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TO: David Jadhon, USACE
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**Subject: F-22 Soil Vapor Extraction Treatment System Installation
After-Action Letter Report**

Dear Mr. Aide and Mr. Jadhon,

This letter report presents the field activities and preliminary findings for installation of the soil vapor extraction (SVE) system, soil excavation and ventilated stockpile construction activities conducted between 14 June 2011 and 19 August 2011 in support of the F-22 Weapons Release Shop project. Fieldwork was performed at two distinct locations, the SVE Excavation Location (Building 17720) and the Ventilated Stockpile Location (Old Landfill 007).

Activities were conducted in accordance with the *2011 Soil Vapor Extraction System Design and Construction Work Plan Addendum*.

SVE System Installation and Soil Excavation

Construction activities included advancing borings for the installation of vapor monitoring points and vapor extraction wells, installation of a piping network to connect vapor extraction wells to a blower system, and excavation of soil contaminated with chlorinated solvents and diesel-range organics (DRO). Site layout and the SVE system location are shown on Figure 1.

Borings included nine vapor extraction wells and three vapor monitoring point clusters. Vapor monitoring point clusters each consisted of three screened intervals to develop a vertical profile of soil gas concentrations for contaminants of concern. Well installation and vapor monitoring point construction details are provided in Tables 1 and 2. All borings were drilled via the down-hole hammer method, which penetrated the soil and cobbles to the desired depths.

SVE header piping consists of 2-inch and 3-inch high-density polyethylene (HDPE) pipe with welded joints. Trenching was completed concurrently with the main excavation. Piping was surrounded on the top and sides with 2-inch rigid foam insulation and capped with 3 inches of concrete. A break in the concrete cap was left across the area where piping crosses the proposed building foundation and will be removed during follow on construction activities. Heat trace was not used in the SVE headers, however, locate wires were installed.

Table 1
Vapor Extraction Well Installation Details

Well Number	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	SVE Piping Diameter (inches)
VW-1	3.5	29.5	2
VW-2	5.0	20.0	2
VW-3	4.75	42.25	3
VW-4	4.5	40.5	3
VW-5	5.25	41.25	2
VW-6	10.5	42.25	3
VW-7	3.75	59.75	3
VW-8	4.5	50.5	3
VW-9	5.25	31.25	3

Note:

All depths are referenced to the ground surface prior to excavation and are approximated to the nearest 0.25 feet.

Below ground surface (bgs)

Table 2
Vapor Monitoring Point Clusters

Screened Intervals	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)
Upper	6.0	7.0
Middle	25.5	26.5
Lower	49.0	50.0

Note:

All depths are referenced to the ground surface prior to excavation and are approximated to the nearest 0.25 feet.

Depths are typical for each monitoring point location.

A total volume of 22,000 CY of trichloroethene (TCE) and tetrachloroethene (PCE)-contaminated soil, above ADEC migration to groundwater cleanup criteria, was removed from the proposed building construction footprint followed the installation of borings and wells. The excavation extended to a depth of 3 to 15 feet below the pre-existing ground surface (bgs).

Areas were excavated to the following depths:

- 3 feet bgs where pavement upgrades are proposed;
- 11 feet bgs where building foundations are proposed;
- 3 to 5 feet bgs where DRO contamination was present; and

- 15 feet bgs where a conflicting fire hydrant tied in to the existing 18-inch asbestos-concrete water main.

In general, excavations were sloped in accordance with EM-385 and Occupational Safety and Health Administration (OSHA) regulations where access for construction personnel was required. A caisson was used to shore up the excavation during removal of the fire hydrant valve.

A pulverized asphalt layer was encountered at 2 to 3 feet bgs during excavation of the area of surface/near-surface detections of DRO, residual-range organics (RRO), and polycyclic aromatic hydrocarbons (PAH) found during site characterization in 2010. This discovery corroborated the Engineering Evaluation/Cost Analysis (EE/CA) report, which inferred that the shallow detections of DRO, RRO and PAHs were consistent with asphalt rather than a fuel release. The asphalt layer measured approximately 2 inches to 6 inches thick and extended over an area of at least 500 square feet.

Most of the asphaltic-concrete was removed during excavation associated with the treatment system installation, but the layer extends to the north and west beyond the excavation and the extent was not delineated. The remaining asphaltic concrete should not pose a significant risk of migration to groundwater as asphaltic concrete exhibits a low-mobility in the environment. A picture of the asphaltic concrete layer is shown below.



Asphalt layer contributing to DRO contamination found along the north end of the excavation at Building 17720.

Buried asphaltic concrete is not considered to be an environmental concern on JBER and was left in place. PAHs, DRO, and RRO were identified above ADEC action limits during the 2010 drilling effort in 12 of the 15 surface samples. The occurrence of PAHs, RRO, and DRO in the top 4 feet of fill material may be attributed to the construction-driven migration of asphalt from the asphalt covered surfaces that surround the sample collection area. The PAH exceedances were all identified during collection of the first soil core. Neither PAHs, RRO, nor DRO were identified in the sample collected from the next depth interval, confirming that contamination was limited to surface fill and construction material.

Ventilated Stockpile

The ventilated stockpile was constructed within the LF007 landfill area, south of an ongoing University of Fairbanks research plot (Figure 2). The stockpile has a footprint of approximately 90 feet by 120 feet with the long axis oriented north-south. Brush was cleared from a strip along the eastern side of the area to facilitate stockpile construction.

The stockpile was constructed on a 2-inch sand base with a 24-inch-tall berm around the perimeter. A 60-mil HDPE liner was installed over 6-ounce non-woven geotextile felt to form the base of the stockpile. A layer of 6-ounce non-woven geotextile felt followed by 4 inches of sand was placed on top of the 60-mil HDPE liner to protect the liner material. The stockpile base was constructed to drain toward a low point near the southwest corner of the stockpile. A sump was installed to remove water following construction. Slotted 2-inch polyvinyl chloride (PVC) pipes were placed on 12-foot centers across the bottom of the stockpile. Each pipe was bedded with clean pea gravel and covered with a layer of 6-ounce non-woven geotextile felt. The slotted PVC piping was connected via a 4-inch HDPE header to a 1.5 horse power vacuum blower in a skid-mounted blower building on the west side of the stockpile.

Soil containing TCE and PCE was trucked in covered end-dumps from the SVE excavation location to the stockpile. Soil was sloped up from the inside edge of the berm at a 1:1 slope. Maximum height of the stockpile reached approximately 8 feet above the prepared base.

Nine perforated 4-inch pipes were placed across the top of the stockpile at approximately 12 foot intervals, and the stockpile was covered with a 20-mil HDPE liner. The liner was anchored by clean soil placed on its perimeter and a netting cover with sandbags. A temporary chain-link fence encircles the stockpile and blower building. Final layout of the stockpile location is shown on Figure 2.

Final Site Conditions

The topography of the SVE site following excavation and after backfilling and compaction was documented in several figures by a licensed surveyor. These figures were electronically distributed to project stakeholders on 29 August 2011. The surveyor also surveyed the ventilated stockpile at the end of construction. These figures will be included in a follow up Technical Memorandum Report.

Air Monitoring and Blower Systems Operations

During excavation, stockpile construction, and SVE system installation, the breathing zone was monitored for VOCs using a photoionization detector (PID) and for TCE and PCE using, COC specific, Draeger Tubes. The highest PID screening results (2.8 parts per million [ppm]) were identified during installation of vapor monitoring point VMP3; during other activities, VOC levels were less than 1 ppm. PCE and TCE monitoring was below the Draeger tube detection range of 2 to 300 ppm for PCE and 2 to 250 ppm for TCE.

It is recommended that air monitoring be performed as part of future invasive site activities. Concentrations of VOCs in air will vary over time and may become mobile during operation of the SVE system. Future invasive site activities may encounter concentrations of VOCs within worker breathing zones. The ventilated stockpile blower system began continuous operation on 17 August 2011, and the SVE blower system followed two days later, on 19 August 2011. These systems discharge untreated vapor to the atmosphere. For the SVE system, the exhaust vent is located 2 feet above the peak of the adjacent building (17720), meeting the general building codes for roof-level vents.

Potential emission rates for the SVE system and ventilated stockpile were presented in the Work Plan Addendum, based on the highest soil gas concentrations measured during site investigations in 2010. Actual emission rates will be calculated when the results from system monitoring are available. The potential combined emission rate of 0.0009 pounds per year is far less than the permitting threshold of 2 tons per year (Alaska Administrative Code, Chapter 18, Section 50.326 [18 AAC 50.326]), indicating that SVE and ventilated stockpile blower emissions are exempt from permitting.

Soil Sampling

Soil samples were collected for pre-construction screening, waste characterization, and worker exposure purposes. Samples were analyzed samples for VOCs, DRO, or Toxic Characteristic Leaching Procedure (TCLP), as appropriate. TCLP soil sample analysis confirmed the soil was nonhazardous.

Waste characterization and worker exposure soil sampling analytical results are inline with pre-excavation site characterization samples collected during the 2010 site characterization.

Soil Gas Sampling

Soil gas samples are being collected at the startup of blowers at both the SVE system and ventilated stockpile locations. Over the first 90 days, most of the mass removal of TCE and PCE is expected to occur, the SVE system will be sampled 14 times and the stockpile system will be sampled eight times. Intervals between samples start at 1 day for the SVE system (3 days for the stockpile system) and lengthen progressively to as much as 21 days. Stockpile samples have been/will be collected from a port in the exhaust stack and thus represent a composite of the ventilated soil gas. Most SVE samples will also be composites, collected from a port just upstream of the knockout tank. Additionally, each of nine vacuum wells has been/will be sampled individually before startup and at 14, 47, and 90 days of operation, and the eleven vacuum monitoring points have been/will be sampled individually before startup and at 90 days. Early analytical results have been received but not validated; they will be presented in subsequent reports.

Stockpile Dewatering

Leachate from the stockpile collects at a low point constructed into the stockpile base liner near the southwest corner of the stockpile. Leachate is removed from the sump daily. Approximately 5 gallons of water is removed per pumping event and the pile is pumped up to three times each day. Water accumulated in two 55-gallon drums on site and then moved to a 500-gallon poly tank located at the JBER contractor's yard. Prior to winterization of the contractor's yard, leachate accumulated at the contractors yard will be sampled in accordance with the JBER Contractor's Guide and, if the leachate meets the treatment criteria, treated using the JBER GAC system.

Waste Management and Decontamination

Heavy equipment was decontaminated using dry decontamination procedures before demobilization from the site. Soil removed from equipment was placed in the stockpile and four Super Sacks® of used personal protective equipment (e.g., gloves, earplugs), investigation-derived waste (e.g., sampling spoons, Ziploc® freezer bags, temporary stockpile cover) were transported offsite for disposal. This waste was determined to be nonhazardous; waste manifests were completed to meet the regulatory requirements of 40 CFR 172 b,c,g.

Please let me know if you have any questions or require additional information.

Sincerely,

Jillian Ladegard
Jacobs Engineering
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References

U.S. Army Corps of Engineers (USACE), Alaska District, 2011. *Soil Vapor Extraction System Design and Construction Work Plan Addendum*. JBER-Elmendorf, Alaska. Prepared by Jacobs Engineering Group Inc.

USACE (U.S. Army Corps of Engineers). 2011 (May) *F-22 Weapons Release Shop Engineering Evaluation and Cost Analysis*, JBER-Elmendorf, Alaska.

Figures

Figure 1 SVE Layout

Figure 2 Stockpile Layout

FIGURES

LEGEND

- (X) VACUUM WELL
- (Δ) VACUUM MONITORING POINT (TRI-LEVEL IN BOREHOLE)
- (○) VACUUM MONITORING POINT (SINGLE LEVEL IN PIPING TRENCH)
- TRENCH FOR SYSTEM PIPING**
- DRO EXCAVATION AREA**
- * SO-WE-68 POST-EXCAVATION SOIL SAMPLE
- POSSIBLE EXTENT OF BURIED ASPHALT LAYER (DASHED WHERE ESTIMATED)



