seneca Army Depot Activity; EPA Site ID# NY0213820830 and NY Site ID# 8-50-006

Dear Mr. Vazquez:

The purpose of this letter is to document that the remedial action completed at the Ash Landfill Operable Unit (OU) at the Seneca Army Depot Activity in Romulus, New York is "operating properly and successfully" (OPS). This OPS document is a precondition to the deed transfer of federally-owned property, as require by Section 120(h)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). A successful demonstration to the United States Environmental Protection Agency (USEPA) allows for the deeded transfer of property with a remedial action in place prior to the attainment of the cleanup levels.

Introduction

A remedial action to address impacts to groundwater and soil at the Ash Landfill was presented and defined in the "Record of Decision for the Ash Landfill Operable Unit", *Final* (Parsons, 2004) (ROD). In accordance with the ROD, the Remedial Design Work Plan (Parsons, 2006), and the Remedial Design Report (RDR) (Parsons, 2006), a remedial action was completed in October and November 2006. The remedial action involved the following:

- Installation of three dual biowall systems (A1/A2, B1/B2, C1/C2) to address volatile organic compounds (VOCs) in groundwater that exceed New York State Department of Environmental Conservation's (NYSDEC's) Class GA groundwater standards;
- Construction and establishment of a 12-inch vegetative cover over the Ash Landfill and the Non-Combustible Fill Landfill (NCFL) to prevent ecological receptors from coming into direct contact with the underlying soils contaminated with metals and polycyclic aromatic hydrocarbons (PAHs);
- Excavation and disposal of Debris Piles A, B, and C; and

- Regrading of the Incinerator Cooling Water Pond to promote positive drainage.

As part of the remedial action at the Ash Landfill OU, long-term groundwater monitoring (LTM) is being performed as part of the post-closure operations. Groundwater monitoring is required as part of the remedial design, which has been formulated to comply with the ROD. The first of four rounds of groundwater sampling for the first year of LTM was completed between January 3, 2007 and January 4, 2007, the second was completed between March 15, 2007 and March 17, 2007, the third was completed between June 5, 2007 and June 7, 2007, and the last of the four was collected between November 13, 2007 and November 15, 2007. The analytical and geochemical results were presented in four letter reports, submitted April 12, 2007 (Quarter 1), June 5, 2007 (Quarter 2), September 19, 2007 (Quarter 3), and February 21, 2008 (Quarter 4). The "Annual Report and One-Year Review for the Ash Landfill", *Draft* (Parsons, 2008) was submitted in March 2008 to provide an assessment of the results for the 2007 LTM year as part of the evaluation of the overall remedy and to provide conclusions and recommendations about the effectiveness of the remedial action, including both the groundwater remedy and the vegetative landfill covers. The Annual Report presented an analysis of the remedial action's compliance with the requirements of a system "operating properly and successfully." This letter will refer to the data and analysis presented in the Annual Report.

The USEPA's "Guidance for Evaluation of Federal Agency Demonstrations that Remedial Actions are Operating Properly and Successfully Under CERCLA (Section 12(h)(3))" provides guidance on the requirements for achieving the "operating properly and successfully" determination. The Army believes that the remedial action completed at the Ash Landfill has demonstrated that it meets the "operating properly and successfully" designation. Supporting data is provided in the Annual Report (Parsons, 2008).

Site Characterization

SEDA is a 10,587-acre former military facility located in Seneca County near Romulus, New York, which has been owned by the United States Government and operated by the Department of the Army since 1941. SEDA is located between Seneca Lake and Cayuga Lake in Seneca County and is bordered by New York State Highway 96 on the east, New York State Highway 96A on the west, and sparsely populated farmland on the north and south.

The location of the Ash Landfill OU, also referred to as the Ash Landfill, is composed of five solid waste management units (SWMUs). The five SWMUs that comprise the Ash Landfill OU are the Incinerator Cooling Water Pond (SEAD-3), the Ash Landfill (SEAD-6), the Non-Combustible Fill Landfill (NCFL) (SEAD-8), the Debris Piles (SEAD-14), and the Abandoned Solid Waste Incinerator Building (SEAD-15).

Prior to the development of the Ash Landfill OU, the land in this area was used for farming. From 1941 (the date SEDA was constructed) to 1974, uncontaminated trash was burned in a series of burn pits near the former abandoned incinerator building (Building 2207). According to a U.S. Army Environmental Hygiene Agency (USAEHA) Interim Final Report, Groundwater Contamination Survey No. 38-26-0868-88 (July 1987), the ash from the refuse burning pits was buried in the Ash Landfill (SEAD-6) from 1941 until the late 1950's or early 1960s.

The incinerator was built in 1974. Between 1974 and 1979, materials intended for disposal were transported to the incinerator. Nearly all of the approximately 18 tons of refuse generated per week on the Depot were incinerated. The source for the refuse was domestic waste from depot activities and family housing. Large items that could not be burned were disposed at the NCFL (SEAD-8). The NCFL has an area of approximately two acres and is located southeast of the incinerator building (immediately south of the SEDA railroad line). The NCFL was used as a disposal site for non-combustible materials, including construction debris, from 1969 until 1977.

Ash and other residue from the incinerator were temporarily disposed in an unlined cooling pond immediately north of the former incinerator building. The cooling pond consisted of an unlined depression approximately 50 feet in diameter and approximately 6 to 8 feet deep. When the pond filled, the fly ash and residues were removed, transported, and buried in the adjacent ash landfill east of the cooling pond. The refuse was dumped in piles and occasionally spread and compacted. No daily or final cover was applied during operation. The active area of the Ash Landfill extended at least 500 feet north of the incinerator and surrounding area during operation. A fire destroyed the incinerator on May 8, 1979, and the landfill was subsequently closed. The landfill was covered with varying thicknesses of native soils but had not been closed with an engineered cover or cap. Other areas on the site were used for burning of debris.

<u>Soil and Groundwater Impacts</u>

The nature and extent of the constituents of concern at the Ash Landfill OU were evaluated through a comprehensive remedial investigation (RI) program. It was determined that surface water and sediment were not media of concern and did not require remediation. During the RI, a groundwater contaminant plume, emanating from the northern end of the Ash Landfill, was delineated. The primary constituents of concern at the Ash Landfill include VOCs, SVOCs and metals. VOCs are found in both soil and groundwater, and chlorinated VOCs are the primary groundwater COCs. SVOCs, including principally PAHs, and metals were found in the soil. Release of the constituents of concern is believed to have occurred during the former activities at the Ash Landfill OU, as described above.

Soil

VOCs, specifically trichloroethene (TCE), were detected in the soil in the "Bend in the Road" area, located northwest of the Ash Landfill. Between 1994 and 1995, the Army conducted a Non-Time Critical Removal Action (NTCRA), also known as an Interim Removal Measure (IRM), to address VOC and PAH soil contamination in areas near the "Bend in the Road". This area is believed to be the source of the identified groundwater plume. The NTCRA was successful in reducing risk due to future exposure to these soils and prevented continued leaching of VOCs to groundwater associated with this operable unit. In the years that have passed since the NTCRA, the positive benefits of the NTCRA have been noted by the observation that the concentration of VOCs in groundwater near the original source area has decreased by two orders of magnitude. Further remediation for VOCs in the soil at the "Bend in the Road" was not required.

The other compounds of significance detected in the soils were PAHs and metals. PAHs were detected at concentrations above NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) #4046 values in the NCFL and in the Debris Piles present around the former Ash Landfill. In general, the highest PAH concentrations were detected in the NCFL and small Debris Pile surface soils. The metals detected at elevated concentrations (significantly above TAGMs) in soils were copper, lead, mercury, and zinc. These elevated concentrations were found in the Ash Landfill, the NCFL, and the Debris Piles, and the highest concentrations of metals were detected at the surface of the Debris Piles. These piles are small, localized, surface features that are visibly discernable and do not extend into the subsurface.

Groundwater

The primary potential impact to human health and the environment is the groundwater plume containing dissolved concentrations of TCE, 1,2-dichloroethene (DCE), and vinyl chloride (VC). The plume measures approximately 1,100 feet in length by 625 feet in width and originated from the "Bend in the Road" area near the northwestern edge of the Ash Landfill. The remedial investigation indicated that vertically the plume is restricted to the upper till/weathered shale aquifer and is not present in the deeper competent shale aquifer.

The nearest exposure points for groundwater are three farmhouse wells, located approximately 1,250 feet from the leading edge of the plume. Two of the farmhouse wells draw water from the shallow till/weathered shale aquifer and the remaining well draws water from the bedrock aquifer As noted above, the source of the plume was removed by the NTCRA.

In December 1998, a 650-foot long permeable reactive zero valent iron (ZVI) wall was installed approximately 100 feet east of the railroad tracks near the property line. The wall was installed as a demonstration project to show that the reactive iron wall could be effective in reducing the concentrations of chlorinated ethenes through reductive dechlorination. The ZVI wall was successful in controlling the level of chlorinated ethenes migrating from the site and is currently providing migration control at the site.

Evaluation of "Operating Properly and Successfully"

The remedial action is operating "properly".

The USEPA guidance describes that "a remedial action is operating 'properly' if it is operating as designed." The Construction Completion Report (CCR) (Parsons, 2007) details that the construction of the vegetative covers were installed as designed, meeting or exceeding the 12-inch of soil requirement as a cover. **Section 3.5** of the Annual Report (Parsons, 2008) describes that the covers are intact and effectively prevent ecological contact with the underlying soil; therefore, the vegetative covers are operating properly.

The CCR also details the construction of the biowalls; deviation from the design resulted in the placement of additional mulch in the biowalls, which were thicker than designed. As this is an enhancement of the design, it is fair to say that the biowalls were constructed as designed. The geochemical data presented and discussed in **Section 3.1** of the Annual Report indicates that anaerobic conditions favorable to reductive dechlorination have been established in the areas of the biowalls, which was the expectation of the design of the biowall system.

The remedial action is operating "successfully".

A remedial action may receive USEPA's designation of operating successfully (1) if "a system will achieve the cleanup levels or performance goals delineated in the decision document" and, (2) if the remedy is protective of human health and the environment. The performance goals delineated in the CCR and discussed in the Annual Report are as follows:

- Confirm that there are no exceedances of contaminants of concern (COC) groundwater standards at the off-site trigger monitoring well MW-56;
- Document the effectiveness of the biowalls to remediate and attenuate the chlorinated ethene plume; and,
- Confirm that groundwater concentrations throughout the plume are decreasing to eventually meet GA standards.

The following discussion presents how the remedy at the Ash Landfill OU is achieving the performance goals and will meet the cleanup levels, and the discussion at the end of this section demonstrates that the remedy is protective of human health.

Achievement of first performance goal:

- *Confirm that there are no exceedances of contaminants of concern (COC) groundwater standards at the off-site trigger monitoring well MW-56;*

Concentrations of chlorinated organics at the off-site well, MW-56, and near the site boundary (PT-24) remain low or non-detect, with no significant increase (i.e., approaching regulatory standards) in the concentration of cis-DCE or VC. TCE and VC were not detected at MW-56 during any of the quarterly sampling events, and DCE was detected below the Class GA groundwater standard (5 µg/L). The first year of long-term monitoring confirmed that there were no exceedances of COC groundwater standards at MW-56.

Achievement of second performance goal:

- *Document the effectiveness of the biowalls to remediate and attenuate the chlorinated ethene plume;*

Concentrations of chlorinated ethenes at well MWT-26 (between Biowall A and Biowall B1) have steadily declined between successive quarterly monitoring events to current concentrations of 2.8 µg/L of TCE, 2.8 µg/L of cis-DCE, and less than 1.0 µg/L (non-detect) of VC; all of these concentrations are below regulatory standards. Concentrations at MWT-24, located downgradient of Biowall C2, show a similar steady decline in cis-DCE concentrations between successive monitoring events (from 210 µg/L in the first quarter to 6.7 µg/L in the fourth quarter), and a substantial decline in VC levels (from 45 µg/L in the second quarter to 3.8 µg/L in the fourth quarter). TCE has consistently been below 2 µg/L at MWT-24.

Upgradient of the biowall systems, TCE was detected above the Class GA groundwater standard (5 µg/L) at concentrations ranging from 2,000 µg/L to 2,700 µg/L at PT-18A and 26 µg/L to 55 µg/L at MWT-25 over the four quarterly sampling events, as is shown on **Table 3** of the Annual Report. TCE concentrations within the biowalls (MWT-27, MWT-28, and MWT-23) remain below detection limits, which is an expected performance measure. However, it is just as significant that concentrations of DCE or VC are not elevated within the biowalls. This suggests complete mineralization of chlorinated ethenes, perhaps involving multiple anaerobic degradation processes. Ethene is only slightly elevated within the biowalls, but this is not unusual. Ethene is not produced by anaerobic oxidation of cis-DCE or VC, or by abiotic transformation of chlorinated ethenes by reduced iron sulfides. In addition, ethene may be further reduced under highly anaerobic conditions and is volatile (may off-gas) relative to other biogenic gases (carbon dioxide and methane) produced within the biowalls. Therefore, the biowalls are operating as expected with no loss of performance. TOC concentrations remain sufficiently elevated to promote effective degradation of chlorinated ethenes within the biowalls.

The changes in groundwater concentrations of TCE, DCE, and VC as the groundwater passes through the biowalls are shown in **Figures 5A** through **5D** in the Annual Report for Quarters 1, 2, 3, and 4, respectively. The figures show that the concentrations of TCE in groundwater are reduced to concentrations below the detection limit within the biowalls. The concentration of TCE does rebound as the distance away from Biowalls C1/C2 increases, but this increase is associated with the desorption of TCE from soils located downgradient of the treatment wall. These results indicate that when groundwater is intercepted and treated by the biowalls, a measurable (albeit slower) improvement in downgradient water quality will occur.

Anaerobic degradation of TCE may also occur downgradient of the biowalls in the aquifer formation due to soluble organic carbon released from the biowalls. It is notable that concentrations of cis-DCE and VC are highest downgradient of the biowalls, and not within the biowalls. This suggests that sequential biotic reductive dechlorination of chlorinated organics is the primary degradation process in the downgradient reaction zones, with low levels of TCE being released by desorption from the aquifer matrix or from back diffusion of contaminated groundwater from low permeability sediments. A further indication of biotic reductive dechlorination is the elevated concentration of ethene (200 µg/L) observed at well location MWT-29 during fourth quarter monitoring. Further downgradient, TCE was detected at MWT-7 (310 feet from C1/C2) at a maximum concentration of 510 µg/L in the fourth quarter; it is likely that the effects of the biowalls have not reached this part of the plume, which is expected after only one year since the biowall installation.

Achievement of third performance goal:

- *Confirm that groundwater concentrations throughout the plume are decreasing to eventually meet GA standards.*

In general, concentrations of TCE, cis-DCE, and VC decreased at the wells near the biowalls and downgradient of the biowalls over the span of the four sampling events. Time plots for monitoring wells MWT-25, MWT-26, MWT-27, MWT-29, MWT-22, PT-22, MWT-23, MWT-24, and PT-24 are presented in **Figures 6A** through **6I**, respectively, of the Annual Report. The plots show an overall decreasing trend for COCs, though **Figure 6E** (MWT-22) and **Figure 6F** (PT-22) of the Annual Report show that cis-DCE may increase initially as TCE decreased, and VC increases as concentrations of cis-DCE decrease, specifically in wells near the biowalls. DCE and VC are byproducts of reductive dechlorination, and these increases are expected when reductive dechlorination is occurring; however, over time, the concentrations of cis-DCE and VC are expected to diminish. VC concentrations will decrease under aerobic conditions, which exists downgradient of the anaerobic treatment zones near the biowalls.

The time plots of the downgradient wells (MWT-29, MWT-22, PT-22, MWT-24, and PT-24) in the Annual Report show that the TCE concentrations measured in the wells in the vicinity of the biowalls and downgradient of the biowalls are decreasing.

An exponential regression, which matches the rate of decay typical for biological processes, has been calculated for the monitoring wells as a means of estimating the time it will take for the concentrations of chlorinated organics to meet their respective GA groundwater standards. **Table 4** in the Annual Report summarizes the trend for each contaminant in each well and provides an estimate of the date that the standards will be achieved based on the exponential regressions. This table shows that with the exception of the source well (PT-18A), PT-17, and MWT-7, all concentrations at site wells have either reached the Class GA groundwater standard or are expected to reach their respective standards by 2014. These dates are intended to provide an indication of the timeframe required for concentrations to reach acceptable levels, and are not meant as a time commitment for the remedy. There may be limiting factors in reaching the groundwater standards by the specified date, such as desorption and back diffusion from low permeability sediments, which may drive the actual time required to reach compliance.

Time plots of the data for PT-18A, PT-17, and MWT-7 (**Figures 7A**, **B**, and **C**) in the Annual Report include historic data prior to the installation of the biowalls. **Figures 7A** and **7B** indicate that there is an overall decreasing trend for the COC concentrations at PT-18A and PT-17, respectively, even though more recent data has been increasing. The concentrations of TCE at PT-18A (located upgradient of the biowalls), MWT-7, and PT-17 (both located well downgradient of Biowall C2) do not appear to have been impacted by the biowall system and dates to achieve compliance cannot be estimated due to the natural variation in concentrations over time. Concentrations at these wells are within observed historic levels and the Army will continue to evaluate any impact from the biowall on this portion of the plume.

The data presentation in **Section 3.3** of the Annual Report demonstrates that concentrations of VOCs are decreasing and will eventually meet the Class GA groundwater standards and all performance goals are achieved. The time plots presented in **Figure 6** (**A** through **I**) of the Annual Report show a decreasing trend for the COCs; **Table 4** of the Annual Report summarizes the trends in concentrations and provides a time estimate based on exponential regressions of the time plots. The time estimates are not exact dates that Class GA groundwater standards will be achieved; rather they serve to demonstrate that the concentrations in groundwater will eventually meet the groundwater standards. The data and analysis provided in the Annual Report show that since the installation of the biowalls, concentrations are attenuating and the plume is neither migrating nor expanding.

Recent inspection of the vegetative covers at the Ash Landfill and the NCFL indicate that the covers are preventing ecological receptors from contacting the underlying soil. The LUCs have been maintained and no one is accessing the groundwater; in addition, groundwater concentrations are below NYSDEC Class GA standards at the off-site well, MW-56. Therefore, there is no threat to human health. Based on a review of the site data, inspection of the condition of the vegetative covers, and confirmation that the LUCs are being maintained, the Army believes that the remedial action is operating successfully.

Summary and Conclusions:

- The Ash Landfill OU remedy was constructed as designed;
- An evaluation of groundwater concentrations from the first year of LTM in Annual Report indicates groundwater concentrations are decreasing and that NSYDEC Class GA groundwater standards will eventually be achieved;
- The remedy for soil, placement of vegetative covers, are in place and effectively preventing ecological receptors from contacting underlying soils; and
- LUCs have been maintained and no one is accessing the groundwater.

Based on an assessment of the design and construction of the remedial action, as well as an evaluation of the geochemical and analytical data from the first year of quarterly groundwater monitoring, the remedial action at the Ash Landfill meets the requirements to be designated as "operating properly and successfully".

Parsons, on behalf of the U.S. Army, appreciates the opportunity to provide you with this letter. Should you have any questions, please do not hesitate to call me at (617) 449-1405 to discuss them.

Sincerely,

Todd Heino, P.E.
Program Manager

Enclosures

cc: S. Absolom, SEDA (paper and email)
R. Walton, USAEC (email only)
R. Battaglia, USACE, NY District (email only)
T. Battaglia, USACE, NY District (email only)
Air Force email
K. Hoddinott, USACHPPM (email only)
K. Gupta, NYSDEC (email only)
M. Sergott, NYSDOH (email only)
J. Hill, AFCEE (email only)