THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Environmental Conservation

DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites Program

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File: 310.38.028

November 7, 2019

Melissa Bynum, Program Manager, CDT
North Slope Borough
Dept. of Capital Improvement Program Management
PO Box 1050
Barrow, Alaska 99723

Re: Decision Document: NSB South Pad
Cleanup Complete Determination

Dear Ms. Bynum:

The Alaska Department of Environmental Conservation, Contaminated Sites Program (ADEC) has completed a review of the environmental records associated with the NSB South Pad site located in Barrow. Based on the information provided to date, it has been determined that the contaminant concentrations remaining on site do not pose an unacceptable risk to human health or the environment and no further remedial action will be required unless new information becomes available that indicates residual contaminants may pose an unacceptable risk.

This Cleanup Complete determination is based on the administrative record for the NSB South Pad site, which is located in the ADEC office in Anchorage, Alaska. This decision letter summarizes the site history, cleanup actions and levels, and standard site closure conditions that apply.

Site Name and Location:
NSB South Pad
Plat 87-6, Block B, Lots 2 and 3
Latitude: 71.272685
Longitude: -156.811367
Barrow, AK

Name and Mailing Address of Contact Party:
Melissa Bynum, Program Manager, CDT
North Slope Borough
Dept. of Capital Improvement Program Management
PO Box 1050
Barrow, Alaska 99723

DEC Site Identifiers:
File No.: 310.38.028
Hazard ID.: 25916

Regulatory Authority for Determination:
18 AAC 75

Site Description and Background
The NSB South Pad site is located in Barrow, Alaska. The site is located on Lots 2 and 3 of Block B, Plat Number 87-6, which is located roughly one mile south of the Barrow airport, and roughly one

half mile down Nunavak Road on the southeastern side. The pad was constructed in the 1980s and is roughly 17-acres in size. Contamination was identified at various locations across the pad as early as 1993; however nearly all the investigation has focused on the drum storage area and shop building. An environmental history of this site is presented below in the Characterization and Cleanup Activities section of this letter.

Contaminants of Concern
During the site characterization and cleanup activities at this site, samples were collected from soil, groundwater, and surface water and were tested for one or more of the following: gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO), metals, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and glycols. Based on these analyses, the following contaminants were detected above the applicable cleanup levels and are considered Contaminants of Concern at this site:

- Gasoline Range Organics (GRO)
- Diesel Range Organics (DRO)
- Residual Range Organics (RRO)
- benzo(a)anthracene
- benzo(a)pyrene
- 1,2,4-trimethylbenzene

Cleanup Levels
The cleanup levels for petroleum hydrocarbon-contaminated soil on manmade gravel pads and roads in the Arctic Zone are established in 18 AAC 75.341 Method One, Table A2, and 18 AAC 75.341 Method Two Tables B1 and B2.

A number of factors are considered by ADEC when evaluating site specific cleanup levels in the Arctic Zone including:

- human health (ingestion/inhalation);
- ecological impacts (contamination impacting ecological species other than humans);
- groundwater and surface water quality;
- presence of free phase product; and
- any other factors that might cause a deleterious impact to the environment.

Seasonal groundwater (porewater) in the Arctic Zone is not considered a reasonably expected current or future source of drinking water. However, the groundwater can act as a transport medium to the surrounding soil; to sediment or surface water where it may pose a risk to ecological receptors; or to a subpermafrost aquifer or other zones of saturation that may have a current or reasonably expected potential future use as drinking water. These potential transport pathways and potential risks to ecological receptors in receiving waters must be taken into consideration when evaluating sites in the Arctic zone.

The migration to surface water pathway is evaluated as the primary migration pathway and as a possible risk to human health (via drinking water) and for compliance with Alaska Water Quality standards (18 AAC 70). The migration to surface water is evaluated as a possible exposure pathway

for ecological receptors because of the tundra wetland ecosystem that exists throughout the Arctic region.

Potential future use of the property must also be taken into account when determining closure status. Differentiating between a "Cleanup Complete" and a "Cleanup Complete with Institutional Controls" determination will be based on site specific conditions and exposure pathways as determined by ADEC.

For the purposes of this Cleanup Complete Determination, the following cleanup levels from 18 AAC 75 were used and are applicable:

Table 1 – ADEC Soil Cleanup Levels

Contaminant	Method One Table A2 (mg/kg)	Method Two Table B2 Ingestion (mg/kg)	Method Two Table B1 Human Health (mg/kg)
GRO	100	1,400	NA
DRO	200	12,500	NA
RRO	2,000	13,700	NA
Benzo(a)anthracene	NA	NA	2.7
Benzo(a)pyrene	NA	NA	0.28
1,2,4-trimethylbenzene	NA	NA	400 (human health), 43 (saturation)

Legend
GRO = gasoline range organics; DRO = diesel range organics; RRO = residual range organics; mg/kg = milligrams per kilogram; NA = not applicable; ug/l – micrograms per liter

Characterization and Cleanup Activities
Several environmental assessments were completed at the NSB South Pad prior to being listed as an active contaminated site. Those assessments include the:

- *Final Report Evaluation of Alternatives, Floor Slab Repairs, South Pad Maintenance Facility, Barrow, Alaska*, dated July 15, 1993 prepared by CH2M Hill;
- *Draft Report Preliminary Environmental Site Assessment, NSB South Pad*, dated August 5, 1997 prepared by Woodward-Clyde;
- *Phase I Environmental Site Assessment, South Pad*, dated March 2000 prepared by Travis Peterson Environmental Consultants; and the; and the
- *Summary Technical Memorandum Phase II Environmental Sites Assessment, South Pad, Barrow Alaska* report, dated March 2002.

ADEC does not have and was not able to obtain a copy of the 1993 report mentioned above. However it is documented in subsequent assessments that during the 1993 activities soil samples were collected from six soil borings advanced through the concrete slab of the service shop building. Analytical results indicated that GRO, DRO, toluene, xylenes, acetone, and 2-butanone [methyl ethyl

ketone (MEK)] were detected in the subsurface soils. It is not mentioned in any of the documents what the actual concentrations of those contaminants were.

The 1997 Preliminary (Phase I) Environmental Site Assessment (ESA) was prepared to identify recognized environmental conditions that may have existed on the property. Several environmental conditions were identified, as summarized below:

- A potential for site-wide contamination of the gravel pad associated with numerous spills that were not cleaned up; from engines, aboveground fuel storage tanks, and drums containing various petroleum products and glycol.
- A potential for contamination associated with leaching of chemicals from the treated lumber stockpile.
- A potential for contamination at the abandoned fuel tank farm and dispensing area.
- A potential for contamination associated with the numerous field storage tanks residing on the pad

A second Phase I ESA was prepared in March of 2000. The 2000 ESA documented similar findings to the 1997 ESA, and a recommendation was made that follow up (Phase II) environmental sampling should be completed.

A Phase II ESA was completed in 2002. The objective of the 2002 ESA was to determine the nature and extent of soil and pore-water contamination, and also to characterize the type and quantity of waste materials stored on site. Activities documented in the ESA included installation and sampling of soil borings and monitoring wells, building material sampling, and characterization and inventory of materials stored at the site.

In total, 52 subsurface soil samples were collected from 30 soil borings, and 90 surface soil samples were collected from various locations across the pad. Eight of the borings were completed as pore water monitoring wells, and were sampled. Four surface water samples were collected off the pad, and one surface water sample was collected from a diked area at a 45,000-gallon AST.

In soil, DRO and RRO were present up to 34,100 and 19,300 mg/kg, respectively, near the drum storage docks. PAHs including benzo(a)anthracene (37.5 mg/kg) and benzo(a)pyrene (13.7 mg/kg) were detected in surface soils at concentrations above applicable cleanup levels near the creosote pole storage area. PCBs were not detected in any samples. Arsenic was present at varying concentrations across the site, up to 23.9 mg/kg, but is considered within background levels. Contaminants were not present in the surface water samples above applicable cleanup levels. In pore water, seven of the eight wells sampled contained DRO and/or RRO above Table C groundwater cleanup levels. The drum characterization indicated waste was present from up to 38 different waste streams. Drum contents included fuels, waste oil, acids, solvents, batteries, and others. The Phase II estimated that up to 80 cubic yards (cy) of contaminated soil was present at the site. A Corrective Action Plan (CAP) was prepared following the 2002 ESA, however was not implemented.

In 2011, an inspection of the Service Shop Building was completed in support of the potential rehabilitation and reuse of the building. These activities are documented in the *Summary of Site Visit, South Pad, Barrow, Alaska* report, dated August 23, 2011. The shop was constructed in the early 1980s, but was condemned in 1993 because of extensive floor settling.

The 2011 site visit documented the presence of containers and drums of varying capacities and contents within and outside of the shop building, including petroleum, paint, and unknown contents. A total of four sumps were identified during the site visit. Onsite observations indicated that hazardous substances may have been released to the sumps. Over 350 drums, 24 ASTs, and numerous 1- and 5-gallon containers were documented outside of the shop. Some drums were observed to have leaked, as evidenced by stains.

Characterization of the various drums and sumps within the Service Shop Building were completed in November 2011, as documented in the *Service Shop Characterization, South Pad, Barrow, Alaska* report, dated March 2012. The November effort included an evaluation of the four sumps at the site, which included collecting soil, sediment, and water samples from the sumps, sample collection from drums, and characterization of materially subject to disposal.

Non-hazardous solid waste debris was disposed of at the Barrow landfill. Various drums, paints, and other potentially hazardous materials were characterized, inventoried, and consolidated for future disposal. Soil samples collected from the sumps contained DRO up to 40,500 mg/kg and RRO up to 129,000 mg/kg in Sump 3. Several VOCs were also detected and lead and chromium concentrations in Sump 3 indicated that the material could be hazardous waste if removed. Petroleum contaminants were also detected in water samples from each of the sumps.

This site was added to the contaminated sites database in September 2012, following receipt of the documents described above.

Additional drum characterization was completed in December 2012 and January 2013, as documented in the *Drum Characterization Report, South Pad, Barrow, Alaska*, dated June 5, 2013. Numerous (over 500) individual drums and containers were identified at the site. Drum and container contents included tar, grease, oily water, antifreeze, and solvents including paint thinner, paint, battery acid, solids and other materials. The contents of select drums were sampled and determined to be non-hazardous waste. In addition to the drum characterization, two ASTs located east of the service shop were evaluated. It was determined that both tanks were 1/3rd full of diesel and no water.

Additional characterization of the soil and porewater was completed in September 2013, as documented in the *Site Characterization, South Pad, Barrow, Alaska* report, dated February 2014. The objective of the investigation was to delineate the extent of soil contamination in areas where drums had previously been stored along the northern portion of the property.

Surface soil samples were collected and field screened from numerous locations on the pad, generally from or adjacent to areas of visible staining. Twenty-two (22) of those samples were submitted for laboratory analysis of GRO, DRO, and RRO. Of the 22 samples, 7 were also analyzed for VOCs, PAHs, PCBs, and RCRA metals. Four surface water samples were also collected, from ponded water located adjacent to the former drum storage areas. The surface water samples were analyzed for BTEX and PAHs.

Soil samples contained DRO above the Method One gravel pad cleanup level of 500 mg/kg in 18 of the 22 samples with concentrations ranging from 630 mg/kg to 27,500 mg/kg. Fifteen (15) of the soil samples contained RRO above the cleanup level of 2,000 mg/kg with concentrations ranging

from 2,850 mg/kg to 45,100 mg/kg. PCBs were not detected, and PAHs and VOCs were not detected above cleanup levels. Surface water samples did not contain concentrations of TAH or TAqH above water quality standards. The report indicates that significant staining is present across portions of the pad and spilled tar has covered the pad in some areas.

Additional evaluation and cleanout of the four sumps within the service shop building was completed in March 2014, as documented in the *Sump Evaluation, South Pad, Barrow, Alaska* report, dated July 21, 2014. It was noted that each sump was constructed of welded steel, and was roughly 2 feet deep and 2 feet in diameter. It was noted that Sump 3 had an approximately 0.5 inch hole in the bottom. Samples were collected from the sediment in sumps 1, 2, and 3 for waste characterization purposes. Sump S4 was characterized for disposal in 2011 and thus no additional samples were collected during this effort. Following sampling, the sediment was removed and placed in 55 gallon drums. Tightness testing indicated a leak in sump 2. Sediment samples from Sumps 1 and 2 contained DRO and RRO above ADEC soil cleanup levels with DRO detected at 2,630 mg/kg in sump 1 and 10,600 mg/kg in sump 2. None of the samples exceeded TCLP regulatory limits.

More site characterization was completed in October 2015, as documented in the *NSB Barrow South Pad Site Characterization Report*, dated May 9, 2016. Site characterization activities were conducted at 6 locations: The Northwest Area, Northeast Area, Southeast Area, AST Area, Dispenser Area, and Pump House Area. Overall site characterization activities included the advancement of 173 soil borings, installation of 7 monitoring wells and the collection of soil, surface water, and sediment samples. Pad porewater samples could not be collected because of slow recharge in the monitoring wells. Soil samples were analyzed for DRO, RRO, GRO, RCRA Metals, glycols, and VOCs with 5% of samples also analyzed for SVOCs and PAHs.

At the Northwest Area, 40 soil borings were advanced and one analytical soil sample was collected from each borehole based on field screening results. Contaminants were detected above cleanup levels at one location, grid point J-3, where DRO was detected at 3,380 mg/kg, GRO at 669 mg/kg, and 1,2,4-trimethylbenzene at 50.1 mg/kg.

At the Northeast Area, 99 soil borings were advanced and one analytical soil sample was collected from each borehole based on field screening results. DRO was detected above the cleanup level at three discrete locations, near grid points S-2, V-3, W-7 and GRO was detected above the cleanup level at W-7 at 109 mg/kg. The highest concentration of DRO was detected at V-3 at 3,430 mg/kg.

At the Southeast Area, 10 soil borings were advanced and one analytical soil sample was collected from each borehole based on field screening results. Contaminants were not detected above cleanup levels in any of the samples. At the AST Area, 12 soil borings were advanced and 2 samples were collected from each borehole based on field screening results. Contaminants were detected above cleanup levels at grid points CC-1 and CC-3 with DRO detected up to 668 mg/kg at CC-1 and GRO detected up to 416 mg/kg at the same location in a deeper sample.

At the Dispenser Area, 4 soil borings were advanced and two soil samples were collected from each borehole. Contaminants were detected above cleanup levels at grid points GG-1 and GG-2 with DRO detected up to 1,190 mg/kg at GG-2 and GRO detected up to 150 mg/kg in the same sample.

At the Pump House Area, 4 soil borings were advanced and two samples were collected from each borehole. Contaminants were detected above cleanup levels at grid location AA-1 with GRO up to 224 mg/kg.

Additional activities conducted as part of this effort included the cleaning and decommissioning of a 45,000-gallon above ground fuel storage tank and debris removal/site cleanup activities at the Southeast Area, Northeast Area, and Service Shop Building.

At the Southeast and Northeast Areas, wood racks were cut and stacked for disposal. At the Northeast Area, solidified tar was removed from the ground surface and placed into supersacks for future disposal.

At the Service Shop, two of the four floor sumps were removed and samples were collected below the sumps following excavation that was guided by field screening. At Sump 3, a 5 foot by 5 foot square of concrete was removed from around the sump and staged for disposal as solid waste based on previous concrete sample results. Four supersacks of material were removed from below the sump, confirmation samples did not contain contaminants above cleanup levels.

At Sump 2, concrete was also removed and 6 supersacks of material were removed from below the sump. Confirmation samples did not contain contaminants above cleanup levels. Soil from below the sumps was sampled for waste disposal purposes and the supersacks were staged in the Service Shop for disposal pending results.

Two remnant monitoring wells were located and decommissioned and 7 new monitoring wells were installed; however, the new wells could not be sampled because of slow recharge rates. Although follow on sampling of the wells was planned in 2016, none of the wells were actually sampled.

Surface water samples were collected from three locations across the site, with collocated sediment sampling at two of those locations. Contaminants in surface water were not detected above Alaska Water Quality Standards (AWQS) and contaminants in sediment were not detected above NOAA Squirt threshold effect levels.

Additional site characterization and cleanup was completed at this site in 2016, as described in the *NSB Barrow South Pad Removal Action Report*, dated Mary 23, 2017. Nearly 2,000 tons of contaminated soil was excavated from nine discrete source areas and contaminated sediment was removed from a secondary containment cell for a 45,000-gallon AST.

The 45,000-gallon AST was cut into pieces and staged for recycling. Water that had ponded in the secondary containment cell was sampled, determined to meet water quality standards, and discharged onsite. Water that continued to flow into the secondary containment cell was pumped into a lined pond and filtered through granular activated carbon prior to discharge. A strong petroleum odor was noted below the cell following its removal. A pump house was also demolished as part of the 2016 cleanup activities. Strong petroleum odor was noted in soil below the pump house following its removal.

Excavations were conducted at nine areas named Excavation Area (EA) 1 through 9. EA 1 was at the dispenser area associated with the 45,000-gallon AST, which was the location of EA 2 after the containment cell was removed. EA1 and EA2 eventually merged into a single excavation. EA3 was

at the 10,000-gallon AST area, EA4 was at the pump house area and EA5-EA9 were at other discrete areas of contamination identified during previous investigations at the site. At EA 1 and 2, confirmation soil samples contained DRO up to 2,440 mg/kg and GRO up to 231 mg/kg. At EA3, confirmation samples contained DRO up to 1,300 mg/kg and GRO up to 140 mg/kg. At EA4, confirmation samples did not contain contaminants above cleanup levels. At EA5, excavation progressed to the pad/tundra interface. Confirmation samples from this excavation contained DRO up to 519 mg/kg and RRO up to 2,000 mg/kg. At EA6, EA7, and EA8 sidewall confirmation samples did not contain contaminants above cleanup levels; floor samples were not collected due to infiltrating pore water. At EA9, confirmation samples did not contain contaminants above cleanup levels.

Contaminated soil and sediment was transported by barge and disposed of at Columbia Ridge Landfill in Arlington, Oregon. Drums and other uncontaminated debris was collected and disposed of at the Barrow landfill.

Additional characterization was completed at the crate and creosote pole area on July 24, 2019. No stained soil was observed. Twelve soil samples were collected from the previously known contaminated area and were submitted to the laboratory for analysis of PAHs. None of the sample results exceeded Method Two cleanup levels.

In summary, contamination remains in the gravel pad and underlying tundra, but at concentrations below the risk-based Method Two Soil Cleanup Levels. Additionally, contaminated porewater appears to exist within most of the pad, but does not appear to be migrating off of the pad and is not impacting adjacent surface water bodies.

Cumulative Risk Evaluation
Pursuant to 18 AAC 75.325(g), when detectable contamination remains on-site following a cleanup, a cumulative risk determination must be made that the risk from hazardous substances does not exceed a cumulative carcinogenic risk standard of 1 in 100,000 across all exposure pathways and does not exceed a cumulative noncarcinogenic risk standard at a hazard index of one across all exposure pathways.

Based on a review of the environmental record, ADEC has determined that residual contaminant concentrations meet the human health cumulative risk criteria for residential land use.

Exposure Pathway Evaluation
Following investigation and cleanup at the site, exposure to the remaining contaminants was evaluated using ADEC's Exposure Tracking Model (ETM). Exposure pathways are the conduits by which contamination may reach human or ecological receptors. ETM results show all pathways to be one of the following: De-Minimis Exposure or Pathway Incomplete. A summary of this pathway evaluation is included in Table 2.

Table 2 – Exposure Pathway Evaluation

Pathway	Result	Explanation
Surface Soil Contact	De-Minimis Exposure	Contamination remains in the surface, but is below human health cleanup levels.

Sub-Surface Soil Contact	De-Minimis Exposure	Contamination remains in the sub-surface, but is below human health cleanup levels.
Inhalation – Outdoor Air	De-Minimis Exposure	Contamination remains in the surface and sub-surface, but is below inhalation cleanup levels.
Inhalation – Indoor Air (vapor intrusion)	Pathway Incomplete	Volatile contamination is not present. All future habitable building will be built on pilings.
Groundwater Ingestion	Pathway Incomplete	Supra-permafrost groundwater is not a potential drinking water source. Sub-permafrost groundwater is found at depths greater than 250 feet and is not impacted by site contamination.
Surface Water Ingestion	Pathway Incomplete	Surface water is not used as a drinking water source in the vicinity of the site and was not impacted by contamination.
Wild and Farmed Foods Ingestion	De-Minimis Exposure	Contamination is confined to the boundary of the pad. There is no vegetation on the pad.
Exposure to Ecological Receptors	Pathway Incomplete	Contamination is not impacting surface waters and the pad is too compact to allow for terrestrial habitation or burrowing.

Notes to Table 2: "De-Minimis Exposure" means that in ADEC's judgment receptors are unlikely to be adversely affected by the minimal volume or concentration of remaining contamination. "Pathway Incomplete" means that in ADEC's judgment contamination has no potential to contact receptors.

ADEC Decision

Soil and groundwater contamination at the site have been cleaned up to concentrations below the approved cleanup levels. This site will receive a "Cleanup Complete" designation on the Contaminated Sites Database, subject to the following standard conditions.

Standard Conditions

1. Any proposal to transport soil or groundwater off-site requires ADEC approval in accordance with 18 AAC 75.325(i). A "site" [as defined by 18 AAC 75.990 (115) means an area that is contaminated, including areas contaminated by the migration of hazardous substances from a source area, regardless of property ownership.

2. Movement or use of contaminated material in a manner that results in a violation of 18 AAC 70 water quality standards is prohibited.

3. Groundwater throughout Alaska is protected for use as a water supply for drinking, culinary and food processing, agriculture including irrigation and stock watering, aquaculture, and industrial use. Contaminated site cleanup complete determinations are based on groundwater being considered a potential drinking water source. In the event that groundwater from this site is to be used for other purposes in the future, such as aquaculture, additional testing and treatment may be required to ensure the water is suitable for its intended use.

This determination is in accordance with 18 AAC 75.380 and does not preclude ADEC from requiring additional assessment and/or cleanup action if future information indicates that

contaminants at this site may pose an unacceptable risk to human health, safety, or welfare or to the environment.

Appeal

Any person who disagrees with this decision may request an adjudicatory hearing in accordance with 18 AAC 15.195 – 18 AAC 15.340 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, 555 Cordova Street, Anchorage, Alaska 99501-2617, within 20 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, P.O. Box 111800, Juneau, Alaska 99811-1800, 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.

If you have questions about this closure decision, please feel free to contact me at (907) 269-7691 or email at joshua.barsis@alaska.gov.

Sincerely,

Joshua Barsis
Project Manager

cc: Spill Prevention and Response, Cost Recovery Unit