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TECHNICAL MEMORANDUM

To: Mr. John Halverson, ADEC Contaminated Sites Program

From: Ms. Molly Welker, Bristol Project Manager

Date: November 20, 2009

Re: Request for Site 7 Landfill Closure at Northeast Cape, St. Lawrence Island, Alaska

Background

In 2009, Bristol Environmental Remediation Services (Bristol) was contracted by the U.S. Army Corps of Engineers, Alaska District (USACE), to conduct remediation activities at the Northeast Cape St. Lawrence Island former military installation under the Formerly Used Defense Site Program. Included in the Scope of Work was the removal of containerized waste and recapping of the Site 7 Cargo Beach Road Landfill (Site 7 Landfill). The final remedy for Site 7 also includes final closure, deed notation, implementation of land use controls, and visual monitoring.

The Site 7 Landfill is at the Northeast Cape former military facilities on St. Lawrence Island (Figure 1). St. Lawrence Island is located in the Bering Sea, approximately 135 air miles southwest of Nome, Alaska, at 63 degrees (°) 19 minutes (') north latitude and 168° 58' west longitude. The legal description of Site 7 Landfill is Township 25 South, Range 54 West, Section 15, North ½ South ½ of the Kateel River Meridian. The site is a part of a former military defense site that was occupied from the 1950s to the early 1970s. The facility functioned as a surveillance station, providing radar coverage for the Alaskan Air Command, and was later used for the North American Air Defense Command. It was part of an Alaska-wide early warning system constructed to reduce potential vulnerability to bomber attack across the polar region.

The Site 7 Landfill is an unpermitted landfill that was used as the installation's main solid waste disposal area from 1965, until closure in 1974. The dump contains a wide variety of non-hazardous materials. The landfill appears to have been created by dumping debris off the sides of a topographic mound. The debris was apparently covered by grading soil out from the top of the mound. The landfill covers approximately 500,000 square feet. The remedy for the Site 7 Landfill included the following major components:

- Exposing underlying drums/debris by digging through the areas with mapped metallic anomalies (an estimated 150,000 square feet) to determine if drums were present;
- Removal of 182 55-gallon drums with liquid or sludge contents, characterization of the waste contents, and proper disposal;

- Removal of 100 tons of incidental contaminated soils associated with identified drums to the extent severely stained soils were evident, characterization of the soils for disposal, and transporting off-site for proper disposal;
- Capping of entire landfill with 2 feet of granular borrow material obtained from a local borrow area;
- Stabilizing the site by grading it to encourage storm water run-off;
- Fertilizing and revegetating the site with an approved grass mixture from the Alaska Plant Materials Center to prevent erosion;
- Surveying the completed landfill boundary;
- Deed notation to implement land use controls to limit groundwater use and preventing construction of buildings on top of the landfill; and
- Performing visual monitoring of the capped area for settlement and erosion over a period of five years, with additional periodic reviews as necessary.

Test Pit, Trenching, and Excavation Activities

In 2007, a geophysical survey was conducted at the Site 7 Landfill by R&M Consultants, Inc., for the USACE. Areas within the landfill that displayed high levels of magnetic activity were examined by Bristol for the presence of drums. Bristol initially completed 11 test pits and/or trenches in these magnetic anomaly areas (see Figure 3 and Photograph 1). After the initial test pits were completed, all of the magnetic anomalies were investigated, solid wastes were turned over, and if any drums were filled with liquid, they were removed. Some anomalies proved to be small, isolated metal debris and this debris was not moved. During the excavation, Bristol encountered over 1,000 empty drums that were crushed and placed back in the landfill. The total area, over 150,000 square feet, that was eventually excavated by Bristol in 2009 is shown in Figure 4.

Photograph 1. A 100-square-foot by 4-foot-deep investigation trench in area of metallic anomalies.

Drum Removal

Drum removal at the Site 7 Landfill occurred between July 12, 2009, and August 3, 2009. Bristol recovered, drained, cleaned, and crushed a total of 182 drums. Fifty of the 55-gallon drums were disposed of offsite. The other 132 drums were placed back in the landfill after they were drained, cleaned, and crushed.

Excavation was performed using a Hitachi 120 excavator (Photograph 2). An environmental scientist and laborer were on-site with the excavator operator, as well as a Quality Assurance Representative from the Corps of Engineers. The environmental scientist and laborer identified the metallic anomaly areas, monitored the excavation progress for drums and other waste streams, and completed waste characterization activities at the site. The USACE Quality Assurance Representative was also present during the entire excavation task.

The excavation areas were chosen based on the metallic anomalies and the information yielded from test pits and trenching. Surface material was excavated and staged along the section of landfill being worked on. Debris was moved and piled until a drum was found. Upon discovery, the drum was checked with the aid of a drum thief. Drums found to have retrievable petroleum product, or residue determined to not be water, were moved to the Hazardous Waste Accumulation Point (HWAP) or were pumped in place into empty barrels and moved to the HWAP (Photograph 3).

Photograph 2. Excavation of soil and drums from the Site 7 Landfill.

Photograph 3. Field crew pumping liquid out of a corroded drum in the landfill.

Oil found in drums was drained and put in new containers for eventual petroleum recycling. Fifty drums were shipped off-island for disposal, and the rest of the drums were cleaned and returned to the landfill prior to capping. Drums that were extremely corroded or crushed were thoroughly cleaned on the outside and filled with Oil-Dri ® absorbent, before being returned to the landfill (Photograph 4).

Photograph 4. Crushed drum that was cleaned, coated with Oil-Dri ® absorbent, and returned to landfill.

During the drum removal task 2,150 gallons of oily sludge, oil, and oily water were properly contained and shipped off site for disposal.

Removal of Additional Waste Streams

During the course of excavation, other wastes were encountered and subsequently removed from the landfill. The three additional waste streams were polychlorinated-biphenyl-contaminated light ballasts, lead batteries, and antifreeze. All items were properly packaged, labeled, and manifested for shipment to off-site waste management facilities.

Several broken batteries and a few intact batteries were discovered and set aside. The batteries were brought to the HWAP. The broken batteries were placed in large plastic totes, and labeled and manifested for disposal. The intact batteries were placed in open-top drums, and labeled and manifested for recycling. Over 4,400 pounds of intact and broken batteries were removed and shipped off-island for proper disposal or recycling. One drum full of light ballasts was shipped offsite for proper disposal.

One drum containing a small amount of antifreeze was discovered. The antifreeze was transferred to a new drum and sampled. The antifreeze was then labeled and manifested for proper disposal to an off-site waste management facility.

Stained Soil Removal

During the course of drum removal, damaged drums were encountered. The condition of some of the drums was such that, occasionally, product leaked onto the soil; that soil was excavated and removed. Oil-stained soil was also found in areas where drums were absent, and over 100 tons of petroleum, oil, and lubricants (POL)-contaminated soil were removed, placed in eight 20-foot containers, and manifested for off-island disposal.

Landfill Cap

Material hauling for the landfill cap began July 8, 2009, using two 40-ton rock trucks. The fill material was hauled from a formerly used borrow pit just south of the Main Operations Complex. Material was initially stockpiled at the landfill in areas that did not coincide with magnetic anomalies during the excavation and drum-removal phase. Capping activities began on July 28, 2009, and proceeded until August 14, 2009.

Bristol placed each section of fill material in a series of four lifts to a minimum thickness of 24 inches above the trash and debris. A lift was spread and repeatedly track-walked with the equipment prior to laying each subsequent lift (Photograph 5). Work progressed section by section, until the entire landfill was covered with fill material, tracked-walked, and graded. Appropriate grading was done to ensure minimal erosion of the cap. Grade was set by a dozer operator with oversight from the foreman and site superintendent.

Photograph 5. Laying down and track-walking 6-inch lifts for a minimum of a 24-inch landfill cap.

All miscellaneous debris, the washed and crushed drums that were returned to the landfill, and disturbed soil from the excavation task, were graded prior to the cap being placed. Grade played an important role in determining the thickness of the cap. As stated above, the minimum thickness of material overlying trash and debris was set at 24 inches; however, some of these areas required more material in order to set grade.

Quality control measures taken in the field to ensure appropriate cap thickness consisted of excavating test pits through the capping material to its interface with the debris. The thickness of the material was noted, and fill stakes were placed at all locations that required additional material (Photograph 6).

Photograph 6. Measurement showing a 2-foot-thick cap in a test pit in the landfill.

Professional land surveys were conducted before and after the completion of the Site 7 Landfill cap. The post-landfill cap survey is shown on Figure 5.

Stabilization and Revegetation

In addition to grading to encourage water runoff, seeding and fertilization were done to prevent erosion. Bristol performed final seeding of the landfill cap on August 13, 2009. The landfill cap was spread with native plant seed adapted to the St. Lawrence Island environment in accordance with the manufacturer's instructions. The seed mixture was approved by the Alaska Plant Materials Center and proportioned by weight: 70 percent tufted hairgrass and 30 percent red fescue.

Seed was applied at a uniform rate of one pound per 100 square feet. Fertilizer was applied at a rate of 450 pounds per acre, and had a nitrogen-phosphorus-potassium ratio of 20 percent nitrogen; 20 percent phosphorus; and 10 percent potassium. Bristol did not water seeded areas; however, seeding was completed during days of light precipitation. As of September 11, 2009, grass seed had taken root and was growing on the landfill cap (Photograph 7).

Photograph 7. Germinated grass seed on landfill (September 11, 2009).

Deed Notification

A document will be recorded with the Alaska Department of Natural Resources Recorder's Office in Fairbanks, Alaska. The intent of the document will be to place an institutional control on record to limit groundwater use, and prevent construction of buildings on top of the landfill. The legal description and recording district for the Site 7 Landfill used for indexing purposes at the Recorder's Office will be Cape Nome District: Township 25 South, Range 54 West, Section 15, North ½ South ½ of the Kateel River Meridian.

Request for Closure

Based on the information provided in this memorandum, Bristol formally requests that the Alaska Department of Environmental Conservation Contaminated Sites Program approve the closure of the Site 7 Landfill (Photograph 8). The USACE will visually monitor the capped area for settlement and erosion over the next five years, with additional periodic reviews as necessary.

Photograph 8. View looking north at the capped Site 7 Landfill (August 18, 2009).