STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
CONTAMINATED SITES PROGRAM

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Re: Cleanup Complete Determination
Former Cube Cove Logging Camp and LTF
Database ID Number 1998110121901

The Alaska Department of Environmental Conservation, Contaminated Sites Program (ADEC) reviewed site assessment data presented in the February 2006 and March 2006 (revised September 28, 2006) final cleanup reports on the former Cube Cove logging camp and log transfer facility (LTF) located on Admiralty Island in southeast Alaska. Based on information provided to date, ADEC has determined that petroleum contamination remains on site above the approved cleanup levels but poses no unacceptable risks to human health or the environment. As a result of this determination no further cleanup action is required at the site.

Site Background
The former Cube Cove logging camp and LTF is located along the northwest shore of Admiralty Island, about 30 miles southwest of Juneau, Alaska. Silver Bay Logging Inc. established and operated the camp, the LTF and its associated infrastructure on behalf of Atikon Forest Products from 1984 until 2002 when all buildings and structures were demobilized and removed from the area.

Breaks in bunkhouse heating fuel lines were discovered in September 1997, resulting in the release of an undetermined amount of diesel fuel in the bunkhouse area of the camp. The fuel lines were repaired, a small amount of contaminated soil removed and three oil-water separators installed down-gradient of the bunkhouses. Atikon Forest Products contracted Southeast Management Services (SMS) to conduct an environmental evaluation of all camp facilities in the spring of 1998. SMS submitted the Environmental Evaluation (Site Characterization Report) and the Proposed

Cleanup Plan for the site in August 1998. SMS revised the plan based on ADEC comments and re-submitted it in October 1998. The plan was approved by ADEC in November 1998.

Soil and water samples analyzed in conjunction with the site characterization identified widespread petroleum contamination from long-term logging related activities throughout various areas of the camp. Site specific parameters for these areas of concern (AOCs) were evaluated and received additional laboratory analysis for development of alternative cleanup levels under Method 3 of the site cleanup rules (18 AAC 75.325-390). The primary contaminants of concern were identified as Diesel Range Organics (DRO), Residual Range Organics (RRO) and benzene released to surface and sub-surface soil.

Cleanup Levels

Cleanup levels for petroleum contaminated soil are established in 18 AAC 75.341, Method 2, Tables B1 and B2 (over 40-inch precipitation zone) for two direct human health exposure scenarios: direct contact/incidental ingestion of contaminated soil, and inhalation of volatile contaminants in outdoor air.

Migration to groundwater cleanup levels in Tables B1 and B2 correspond to concentrations that may safely remain in soil without migrating to groundwater. Migration to groundwater cleanup levels are typically the most conservative (lowest) of the three levels found in Tables B1 and B2. The applicable migration to groundwater cleanup level for DRO, the primary contaminant at the site, is 230 mg/kg.

Alternative migration to groundwater soil cleanup levels may be proposed by a responsible person to account for site-specific factors that may allow higher contaminant concentrations to remain safely in place. ADEC approved site-specific Method 3 DRO cleanup levels under 18 AAC 75.340 for the following areas within the camp:

Excavation Site	Method 3 DRO Cleanup Levels (mg/kg)
Old Camp Generator Area	3,600
Heliport	8,250
Upland Fuel Distribution Depot	4,300
Bunkhouse and Cookhouse Area	8,250
Electric Generator and Fuel Tank	8,250
Equipment Repair Building Area	1,900
Main Fuel Depot	7,300

Applicable groundwater cleanup levels are found at 18 AAC 75.345, Table C. Contaminant concentrations in surface water must not exceed Alaska Water Quality Standards (18 AAC 70).

Summary of Cleanup Activities

The cleanup of the Cube Cove camp occurred in three phases. Excavation prior to camp closure began in 1997 and continued intermittently through mid-2001. Seven areas of the camp were excavated during this time, resulting in the stockpiling of 1,923 – 2,523 cubic yards (cy) of petroleum-contaminated soil, as summarized in the following table.

1997-2001 Cleanup	
Bunkhouse oil spill (1997)	7 cy
Oil drum storage area (1998)	10 cy
Eight-mile pit #11 (1998)	3 cy
Kathleen Cr. rock crusher (1999)	100 cy
Old camp generator (2001)	1,200 – 1,600 cy
Old camp maintenance bldg. (2001)	100 – 150 cy
Heliport (2001)	500 – 650 cy

Excavation removed 7,010 – 8,035 cy of soil in the following additional nine locations during and after camp demobilization in 2002.

2002 Cleanup	
Upland fuel distribution facility	650 - 755 cy
Chainsaw repair building	20 cy
Bunkhouse	3,900 - 4,565 cy
Cookhouse	830 - 965 cy
Electric generator and tank	190 - 225 cy
Equip. repair shop/drum storage area	1,010 - 1,175 cy
Incinerator, equip. parking and storage area	25 - 30 cy
Residential trailers	85 – 100 cy
Main fuel depot	130 – 200 cy

Silver Bay Logging Inc. contracted with DMC Technologies (DMC) in 2004 to complete the remaining excavations and bioremediate all stockpiled contaminated soil. DMC's workplan was finalized and approved in May 2004 and site cleanup was completed in September 2004. During this cleanup effort, 1,946 cy of additional soil were removed and 10,876 – 12,501 cy from all cleanup events were bioremediated on-site.

2004 Cleanup	
8 Residential trailers and schoolhouse	151 cy
Lower portion of main fuel depot	1,746 cy
LTF log bundle crane	49 cy

Soil Treatment Results

The bioremediation system used by DMC was a natural blend of non-genetically engineered bacterial strains cultured from petroleum contaminated environments. This microbe mix was applied to the stockpiled soil along with a specially formulated fertilizer base that would not quickly leach away with heavy rain and would help stimulate microbial activity. Water soluble phosphate and urea were also mixed with the nutrient base to accelerate the treatment process.

Approximately 6,000 cy of contaminated soil in the north stockpile and 4,000 cy in the south stockpile were spread to depths of 18"-24" in early July 2004. During July 5-11, 2004, the microbe mixture was sprayed across the treatment cells, fertilizer and urea were added, and thorough mixing was accomplished with a backhoe and a bulldozer equipped with a modified rake.

Following 21 days of treatment, 60 confirmation samples and six duplicates were collected from the north cell and analyzed for DRO and RRO. The cell was divided into grids and a random number generator utilized to determine which grids would be sampled. A stainless steel coring tool was used to collect soil from undisclosed depths within the cell. The data was statistically analyzed to define the statistical mean after transformation at the 95 percent upper confidence limit (UCL). Based on this analysis, the north cell met the ADEC Method 2 limit of 230 mg/kg DRO with a 95 percent UCL of 136 mg/kg, and the 8,300 mg/kg RRO limit with a 95 percent UCL of 286 mg/kg.

Forty samples and four duplicates were collected from the south cell following 37 days of treatment. The 95 percent UCL's for DRO and RRO were calculated to be 84 mg/kg and 118 mg/kg, respectively, which met the Method 2 cleanup levels.

Residual Contamination Above Cleanup Levels

All Cube Cove cleanup areas met the ADEC Method 2 cleanup criteria for RRO and BETX compounds. The cleanup areas also met their applicable Method 2 or site-specific Method 3 cleanup criteria for DRO, except for five areas where de minimus amounts of residual contamination (approximately 10 cy or less at each area) were not practical to remove or could not be accessed by heavy equipment. The five areas are the Drum Storage, Eight Mile Pit, Old Camp Generator, Parking/Storage, and Equipment Repair Building.

Shallow groundwater was encountered at several sites during the investigation and cleanup but was not comprehensively evaluated. Because groundwater was not sampled at most sites, residual groundwater contamination in the former source areas may be present above cleanup levels but is expected to attenuate naturally now that the majority of soil contamination has been removed.

For each cleanup site where groundwater or surface water was encountered, a downslope water containment sump with submerged-discharge was installed to avoid adverse surface water quality impacts during the cleanup. Surface water was temporarily affected but water quality samples collected from sump discharges after completion of cleanup activities were below ADEC cleanup and water quality criteria. Furthermore, no petroleum sheens were observed on any surface water bodies within the camp post-cleanup.

Exposure Pathway Evaluation

Potential human health exposure pathways evaluated at this site relative to this decision include inhalation of ambient air, direct contact and incidental ingestion of soil particles, groundwater ingestion, and surface water ingestion. Because soil contamination remaining on-site is located below ground surface and does not exceed 18 AAC 75 health based levels, the inhalation and direct contact/ingestion pathways are considered incomplete, meaning there is no unacceptable risk posed to human health.

Though not a direct human health exposure pathway, ADEC also evaluated the potential for contaminant migration through soil to nearby ground and surface water. As stated earlier, DRO concentrations in the cleanup areas either met the default Method 2 DRO cleanup criterion in 18 AAC 75.341, Table B2 or site-specific Method 3 cleanup levels for migration to groundwater, except for five areas where de minimus soil volumes were not removed.

Groundwater at a site is considered to be a potential drinking water source unless a responsible person demonstrates or the department determines otherwise (18 AAC 75.350). ADEC has determined that shallow groundwater underlying the Cube Cove cleanup areas:

- is not currently used for a private or public drinking water source, is not within the zone of contribution of an active private or public drinking water system, and is not within a recharge area for a private or public drinking water well, a wellhead protection area, or a sole source aquifer;
- is not a reasonably expected future source of drinking water; and
- will not be transported to any groundwater source that is a current or reasonably expected potential future source of drinking water.

Surface water and adjacent soil were impacted by petroleum contamination at several areas within the former camp. Cleanup actions removed the impacted soils to Method 2 or Method 3 levels but small amounts of residual contamination above cleanup criteria remain on-site.

It is unlikely that residual contamination could affect long-term groundwater- or surface water quality. However, as a precautionary measure a notice of residual contamination has been recorded with the State Recorder's Office by Atikon Forest Products and the landowner, Shee Atika, Inc. The notice informs future landowners that surface water or groundwater proposed as a drinking water source and located within a cleanup area should be tested for petroleum constituents.

Cumulative Human Health Risks

Under 18 AAC 75.325 (g), ADEC requires that cumulative risk be evaluated at a site whenever Method 2 or Method 3 cleanup levels are established for soil and when cleanup levels under Table C are established for groundwater. A chemical that is detected at one-tenth or more of the Table B1 inhalation or ingestion values set out in 18 AAC 75.341(c), the Table B2 values set out in 18 AAC 75.341(d) or the Table C values set out in 18 AAC 75.345 must be included when calculating cumulative risk under 18 AAC 75.325(g). Petroleum mixtures are not included in cumulative risk calculations.

Polynuclear aromatic hydrocarbons (PAH) were evaluated for at least one soil sample at all nine of the 2002-2004 cleanup sites, during either the 1998 site evaluation or subsequent cleanup activity. No chemicals required to be examined for cumulative risk calculations were detected at one-tenth or more of the ingestion or inhalation cleanup levels. Based on this evaluation, ADEC has determined that no cumulative risk issues exist at the Cube Cove site.

Ecological Risks
Contaminant migration is not expected. Impacts to streams, wetlands or other sensitive aquatic environments from residual contaminants are unlikely because the majority of contamination from all source areas has been removed. Moreover, petroleum sheen, a visual indicator of contaminant migration, was not observed in the upper or lower intertidal areas throughout the site during a summer 2007 site visit. This includes the area directly beneath the lower fuel depot, a source area adjacent to the intertidal zone.

ADEC Decision
While de minimus volumes of DRO contamination above the Method 2 and Method 3 cleanup criteria remain in soil in several areas at the former Cube Cove logging camp and LTF, remaining soil contaminant concentrations were evaluated for potential exposure pathways and were determined by ADEC to pose no unacceptable risk to human health or the environment.

Atikon Forest Products and the landowner, Shee Atika, Inc., have recorded a notice with the State Recorder's Office in Juneau that describes the Cube Cove areas where oil-contaminated soil cleanup occurred. It states that as a precautionary measure, any future groundwater or surface water sources within the cleanup areas used for drinking water should be first tested to confirm that ADEC drinking water standards are met. The notice also identifies the following precautions and steps to be followed, if residual contaminated soil above the most stringent cleanup criteria are excavated and/or relocated to another location:

1. Excavated soil or groundwater with residual contamination will not to be re-deposited on wetlands or within 100' of surface water.

2. Precautions are to be taken to assure complete containment during the relocation or off-site transport of soil with residual contamination.

3. Any excavated soil with residual contamination is to be re-deposited where they are unlikely to be disturbed by future activity.

As a result of the above notice by Atikon Forest Products and the landowner, Shee Atika, Inc., ADEC hereby provides approval under 18 AAC 75.325(i) for any future transport of soil and/or groundwater with residual contamination above the most stringent cleanup criteria.

Based on the information provided, ADEC has determined that no further remedial action is required at the site. This determination is in accordance with 18 AAC 75.380(d)(2) and does not preclude ADEC from requiring additional assessment and/or cleanup action if future information indicates that this site may pose an unacceptable risk to human health or the environment.

Appeal
Any person who disagrees with this decision may request an adjudicatory hearing in accordance with 18 AAC 15.195 - .340 or an informal review by the Division Director in accordance with 18 AAC 15.185. Informal review requests must be delivered to the Division Director, 410 Willoughby Avenue, Suite 303, P.O. Box 111800, Juneau, Alaska 99811-1800, within 15 days after receiving

the department's decision reviewable under this section. Adjudicatory hearing requests must be delivered to the Commissioner of the Department of Environmental Conservation, 410 Willoughby Avenue, Suite 303, PO Box 111800, Juneau, Alaska 99801-1800, within 30 days after the date of issuance of this letter, or within 30 days after the department issues a final decision under 18 AAC 15.185. If a hearing is not requested within 30 days, the right to appeal is waived.

Cost Recovery

Alaska Statute 46.08.070 requires that recovery be sought for certain costs, including oversight activities, incurred by the State in responding to pollution incidents. The State may bill the responsible party at a later date for State expenditures associated with this pollution incident. State expenditures include the direct costs of staff time and indirect State overhead costs, as well as contractual and material costs. State staff time includes all time spent on activities related to the incident, including site visits, response and report reviews, telephone conversations, meetings, legal services, and interest.

If you have questions about this determination please contact me at (907) 465-5208 or bill.janes@alaska.gov.

Sincerely,

William Janes
Project Manager