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FOR INCLUSION IN THE ADMINISTRATIVE RECORD

September 11, 2007

United States Environmental Protection Agency

Region 1 - New England Regional Office

One Congress Street, Suite 1100 (HBO)

Boston, Massachusetts 02114-2023

Attn: Anna Krasko, Project Manager

**RE: Remedial Alternatives for Source-area Soil
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island**

Dear Ms. Krasko:

This letter augments correspondence of June 8 and July 18, 2007, submitted on behalf of Emhart Industries, Inc. ("Emhart"), and responds to the United States Environmental Protection Agency's (EPA's) correspondence of August 14, 2007 regarding the remedial alternatives that EPA is evaluating for source-area soils at the above-referenced site. The remedial alternatives being evaluated by EPA are: (i) no further action; (ii) upgrade and maintain existing caps and parking lots; and (iii) convert to RCRA caps and maintain. These alternatives were presented at the April 23, 2007 dialog meeting. At that meeting, the EPA project team explained that the second alternative contemplates importing soil to re-grade the caps with three percent slopes to direct water away from the capped soils. The EPA project team further explained that the third alternative contemplates the incorporation of a geomembrane liner and importing soil to re-grade the caps with three percent slopes in converting the existing caps to RCRA caps. As presented herein, the remedial alternatives that are being evaluated should include an additional and separate alternative for monitoring and maintenance of the existing caps.

As presented in the June 8 and July 18, 2007 letters, upgrades to the existing caps and parking lots or conversion of the existing caps to RCRA caps are not warranted. In response to the referenced correspondence, EPA stated in its letter dated August 14, 2007 that it will continue to evaluate the three alternatives. Moreover, EPA will reconsider its initial screening efforts to confirm that the three alternatives represent the appropriate universe of potential approaches for the source-area soils. While EPA's reconsideration of its initial screening is certainly appropriate, the constituent concentrations in the source-area soils do not warrant upgrades to the



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existing caps and parking lots, or conversion of the existing caps to RCRA caps, as explained below.

According to EPA, constituents are present in the capped materials at concentrations that exceed the Rhode Island Department of Environmental Management's (RIDEM's) residential direct exposure criteria (RDEC). While it may be argued that EPA's second and third remedial alternatives identified above may minimize the potential for constituents to leach from the capped materials, these alternatives would provide no greater protection to human health via the direct exposure pathways than the protection provided by the existing caps. Monitoring and maintenance of the existing caps will continue to provide a direct barrier to contact with constituents present in the underlying source-area soils. With the implementation of regular monitoring and maintenance, there is no need to upgrade the existing caps or to convert them to RCRA-type systems to ensure the protection of human health from potential risks via direct contact.

The issue regarding whether the existing caps need to be upgraded or converted to minimize the potential for constituents to leach from the capped materials is presented in the remainder of this correspondence. The applicability of the leachability criteria is first presented followed by a summary of the constituent concentrations reported by EPA in the source-area soils. The rationale for understanding why the conditions in the source-area soils do not warrant an upgrade to the existing caps or conversion of the existing caps to RCRA-type systems is then presented, followed by a recommendation for the most prudent and, in our view, the only appropriate long-term remedy for the source-area soils.

Applicability of GB Leachability Criteria

According to EPA and the June 30, 2005 *Interim Final Remedial Investigation Report* prepared by Battelle (Report), constituents are present in the capped materials at concentrations that reportedly exceed RIDEM's leachability criteria. A summary of these constituents is provided in Table 4-4 of the Report. The leachability criteria are intended to ensure protection of the designated groundwater classification. The groundwater beneath and downgradient of the site is classified as GB. In accordance with the RIDEM *Remediation Regulations* (DEM-DSR-01-93), the GB leachability criteria apply to site soils as long as the application of these criteria will not contribute to actual or potential impacts to surface water and/or sediment. As stated in the Report, the constituents identified in the source-area soils at concentrations that exceed RIDEM's leachability criteria are not adversely impacting surface water and sediment quality proximate to the site. Therefore, the GB leachability criteria apply to the site. Pursuant to the RIDEM Remediation Regulations, the GB leachability criteria apply to the soils throughout the vadose zone, which at the site has an average thickness of approximately five feet.

The GB leachability criteria have been established by RIDEM for certain volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) only. For other constituents,



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leachability criteria established through a laboratory test such as the Toxicity Characteristic Leaching Procedure (TCLP) or the Synthetic Precipitation Leaching Procedure (SPLP) may be used to demonstrate that the constituents will not leach to groundwater at levels which exceed the groundwater objective. Such demonstrations are only necessary for areas in which groundwater is classified as GA. As explained above, groundwater at the site is classified as GB. Thus, RIDEM's leachability criteria apply only to the specific VOCs and PCBs that may be present in source-area soils, for which such criteria are listed in RIDEM's Remediation Regulations.

Constituent Concentrations

As provided in Table 4-4 of the Report, the constituents reported to exceed the GB leachability criteria include VOCs reported to be present in soil samples collected from borings advanced in the areas of the cap. These borings include soil borings CMS-405, CMS-408, CMS-417, CMS-419, CMS-060, and MW-05S. A summary of the constituents reported to be present at each of these locations is presented as follows:

Soil Borings CMS-405 and CMS-408

Soil borings CMS-405 and CMS-408 are located in the Centerdale Manor south parking lot. Based on laboratory analytical data obtained for soil samples collected from the vadose zone at these boring locations, benzene was reported to be present at maximum concentrations of 130 milligrams per kilogram (mg/kg) (CMS-405) and 480 mg/kg (CMS-408). The reported concentrations of benzene exceed the GB leachability criteria (4.3 mg/kg). No other borings located in this area were characterized to contain constituent concentrations that exceed the GB leachability criteria.

Based on the laboratory analytical results of groundwater samples collected from nearby monitoring well MW-09S, no VOCs were reported to exceed criteria for the GB groundwater objective. Benzene was reported to be present at a maximum concentration of 21 micrograms per liter ($\mu\text{g/l}$) for this well location. This concentration is less than the criteria established for the GB groundwater objective (140 $\mu\text{g/l}$).

Soil Borings CMS-417 and CMS-419

Soil boring CMS-417 is located in the Brook Village parking lot at the northern extent of Cap #2. Based on laboratory analytical data obtained for soil samples collected from the vadose zone at this boring location, chlorobenzene, *cis*-1,2-dichloroethylene, ethylbenzene, tetrachloroethylene, trichloroethylene, and toluene were reported to be present at concentrations that exceed the applicable GB leachability criteria as presented in Table 4-4 of the Report. With the exception of trichloroethylene, the same VOCs were reported to be present at concentrations that exceed the applicable GB leachability criteria in the soil samples collected from soil boring CMS-419, located in the Centerdale Manor north parking lot.



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The vertical distribution of VOCs reported in the vadose zone at locations CMS-417 and CMS-419 are summarized in Table 4-5 of the Report. As presented in this table, the highest VOC concentrations are found within two feet of the ground surface, with significantly lower concentrations in deeper samples collected from the vadose zone. In fact, the concentrations for all constituents are below the respective GB leachability criteria in the vadose zone samples nearest the water table. For location CMS-417, VOCs were lower than the GB leachability criteria for the deepest sample collected from this boring (3-4 feet below ground surface (bgs)). For location CMS-419, VOCs were lower than the GB leachability criteria for the deepest three samples collected from this boring (3-8 feet bgs). These reported data indicate that the VOCs are primarily present in the upper most horizon of the soil column, and although presumably present for several decades, they are not mobilizing downward in the soil column.

Based on the laboratory analytical results of groundwater samples collected from nearby monitoring wells MW-01S and MW-06S, no VOCs were reported to exceed criteria for the GB groundwater objective. No VOCs were detected in the groundwater at monitoring well MW-01S and except for chlorobenzene, no VOCs were reported to be present in the groundwater samples collected from monitoring well MW-06S at other than estimated concentrations. Chlorobenzene was reported to be present in groundwater at monitoring well MW-06S at a maximum concentration of 190 µg/l. This concentration is less than the criteria established for the GB groundwater objective (3,200 µg/l).

Soil Borings CMS-060 and MW-05S

Soil boring CMS-060 is located in the northern extent of Cap #2. Based on laboratory analytical data obtained for soil samples collected from the vadose zone at this boring location, tetrachloroethylene was reported to be present at a maximum concentration estimated by the analyzing laboratory to be 63 mg/kg. Based on this result, the reported concentration exceeds the GB leachability criteria (4.2 mg/kg). No other VOCs were reported to be present in soil at concentrations that exceed the GB leachability criteria at this location.

Soil boring MW-05S is located in the Brook Village parking lot. Based on laboratory analytical data obtained for soil samples collected from a depth of 4 – 6 feet below the ground surface at this boring location, tetrachloroethylene was reported to be present at a maximum concentration estimated by the analyzing laboratory to be 300 mg/kg. Based on this result, the reported concentration exceeds the GB leachability criteria (4.2 mg/kg). No other VOCs were reported to be present in soil at this location at concentrations that exceed the GB leachability criteria.

Based on the laboratory analytical results of groundwater samples collected from monitoring well MW-05S, *cis*-1,2-dichloroethylene, trichloroethylene, and tetrachloroethylene were reported to be present in groundwater. A maximum *cis*-1,2-dichloroethylene concentration of 1,600 µg/l was reported for this location. This concentration is below the criteria established for the GB groundwater objective (3,200 µg/l). A maximum trichloroethylene concentration of 2,500 µg/l



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was reported for this location, which exceeds the criteria established for the GB groundwater objective (540 µg/l). For the groundwater samples collected from this monitoring well, tetrachloroethylene was reported to be present at a concentration of 61,000 µg/l. This concentration exceeds the criteria established for the GB groundwater objective (150 µg/l).

Basis for Long-Term Remedy for Source-Area Soils

Based on the results provided in the Report, the VOCs are believed to be stable within the soil because the soils have been in place under the existing asphalt cap for at least several decades. This is not surprising given that asphalt systems historically have been used as low-permeability caps and may provide barriers to infiltration that are as protective, if not more protective, than geomembrane liners. The fact that VOCs are not present in the groundwater at reported concentrations above the GB groundwater objective at the locations discussed above demonstrates that the existing asphalt parking lots are adequate to protect human health and the environment from potential risks associated with constituents that may leach from source-area soils.

In the area of soil boring MW-05S, trichloroethylene and tetrachloroethylene were reported to be present in the soil sample collected from a depth of 4 – 6 feet below the ground surface and believed to be within the zone of water table fluctuation. As presented in the Report, the average thickness of the vadose zone at the site is approximately five feet. The Report suggests that the presence of trichloroethylene and tetrachloroethylene at this location appears to result from a subsurface release, or lateral migration from a nearby surface source. In this area, as well as in the other source-areas, the impacts to soil are localized and not laterally extensive.

With regard to groundwater, the Report also notes the following:

- Concentrations of VOCs are below the GB groundwater objectives except for trichloroethylene in the sample collected at one location (MW-05S) and tetrachloroethylene in the samples collected at monitoring wells MW-05S, MW-14M, and MW-13D.
- The extent of trichloroethylene and tetrachloroethylene dissolved in groundwater at concentrations that exceed the GB groundwater objectives is limited at the site.
- The VOC concentrations have generally decreased or remained consistent over time.
- The VOCs are not adversely impacting surface water and sediment quality at the site.

In summary, tetrachloroethylene reportedly is present at one location, CMS-060, within the area of the constructed caps at concentrations that reportedly exceed the GB leachability criteria. Tetrachloroethylene and other VOCs are reportedly present in other source-area soils localized under the existing asphalt parking lots at concentrations that reportedly exceed the GB leachability criteria. These constituents are not migrating downward through the vadose zone and are not leaching to groundwater. In the area of soil boring MW-05S, the reported presence of trichloroethylene and tetrachloroethylene appears to be the result of a subsurface release, or



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lateral migration from a nearby surface source. At the site, the VOCs reported to be present in groundwater at concentrations that exceed the GB groundwater objectives are limited to trichloroethylene (only at monitoring well MW-05S) and tetrachloroethylene. The extent of the dissolved-phase plume at the site is limited.

Recommendation

In accordance with the RIDEM *Rules and Regulations for Groundwater Quality* (RIDEM Regulation 12-100-006), groundwater classified GB are those groundwater resources not suitable for public or private drinking water use. The GB groundwater designation for the site essentially establishes an incomplete human health exposure pathway. Thus, there is no adverse impact on human health from the potential leaching of constituents through source-area soils. Because VOCs are not adversely impacting surface water and sediment quality at the site, there is no potential risk to the environment from the potential leaching of constituents through source-area soils. The concern regarding purported effects of cosolvency or enhanced solubility as a result of the reported co-occurrence of VOCs and 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) at monitoring well MW-05S was addressed in AMEC's letters dated June 8 and August 15, 2007. Therefore, the constructed caps and existing asphalt cap are protective of human health and the environment, and the cap enhancements under consideration by EPA are unnecessary.

As suggested, we have reviewed the Battelle document entitled, *Final Technical Memorandum – Approach for Developing a Long-term Remedy for Source-area Soils* (July 2004) (Memorandum). Battelle prepared the Memorandum to evaluate source-area soil and groundwater data relative to applicable regulatory criteria, identify contaminant transport and exposure pathways, and to recommend an approach for developing a long-term remedy to address the transport and exposure pathways. According to Battelle, the caps were constructed to minimize human exposure to contaminated soils and to prevent soil erosion and transport. Based on the evaluation presented in the Memorandum, Battelle recommended that the long-term remedial approach for the source-area soils should focus on preventing direct exposure to and erosion of contaminated soils. Battelle also recommended that because there is little evidence that leaching of contaminants from soil to groundwater is occurring, additional measures to prevent leaching should not be necessary, provided that the paved and capped surfaces are maintained.

Accordingly, an alternative for monitoring and maintenance of the existing caps should be included in the feasibility study evaluation. Moreover, it is clear that, based on the constituent concentrations in soil and groundwater in the source-area, monitoring and maintenance to ensure the protectiveness and integrity of the existing caps and pavement at the site is the most appropriate long-term remedy for the source-area soils. Therefore, EPA is requested to reconsider the need to evaluate cap enhancements for the source-area soils. As presented in the June 8 and July 18, 2007 letters submitted on Emhart's behalf, the caps constructed over the



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source-area soils are protective of human health and the environment, and upgrades to the existing caps and parking lots or conversion of the existing caps to RCRA caps is unwarranted.

Sincerely,

LOUREIRO ENGINEERING ASSOCIATES, INC.

David N. Scotti, P.G.
Project Manager

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