NORTHEAST CAPE FORMERLY USED DEFENSE SITE (FUDS) NARRATIVE

INTRODUCTION

The Defense Environmental Restoration Program (DERP) – Formerly Used Defense Sites (FUDS) program is responsible for the cleanup of environmental contamination released during the operation of historic military facilities.

The U.S. Air Force acquired 4,800 acres and constructed an Aircraft Control and Warning Station at Northeast Cape during 1950 and 1951. A White Alice Communications System station was added in 1954. Northeast Cape provided radar coverage and surveillance for the Alaska Air Command, and later for the North American Air Defense Command. Northeast Cape was part of an Alaskan early warning system constructed to reduce vulnerability to bomber attacks over the polar region. All structures, including four large parabolic antennas and numerous fuel tanks have been removed. The runway, improved gravel roads, and some concrete slabs of former structures remain intact.

The land is jointly owned by two Alaska Native Claims Settlement Act (ANCSA) village corporations, Kukulget, Inc. in Savoonga and Sivuqaq, Inc. in Gambell. The current and future land use is traditional subsistence hunting, gathering, and recreation. There are no full time residences at the site, but several permanent cabins are used seasonally for subsistence activities. Drinking water is obtained from surface springs in the mountain upstream of the site. The site is accessible via charter aircraft or boat. Residents from the nearest community, Savoonga, also travel 60 miles overland via all-terrain vehicle to access the site.

Northeast Cape has a cool, moist, subarctic maritime climate, with continental influences during winter when much of the Bering Sea is capped with ice pack. Winds and fog are common, and precipitation occurs approximately 300 days per year. Temperatures average between 34 and 48 degrees Fahrenheit (°F) in the summer and -2°F and 10°F in the winter. Freeze-up normally occurs in October or November, and breakup normally occurs in June. Northeast Cape receives 80 inches of snowfall and 16 inches of precipitation, annually.

Photo 1: Loading the Sam Talaak landing craft barge with 9 cubic yard bulk bags of contaminated soil staged at Cargo Beach. View south towards Kangukhsam Mountain and the Northeast Cape site. (8/2013, R. James)

BACKGROUND

The U.S. Army Corps of Engineers (USACE), Alaska District is responsible for addressing over 532 FUDS properties within Alaska. Alaskan FUDS present unique challenges due to both their complex site conditions and difficult logistics. To successfully investigate and remediate these extremely remote sites, the Alaska District's FUDS Team is continually searching for innovative methods to execute remedial investigations and environmental restoration.

The Alaska District FUDS Program is committed to conducting meaningful government-to-government tribal consultations, effective and transparent communication with local communities and stakeholders, and seeking concurrence from the state regulatory agency.

The Northeast Cape site has a well developed community relations program that includes a Restoration Advisory Board established in 2000, a Technical Assistance for Public Participation (TAPP) advisor since 2001, ongoing tribal government consultations, and interagency collaboration with the Agency for Toxic Substances and Disease Registry (ATSDR) for health consultations.

PROJECT SUMMARY

A Decision Document for the Northeast Cape project was approved in September 2009. The Alaska Department of Environmental Conservation (ADEC) concurred with the selected remedy in December 2009. The contamination at the Northeast Cape site, including PCBs, arsenic, and fuel constituents, posed an imminent and substantial endangerment to human health and the environment.

Photo 2: Over 600 bulk bags are staged at Cargo Beach for transportation offsite via barge. 9 cubic yard bulk bags used to containerize petroleum and PCB-contaminated soil for disposal in the lower 48. View east along the beach. (9/2013, R. Broyles)

The source areas were associated with surface spills, including releases from above ground heating oil or diesel fuel tanks, as well as subsurface leaks or spills from piping at the main complex area, landfills, septic tanks, and scattered drums throughout the facility.

The selected remedy includes 1) excavation and removal of petroleum-contaminated soil from various sites; 2) excavation and removal of PCB-contaminated soil at four sites; 3) excavation and removal of petroleum, metals and PCB-contaminated sediment from one site; 4) monitored natural attenuation of petroleum-contaminated groundwater; and 5) excavation and removal of arsenic-contaminated soil at one site.

ACCOMPLISHMENTS

The Northeast Cape project completed remediation of all PCB and petroleum contaminated soil identified in the approved Decision Document and achieved the remedial action objectives. The 2013-2014 field seasons were noteworthy due to the following accomplishments.

- **Implemented Innovative Sediment Dredging and Treatment Process.** A custom-built suction dredge was used to remove loose sediment from the sensitive wetland drainage. The sediment and water slurry was pumped to a central processing area, where flocculant was added to retain sediment in the dewatering geotextile tubes, and the excess water was treated with granular activated carbon (GAC) and released to the ground surface.
- **Significantly Decreased Mobilization Costs.** Overwintered remote camp and equipment after the 2013 field season, resulting in **$1 million** cost savings. All heavy equipment, remote camp, vehicles, and shipping containers (conexes) remained on site through 2014.
- **Reduced Volume of Soil Transported.** Utilized soil screening plant to segregate large size rocks (greater than 2 inches) from stockpiled contaminated soil. Avoided bagging and shipping oversized material offsite for disposal, reused as excavation backfill.

- **Improved Soil Handling and Transportation Efficiency.** Soil was excavated and stockpiled on a concrete pad processing area. Transferred soil to large capacity bulk bags (9 cubic yards) for transportation and disposal, reducing handling time and waste tracking.
- **On-site Certified Laboratory.** On-site laboratory processed field screening samples for both PCBs and petroleum compounds. Results were available within 24 hours and used to direct additional excavation or collect final soil confirmation samples. During 2014 field season, the mobile laboratory obtained DoD approval and state certification, resulting in decreased wait time to confirm excavations met cleanup levels.
- **Accurately Estimated Volume of Contaminated Soil.** Deployed the Ultra-Violet Optical Screening Tool (UVOST) to completely field screen target area. UVOST accurately models horizontal and vertical extent of subsurface petroleum contamination.
- **Excellent Safety Record. 93,000** man-hours were worked by the entire project team with **zero** lost-time incidents or accidents.

Photo 3: Soil excavation activities at the Main Operations Complex, showing groundwater accumulating in the excavation. View south towards Kangukhsam Mountain. (7/2013, J. Craner)

PROGRAM MANAGEMENT

The Northeast Cape site is one of the highest priority projects overseen by the Alaska Department of Environmental Conservation (ADEC). The Northeast Cape site regularly attracts state and national attention due to stakeholder concerns.

For example, the U.S. EPA conducted an independent review of the project in response to serious health concerns raised by the community and the Alaska Community Action on Toxics (ACAT). The review concluded in February 2013 that the cleanup was consistent with CERCLA regulations and EPA guidance.

The Alaska District coordinated closely with ADEC during implementation of the remedial action. The ADEC has provided oversight during the entire project duration.

The project also involves intense scrutiny from the local community, stakeholders, and other agencies. The team has conducted considerable community outreach, tribal government-to-government consultations, Restoration Advisory Board meetings, and facilitated dialogues.

TECHNICAL MERIT

Over the 2013-2014 field seasons, the remedial action consisted of excavation, transportation, and disposal of over 15,500 tons of petroleum, PCB, and arsenic contaminated soil. The project utilized an innovative and cost-effective approach to planning the petroleum excavation volume and depth, segregating oversized material, field screening, and soil containerization for transport. The past two field seasons represent the final steps of a multi-year remediation effort which involved excavation of an additional 29,000 tons of contaminated soil.

The remedial action also involved removal of 166 cubic yards of contaminated sediment from a sensitive wetland/drainage area. The project utilized an innovative technique for sediment dredging using a custom-made suction dredge, flocculant, geotextile tubes for sediment dewatering, and discharge water treatment with granular activated carbon (GAC).

Accurate Volume Estimates. Based on the results of UVOST plume delineation, the contractor developed detailed petroleum contaminated soil volume estimates. The volume estimates identified the depth of clean overburden and target total depth. The contractor began excavations early in the field season before the groundwater table reached its seasonal peak to maximize source removal.

Significantly Decreased Mobilization Costs. Overwintered remote camp and equipment after the 2013 field season, resulting in **$1 million** cost savings. All heavy equipment, remote camp, vehicles, and shipping containers (conexes) remained on site through 2014. This further extended both field seasons by continuing work into the fall when barge operations typically ceased and beginning field work prior to ice breakup in July.

Reduced Volume of Soil Transported. The petroleum-contaminated soil was excavated and stockpiled on site. Following state guidance, the stockpiled soils were processed using a **rock screen plant** to remove oversized rocks (greater than 2 inch fraction). This significantly reduced the volume (30-50%) of contaminated soil packaged and shipped offsite for disposal. The oversize material was then utilized as backfill in the excavations.

Improved Soil Handling and Transportation Efficiency. Clean overburden was removed from target excavation areas and placed in stockpiles. After verification sampling, the stockpiled soil was used as clean backfill. Screened contaminated soil was transferred into **large capacity bulk bags** (9 CY) which increased project efficiency. Typically, projects utilize 1 or 5 CY bulk bags. Advantages to using large volume bags include decreased soil handling requirements, reduced waste characterization samples, and streamlined waste tracking.

Photo 4: Screen plant operations at soil stockpile management pad. Oversized gravel separated into piles for use as backfill, avoiding offsite transportation and disposal costs. (7/2014, J. Craner)

On-site Laboratory. Two laboratory technicians operated gas chromatography (GC) units and produced results within 24 hours. During the 2014 field season the mobile laboratory was DOD-approved and state-certified for diesel range organics. Confirmation samples from all excavations were analyzed by the mobile laboratory, which increased the productivity of field operations and significantly reduced wait time for sample results by avoiding the logistics of shipping samples from a remote island to a fixed-base laboratory. Turnaround times were reduced from 7 days to 24 hours.

Contaminated sediment removal. The contractor developed an **innovative treatment train** and **dredging process**. A custom-built suction dredge was utilized to remove loose contaminated sediment from a sensitive wetland drainage area. The small dredge footprint resulted in *minimal impacts* to the sensitive wetland, eliminated the need for access roads across the tundra, and prevented excessive erosion from bank undercutting.

A flocculant was injected into the sediment slurry line to facilitate sediment coagulation and settlement. Prior to implementation, a bench scale study was conducted to determine the most effective concentration of flocculant to use in the treatment system and to prove the flocculant didn't interfere with environmental sampling. The sediment-flocculant slurry was then pumped into specially constructed geotextile sediment collection tubes. These tubes contained two geotextile layers, one woven and one non-woven, which retained sediments while allowing water to drain through the pore spaces of the fabrics.

Finally, the large volume of containment water was efficiently processed through two industrial-sized GAC units before discharge to the ground surface. The geotextile tubes were also left in place over the winter to continue dewatering and greatly reduce the weight of sediment for disposal. During active dredging operations, sediment migration controls consisted of a downstream metal sediment trap lined with jute matting.

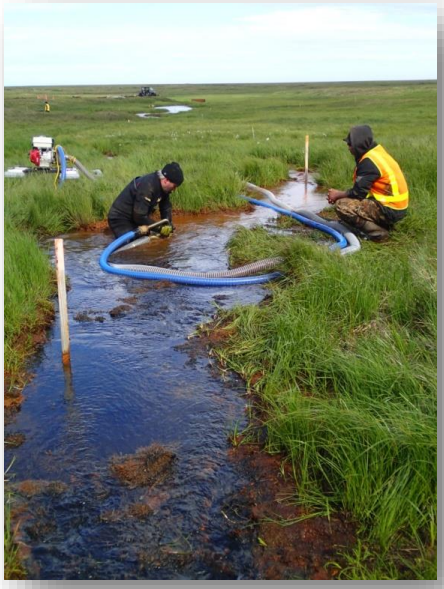

Photo 5: Bristol employees Johnny Willis (left) and Albert Kulowiyi (right), operate the sediment suction dredge (top left) to remove loose sediment from the wetland. Sediment/water slurry was pumped upslope, flocculant added, transferred to geotextile tubes for dewatering, and excess water treated with GAC units before discharge to ground surface. (8/2013, J. Craner)

Site restoration. The remediation activities were effective in protecting, enhancing, and restoring the environment. Soil excavation areas were backfilled with clean soil from a local borrow source, previously removed clean overburden, and oversize rock material segregated during the field activities. Reseeding was successfully completed by October 2014.

Photo 6: Geotubes being filled with sediment/water/ flocculant slurry, slowly dewatering into containment areas. Two large GAC units used as final water treatment step prior to discharging to ground surface. Main Operations Complex in background facing south. (9/2013, J. Craner)

ORIENTATION TO MISSION

The FUDS program has a critical task related to mission. The current FUDS cost-to-complete for Alaska is over $1.9 billion. The actions taken at the Northeast Cape site allowed USACE to significantly reduce future liability at this property. The Alaska District can now focus on other properties that require cleanup.

TRANSFERABILITY

The Alaska District FUDS Program has over 60 other properties with varying amounts of contaminated soil to be addressed in the near future. Because of the extremely high mobilization costs in Alaska, remedial actions must be as efficient as possible to limit cost growth and achieve program objectives in a reasonable timeframe. The lessons learned at Northeast Cape will be used at many other sites to lower remediation costs and increase project effectiveness.

On-site lab certification is a simple, well-defined process and can be used at other remote sites to increase project efficiency, avoid the logistical challenges of shipping samples and delays caused by waiting for results.

Screen plants can be used at other sites to decrease volume of soil shipped offsite by removing oversize materials, thereby dramatically decreasing transportation and disposal costs while still meeting cleanup goals.

The remediation contractor, Bristol Environmental Remediation Services, LLC., proactively hired local laborers and equipment operators on the project. Six Savoonga residents were employed during the project and due to their skills have also been hired for other projects across Alaska. This demonstrates significant investment in the training of local residents and their development to apply skills on other projects

The Alaska District also manages 27 active NALEMP Cooperative Agreements with 19 tribes. Remote locations with both FUDS and NALEMP projects have the opportunity to take advantage of already mobilized equipment, share barge capacity, remote camp costs, and contractor expertise. At Northeast Cape, a concurrent cleanup project by the Native Village of Savoonga saved the NALEMP program between $500K - $1M due to avoided site mobilization costs for heavy equipment, remote camp, field medic, and barge transportation of debris. The NALEMP program conducted debris, containerized waste, and limited soil removal at an adjacent location to reduce hazards at the Native Village of Northeast Cape subsistence cabins.

STAKEHOLDER INTERACTION

Public participation, tribal coordination, and tribal consultations have been an extremely important component of the cleanup process at the Northeast Cape site. A Community Relations Plan was developed for the project and outlines methods used to inform local residents and other interested stakeholders about project activities. A **Restoration Advisory Board (RAB)** was established in June 2000.

Photo 7: Savoonga residents attending a Restoration Advisory Board meeting in December 2012. Attendees include representatives of the Native Village of Savoonga IRA Council, City of Savoonga, Kikulget, Inc, local citizens, state regulator, and USACE representatives (12/2012, L. Geist).

USACE honored it obligation to conduct meaningful government-to-government consultations with federally recognized

tribes throughout the project. Government representatives met with the Native Village of Savoonga IRA council prior to RAB meetings and responded to their numerous concerns.

The Corps of Engineers conducts regular RAB meetings to discuss the status of site cleanup activities with the community. Attendees include representatives of the Native Village of Savoonga IRA Council, City of Savoonga, Kikulget, Inc, local citizens, TAPP advisor, ADEC state regulator, and USACE. RAB meetings are held twice per year and attended by 20-30 local residents. These meetings are held in the afternoon or evenings where maximum public participation can be realized.

Photo 8: Native Village of Savoonga tribal leadership on site visit to Northeast Cape with representatives from ATSDR and the TAPP advisor. From left to right: Jesse Gologergen, Paul Rookuk, Sr., Joe Sarcone (ATSDR), Ron Scrudato (TAPP), Ike Kulowiyi, and Andrew Dudley (ATSDR). (8/2013, L. Geist).

Ongoing community relations activities allowed the local residents to provide feedback and comments on project activities, and encouraged everyone to become involved in the project. The opportunity for public review and comment of project documents has been made available throughout all phases of the project. The RAB also receives support from a TAPP advisor. The TAPP advisor comments on USACE workplans, reports and participates at RAB meetings.

In response to community concerns, the U.S. EPA facilitated a teleconference in November 2012 to discuss St. Lawrence Island environmental health concerns with multiple agencies and stakeholders including tribal, village, and native corporation leaders from Savoonga, ACAT, ADEC, Alaska Native Tribal Health Consortium, Alaska Division of Public Health, ATSDR, Center for Medicare and Medicaid Services Health and Human Services, Norton Sound Health Corporation and USACE. The discussion provided a road map for addressing environmental health concerns and care of the community.

As a result of the meeting, an environmental health committee chaired by ATSDR was developed to share data and hold periodic teleconference discussions. Thus, community health concerns are being addressed by public health officials in a collaborative approach, by the appropriate agency.