ALASKA ARMY NATIONAL GUARD

Final

Nunapitchuk Federal Scout Readiness Center Record of Decision for Petroleum Contamination

September 2013

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Acronyms and Abbreviations

AAC	*Alaska Administrative Code*
ADEC	Alaska Department of Environmental Conservation
ARNG	Alaska Army National Guard
bgs	below ground surface
DRO	diesel-range organics
FSRC	Federal Scout Readiness Center
GRO	gasoline-range organics
IC	institutional control
LTM	long-term monitoring
RRO	residual-range organics
TAH	total aromatic hydrocarbon
TAqH	total aqueous hydrocarbon

1 Site Name and Location

Facility name: Nunapitchuk Federal Scout Readiness Center (FSRC), Nunapitchuk, Alaska.

Hazard ID: 1859

ADEC file number: 2436.38.001

AEDB-R number: CCAK270931

Site location: Nunapitchuk FSRC is located within the City of Nunapitchuk, on the eastern bank of the Johnson River, in the Yukon-Kuskokwim Delta, approximately 22 miles northwest of Bethel (Figure 1). (Figures are at the end of this Record of Decision.) The legal description of the property is: a parcel of land located within protracted Sections 5 and 6 of Township 09 North, Range 74 West of the Seward Meridian, more particularly described as: commencing at the southeast corner of the Bureau of Indian Affairs school building situated within U.S. Survey No. 4049; thence south 130 degrees west, 610 feet to the northeast corner of the FSRC; thence north 45 degrees west, 105 feet to corner number 1, a point on the mean high water line of the Johnson River and the true point of beginning; thence east 190 feet to corner number 2; thence south 150 feet to corner number 3; thence west 130 feet to corner number 4, a point on the mean high water line of the Johnson River; thence northwesterly with meander on the left bank of said river, 160 feet to corner number 1, the true point of beginning. The property comprises 0.55 acre, more or less.

Latitude and longitude: Nunaptichuk FSRC is located at 60.8945147 degrees north, –162.459482 degrees west, based on the 1984 (revised 2004) World Geodetic System (WGS 84) datum.

Facility owner and point of contact: The facility owner is the Alaska Army National Guard (ARNG), and the point of contact is Lieutenant Colonel Joel Gilbert, CFMO/Environmental, Building 57024, Joint Base Elmendorf- Richardson, Alaska, 99505.

2 Contaminants of Concern and Affected Media

Historical practices have resulted in release of petroleum hydrocarbons to soil, surface water, and groundwater at Nunapitchuk FSRC, and the affected areas have been investigated. Based on results of sampling conducted during investigations, the following contaminants of concern and affected media have been identified.

Soil: Diesel-range organics (DRO), gasoline-range organics (GRO), and residual-range organics (RRO) were detected at concentrations greater than the Alaska Department of Environmental Conservation (ADEC) Method 2 cleanup levels (Tables B1 and B2 of Section 75.341[d] in Title 18 of the *Alaska Administrative Code* [AAC]) in surface and subsurface soil to a depth of approximately 9 feet below ground surface (bgs). Benzene, toluene, 1-Methylnaphthalene, 2-Methylnaphthalene, and naphthalene were detected at concentrations greater than the ADEC Method 2 cleanup levels (Table B1 of 18 AAC 75.341[d]) in surface and subsurface soil to a depth of approximately 9 feet bgs.

Groundwater: DRO and RRO were detected in suprapermafrost groundwater at concentrations greater than ADEC cleanup levels (Table C of 18 AAC 75.345[b][1]).

Surface water: Total aromatic hydrocarbon (TAH) and total aqueous hydrocarbon (TAqH) concentrations detected in surface water exceeded ADEC water quality standards (18 AAC 70.020[b][(5][A][iii]).

The maximum reported onsite contaminant concentrations by medium type are presented in Table 1.

TABLE 1
Summary of Contaminant Concentrations by Medium
Nunapitchuk Federal Scout Readiness Center

Chemical of Concern	Maximum Concentration	Sample Depth (feet bgs)
Soil		
Diesel-range organics	100,000 mg/kg	0.5 - 1
Gasoline-range organics	440 mg/kg	1.5 - 2
Residual-range organics	12,400 mg/kg	1.25 - 1.75
Benzene	1.77 mg/kg	1.5 - 2
Toluene	7.9 mg/kg	0 - 0.5
1-Methylnaphthalene	140 mg/kg	0.5 - 1
2-Methylnaphthalene	220 mg/kg	0.5 - 1
Naphthalene	75 mg/kg	0.5 - 1
Groundwater		
Diesel-range organics	23,600 mg/L	1.5
Gasoline-range organics	1,610 mg/L	1.5
Surface Water		
Total aromatic hydrocarbons	64 mg/L	0
Total aqueous hydrocarbons	64.005 mg/L	0

[a] Results of groundwater samples collected in 2011 (CH2M HILL, 2013)
bgs = below ground surface
mg/kg = milligrams per kilogram
mg/L = milligrams per liter

3 Regulatory Authority

The agency with regulatory authority (ADEC) is identified in applicable State of Alaska regulations as promulgated in the Oil and Other Hazardous Substance Pollution Control, 18 AAC 75, revised April 8, 2012, and Water Quality Standards, 18 AAC 70, amended July 1, 2008.

4 Relevant Guidance and Policy

The following ADEC guidance documents are applicable for this Record of Decision: *Policy Guidance to Developing Conceptual Site Models* (2010), *Cumulative Risk Guidance* (2008), *Ecoscoping Guidance* (2012), *Implementing Guidance for the Method 3 Hydrocarbon Risk Calculator* (2011b), *Guidance on Using Institutional Controls in Oil and Other Hazardous Substances Cleanups* (2011a), Site Closure Memorandum (2009), and Policy for Establishing Cleanup Levels for Sites in the Arctic Zone in Accordance with 18 AAC 75, Article 3 (ADEC Guidance SPAR 99-3) (1999).

5 Confirmed Routes of Exposure

The conceptual model for primary exposure at Nunapitchuk was developed in accordance with ADEC guidance (2010). The model (Figure 2) takes into account past and current sources of contamination, chemical release mechanisms, transport/exposure media, potential exposure points, potential exposure routes, and potential receptors. The assessed routes of exposure are as follows:

- Surface soil ingestion and direct contact pathways are considered complete under current and reasonably expected future conditions.

- Direct contact and ingestion of subsurface soil pathways are considered complete under current and reasonably expected future conditions.
- Outdoor and indoor inhalation pathways are considered complete for the purposes of this model; however, potential exposure through outdoor inhalation is limited because volatile chemicals are diffused and diluted in the breathing zone, and potential exposure through indoor inhalation is not considered significant because all buildings are constructed on floating (elevated) foundations, generally limiting the pathway.
- All potentially complete ecological exposure pathways are considered insignificant because the compounds of concern for bioaccumulation are not present and because of the small size of the site (ADEC, 2012), the location of the site within the City of Nunapitchuk, and the presence of more optimal habitat nearby.
- Groundwater is present beneath Nunapitchuk FSRC but approximately 227 feet of permafrost protects the confined aquifer used by the community for drinking water, eliminating the primary groundwater ingestion pathway.
- Suprapermafrost groundwater exists beneath Nunapitchuk FSRC seasonally above the permafrost layer within a seasonal saturated zone. Though the ingestion pathway of suprapermafrost groundwater could be considered complete, its proximity to the surface of the soil, its limited vertical extent, and its transient nature, suprapermafrost groundwater is not likely to pose a risk to human health as a potential drinking water source at the FSRC.
- Suprapermafrost groundwater at the FSRC is considered hydraulically connected to the surface water observed at the site. Although extensive human dermal contact with surface water is not likely—because, for the most part, wooden walkways are used to avoid human contact with surface water features—dermal contact with the surface water must be considered a potentially complete exposure pathway. Surface water ingestion on the property is complete, but also not considered a significant potential exposure pathway because the surface water is not likely to be used as a drinking water source.

6 Basis for Action

On the basis of findings of the cumulative risk assessment performed as part of the data gap investigation (CH2M HILL, 2013), it has been determined that, under current conditions, the petroleum-contaminated soil at Nunapitchuk FSRC poses unacceptable risk to human health. Remedial actions are necessary to protect human health from the risk associated with ingestion of the petroleum-contaminated soil.

Although suprapermafrost groundwater is not likely to be considered a current or potential future source of drinking water (as established under 18 AAC 75.350), regulations in 18 AAC 75.345(f) require that groundwater that is closely connected hydrologically to nearby surface water not cause a violation of water quality standards established in 18 AAC 70.020 for the receiving surface water. Because surface water at Nunapitchuk FSRC contains contaminants at concentrations above water quality standards, both suprapermafrost groundwater and surface water will require remedial action until water quality standards in surface water are met.

7 Site-specific Cleanup Levels

As stated in 18 AAC 75.340(d), for each affected site, a responsible person shall propose soil cleanup levels for hazardous substances in soil for ADEC approval. The proposed soil cleanup levels must be based on an estimate of the reasonable maximum exposure expected to occur under current and future site conditions and must be developed using one or more of the following methods:

- ADEC Method 1 for petroleum hydrocarbon-contaminated soil in a non-Arctic zone, as set out in Table A1 of 18 AAC 75.341(a), or in an Arctic zone, as set out in Table A2 of 18 AAC 75.341(b)
- ADEC Method 2 for soil contaminated with chemicals other than petroleum hydrocarbons, as set out in Table B1 of 18 AAC 75.341(c), or with petroleum hydrocarbons, as set out in Table B2 of 18 AAC 75.341(d)
- ADEC Method 3 for developing site-specific alternative cleanup levels (ACLs)

For each contaminant detected in soil at a concentration above its ADEC cleanup level, the respective cleanup level provided under Method 1 or 2 applies at a contaminated site unless ADEC approves an ACL that has been proposed under Method 3.

For Nunapitchuk FSRC, cleanup levels for soil contaminated with chemicals other than petroleum hydrocarbons were obtained from Table B1 of 18 AAC 75.341(c), while cleanup levels for soil contaminated with petroleum hydrocarbons were obtained from Table B2 of 18 AAC 75.341(d), following Method 2 for sites with mean annual precipitation of under 16 inches per year. Under Method 2, a site-specific ingestion cleanup level for DRO was also developed. The site-specific ingestion cleanup level for DRO was confirmed to meet inhalation criteria, and through use of an approved fate and transport model, was also shown to meet migration to groundwater (MTGW) criteria. Site-specific cleanup levels are presented in the *Nunapitchuk Federal Scout Readiness Center Data Gap Investigation Report* (CH2M HILL, 2013), which has been approved by ADEC (ADEC, 2013). Table 2 summarizes the Method 2 and Method 3 cleanup levels for Nunapitchuk FSRC that are deemed protective of human health.

TABLE 2
Site-specific Soil Cleanup Levels
Nunapitchuk Federal Scout Readiness Center

Contaminant	Maximum Reported Soil Concentration	ADEC Method 2				Site-specific Cleanup Levels[c]	Approved Site-specific Cleanup Level
		Table B1 Cleanup Level[a]		Table B2 Cleanup Level[b]			
		MTGW	Contact	MTGW	Ingestion		
Diesel-range organics							
Aliphatics (81.58%)	--	--	--	7,200	10,000	--	10,000
Aromatics (18.42%)	--	--	--	100	4,100	--	4,100
Total	100,000	--	--	250	10,250	12,258	12,258
Gasoline-range organics	440	--	--	300	1,400	--	300
Residual-range organics							
Aliphatics (64.26%)	--	--	--	20,000	20,000	--	20,000
Aromatics (35.74%)	--	--	--	3,300	3,000	--	3,000
Total	12,400	--	--	300	1,400	8,393	8,393
Benzene	1.77	0.025	11	--	--	0.0723	0.0723
1-Methylnaphthalene	140	6.2	280	--	--	--	6.2
2-Methylnaphthalene	220	6.1	280	--	--	--	6.1
Naphthalene	75	20	1,400	--	--	--	20
Toluene	7.9	6.5	220	--	--	7.9	7.9

Note: All values are in milligrams per kilogram.
[a]Method 2 cleanup levels obtained from 18 AAC 75.341(c), Table B1, under-40-inch zone
[b]Method 2 cleanup levels obtained from 18 AAC 75.341(d), Table B2, under-40-inch zone
Site-specific cleanup levels obtained from *Nunapitchuk Federal Scout Readiness Center Data Gap Investigation Report* (CH2M HILL, 2013) that are deemed protective of direct contact/ingestion, inhalation, and migration-to-groundwater pathways
-- = not applicable
ADEC = Alaska Department of Environmental Conservation
MTGW = migration to groundwater

Table 3 summarizes the applicable groundwater cleanup levels and surface water quality standards for Nunapitchuk FSRC, which are deemed protective of human health.

TABLE 3
Groundwater Cleanup Levels and Water Quality Standards
Nunapitchuk Federal Scout Readiness Center

Contaminant	Cleanup Level (milligrams per liter)
Groundwater	
Diesel-range organics	1.5
Residual-range organics	1.1
Water Supply, Aquiculture	
Total aromatic hydrocarbons	0.01
Total aqueous hydrocarbons	0.015

Source: 18 AAC 75.345(b)(1), Table C, and 18 AAC 70.020(b)(5)(A)(iii)

8 Selected Remedies

Remedial alternatives selected for petroleum contamination at Nunapitchuk FSRC are presented in *Nunapitchuk Federal Scout Readiness Center Data Gap Investigation Report* (CH2M HILL, 2013). The selected remedies will protect human health and meet applicable regulatory requirements by (1) preventing exposure through applying institutional controls (ICs) to limit potential exposure to residual contaminants or (2) by removing the petroleum contamination from the site.

ARNG is committed to implementing, monitoring, maintaining, and enforcing all components of the selected remedies to ensure that site conditions remain protective of human health.

Petroleum-contaminated soil. The remedy selected for petroleum-contaminated soil at Nunapitchuk FSRC is source removal. The major components of the selected remedy for petroleum-contaminated soil are as follows:

- Excavation of petroleum-contaminated soil with concentrations greater than site-specific cleanup levels (Table 2).
- Shipment of the excavated soil offsite for either offsite thermal treatment or disposal in an approved offsite landfill.

Petroleum-contaminated groundwater and surface water. The remedy selected for petroleum-contaminated groundwater and surface water at Nunapitchuk FSRC is LTM with institutional controls (ICs). The major components of the selected remedy are as follows:

- LTM of petroleum-contaminated groundwater for DRO and RRO and petroleum-contaminated surface water for TAH and TAqH. The ARNG will submit an LTM sampling plan and subsequent monitoring reports to ADEC for approval.
- Implementation of site-specific ICs by ARNG, complying with State law restricting access and limiting human exposure to and use of petroleum-contaminated groundwater at Nunapitchuk FSRC, and prevention of discharge and spread of petroleum contamination, including the following:
  - Restricting excavation, drilling, and dewatering in areas containing petroleum-contaminated groundwater without prior ADEC and ARNG approval
  - If petroleum-contaminated groundwater or surface water is used or removed from the site, characterizing and managing the water by following regulations that are applicable at the time
  - Obtaining ADEC approval before removing or disposing of petroleum-contaminated soil, groundwater, or surface water at the site (as required by 18 AAC 75.325[i])

- Inclusion and documentation of ICs in ARNG property records for Nunapitchuk FSRC and filing a Notice of Environmental Contamination with the Bethel Recording District that states the prohibition on the use of surface water and groundwater.
- If the land is transferred the ARNG is responsible for assuring the use restrictions are included in the transfer documents and that the receiving party will maintain the use restrictions. The ARNG will provide notice to ADEC at least six (6) months prior to any transfer or sale of property containing ICs so that ADEC can be involved in discussions to ensure that appropriate provisions are included in the transfer or conveyance documents to maintain effective ICs. If it is not possible for the facility to notify ADEC at least 6 months prior to any transfer or sale, then the facility will notify ADEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to ICs. The ARNG agrees to provide ADEC with such notice, within the same time frames, for federal-to-federal transfer of property accountability. The ARNG shall provide either access to or a copy of the executed deed or transfer assembly to ADEC.
- The ARNG shall notify ADEC of any violation of the ICs or any other activity that is inconsistent with the ICs or IC objectives. The ARNG will notify ADEC as soon as practicable, but no longer than 10 days after discovery, of any activity that violates or is inconsistent with the IC objectives or use restrictions, or any other action that may interfere with the effectiveness of the ICs. The ARNG must take prompt measures to correct the violation or deficiency and prevent its recurrence. In this notification, the ARNG will identify any corrective measures it has taken, or any corrective measures it plans to take, and the estimated time frame for completing them. For corrective measures taken after the notification, the ARNG shall notify ADEC when the measures are complete.
- The ARNG will monitor and inspect all site areas subject to ICs and submit a performance report to ADEC every year, for the first 5 years after the date of the signed decision document. At that time, the frequency of inspections and reports may be reduced, if agreed upon by ARNG and ADEC.
- The ARNG will not modify or terminate ICs or modify land uses that may impact the effectiveness of the ICs without prior ADEC approval.
- LTM of the groundwater and surface water until the contaminant concentrations are shown to be stable or shrinking at which time the monitoring frequency may be reduced. Monitoring of the groundwater and surface water will continue to determine when cleanup levels are achieved, as shown in Table 3, at which time monitoring and ICs may be terminated with ADEC agreement.

9 Post-closure Remedial Review

When the site meets the applicable cleanup levels established in Table 2 and Table 3, the remedial actions can be considered complete without ICs, in accordance with 18 AAC 75.380(d)(1) and the ADEC Site Closure Memorandum (ADEC, 2009), subject to the following condition:

- In accordance with 18 AAC 75.325(i), at a site where DRO and RRO are present in soil at concentrations above the migration-to-groundwater cleanup levels established in 18 AAC 75.341(d), Table B2, any proposal to transport soil offsite will require ADEC approval.
- Soil containing residual contamination may not be placed in surface water or other environmentally sensitive areas, in accordance with 18 AAC 70.
- Under 18 AAC 75.380(d)(1), ADEC may require additional site characterization or remedial action if new information is discovered that leads ADEC to make a determination that the cleanup action described in this Record of Decision is not protective of human health, safety, and welfare and the environment.

The undersigned parties concur with this Record of Decision for the Nunapitchuk FSRC.

JOEL T. GILBERT, Lieutenant Colonel
Alaska Army National Guard

26 SEP 13
Date

DEBRA CAILLOUET, Environmental Specialist
Federal Facilities Section, Contaminated Sites Program
Alaska Department of Environmental Conservation

9/30/13
Date

10 References

Alaska Department of Environmental Conservation (ADEC). 1999. Guidance No. SPAR 99-3. Policy for Establishing Cleanup Levels for Sites in the Arctic Zone in Accordance with 18 AAC 75, Article 3. December 22.

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Alaska Department of Environmental Conservation (ADEC). 2013. Acceptance letter of final *Nunaptichuk Federal Scout Readiness Center Data Gap Investigation Report*. February 4.

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Figures

North

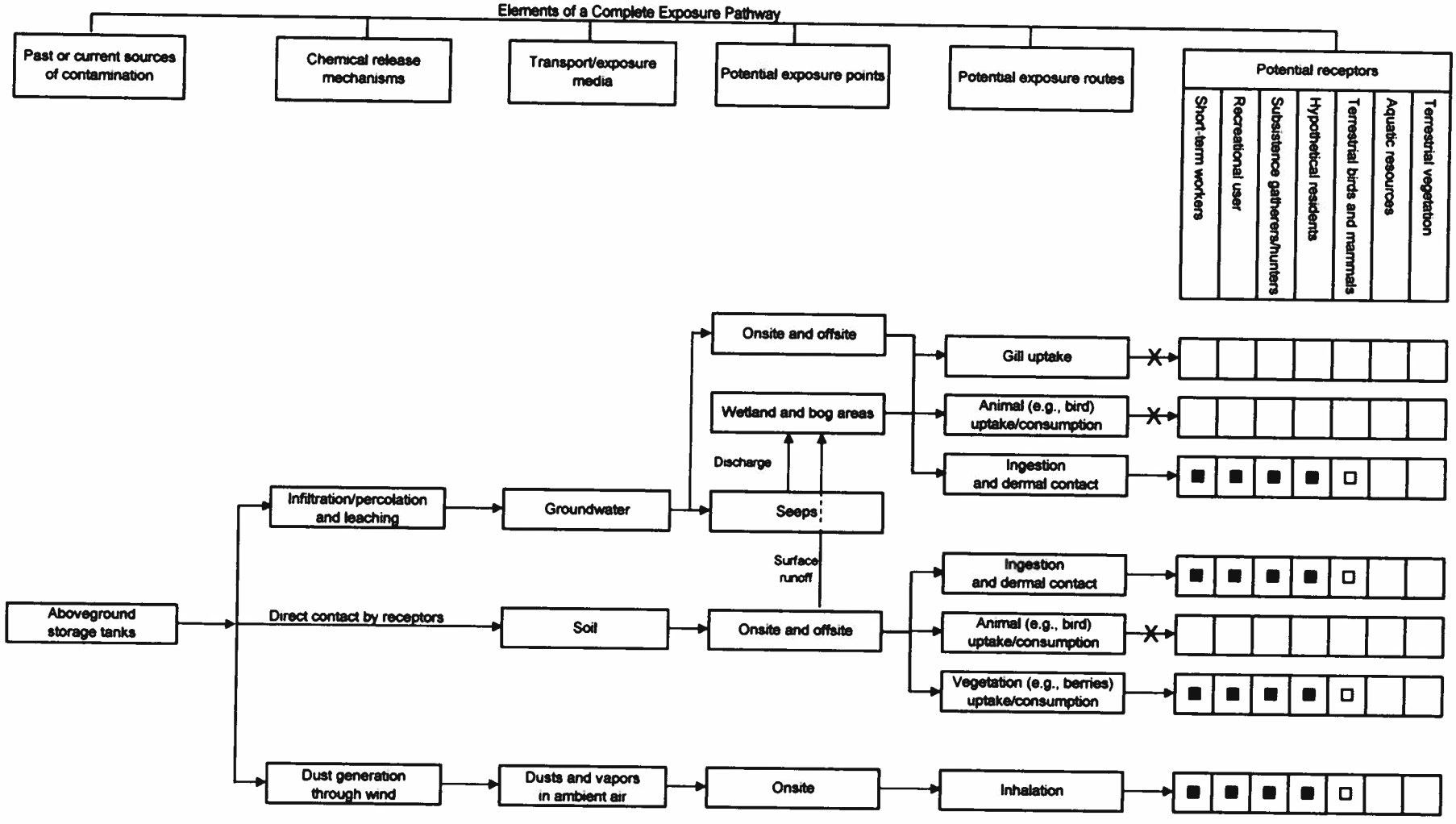
0 275 550

Approximate scale in feet

FIGURE 1
Nunapitchuk Location Map
Nunapitchuk FSRC Data Gap Investigation
Nunapitchuk, Alaska

403507 ES012512133254ANC_ArNG_Nunapitchuk_LocMap_01.ai 05/28/13 cts

CH2MHILL



■ = Potentially complete pathway (to be addressed quantitatively)

□ = Pathway considered minor (to be addressed qualitatively)

Blank = Incomplete pathway

X = Exposure route is not complete

Note: Exposure pathways assume current conditions of the site.

FIGURE 2
Conceptual Exposure Model
Potential Human and Ecological Exposures
Nunapitchuk Federal Scout Readiness Center Record of Decision
Nunapitchuk, Alaska

CH2MHILL