

Dept. of Environmental Conservation SPAR Contaminated Sites - DOD

## Human Health and Ecological Risk Assessment Northeast Cape, St. Lawrence Island, Alaska

# Appendices A through I

Final

Contract No. DACA85-98-D-0007 Task Order No. 026 MWH Americas, Inc. Job No. 1850574.260130

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# APPENDIX A

Description of the Subarctic Coastal Plains Ecoregion, Northeast Cape, St. Lawrence Island, Alaska



### **109. Subarctic Coastal Plains**

- Distinctive Features
- Climate
- Terrain
- Soils
- Vegetation
- Wildfire
- Land Use and Settlement
- Delineation Methods
- References
- A Representative Photo

### **Distinctive Features**

The 91,000 km2 ecoregion mainly includes coastal plains of the Kotzebue Sound area and the Yukon and Kuskokwim River delta area. Flat, lake-dotted coastal plains and river deltas are characteristic of the region (fig. 19). Streams have very wide and serpentine meanders. Soils are wet and the permafrost table is shallow, providing conditions for wet graminoid herbaceous communities, the predominant vegetation type. The region is affected by both maritime and continental climatic influences.

### Climate

Climate is transitional between maritime and continental influences. In general, the southern portion of the region has warmer temperatures and receives more precipitation than the northern portion. Average annual precipitation varies from around 250 mm, around Kotzebue Sound, to 500 mm, in the Yukon-Kuskokwim lowlands. Annual snowfall is approximately 100 cm in the north, and ranges from 105 cm to 150 cm in south. Temperatures in winter range from average daily lows of -25 %C in the north and -20 %C to -15 %C in the south, to average daily maximums of -16 %C in the north and -10 %C in the south. July and August are usually frost free months over most of the region. Average daily minimum temperatures in summer range from 6 %C in the north, to a couple of degrees warmer in the south. Average summer daily maximum temperatures vary from 13 %C to 17 %C in both the northern and southern sections of the ecoregion, generally increasing inland from the coast.

### Terrain

The ecoregion is comprised mainly of flat, poorly drained coastal plains with shallow permafrost tables. Low hills of basalt surmounted by cinder cones and broad shallow volcanic craters occur in some locations, creating a range in regional elevation from sea level to greater than 120 m. Slope gradients in the plains are generally less than 1ø. The region is predominantly covered by older coastal deposits of interstratified alluvial and marine sediments. Quaternary mafic and undifferentiated volcanic rocks occur in the western portion of the Yukon-Kuskokwim lowlands and on Nunivak and St. Lawrence Islands. Cretaceous intermediate volcanic rocks occur in the Selawik Wildlife Refuge Area. Only the northernmost portion of the ecoregion, around

Kotzebue, was subject to Pleistocene glaciation. Continuous thin to moderately thick permafrost currently underlies the entire region. Thaw lakes and thaw sinks are numerous. Pingos are common around the Selawik River area. Streams are sluggish and have very wide meanders.

### Soils

Dominant soils are Histic Pergelic Cryaquepts and Pergelic Cryofibrists. Soils are shallow over permafrost and are constantly wet. Soils have formed from stratified silty and sandy alluvial deposits that, in many areas, have additionally incorporated deposits of volcanic ash and loess. Soils on Nunivak Island formed in very gravelly and stony materials derived from basaltic rock.

### Vegetation

Standing water is almost always present in this ecoregion. Wet graminoid herbaceous communities, such as wet meadows and bogs, predominate in saturated soils. Peat mounds, barren sand dunes, and volcanic soils support dwarf scrub communities dominated by ericaceous species. In areas where peat or alluvium accumulation and growing season temperatures are sufficient, as in the southern section of the ecoregion, invasion by trees is possible and stands of needleleaf forests occur (fig. 20).

Wet meadows are typically dominated by sedges such as *Eriophorum angustifolium* and *Carex* spp. Mosses such as *Sphagnum spp*. are common and may codominate with sedges.

Bogs develop where peat mounds and polygonal ridges provide drained substrates for woody plants, such as ericaceous shrubs, including *Empetrum nigrum*, *Ledum decumbens*, *Loiseleuria procumbens*, *Vaccinium vitis-idaea*, and *Andromeda polifolia*). Sedges are common or codominant with woody species. Sphagnum species usually dominate the moss layer.

Dwarf scrub communities are typically dominated by crowberry (Empetrum nigrum). A number of other ericaceous species, including Vaccinium vitis-idaea, V. uliginosum, Ledum decumbens, Loiseleuria procumbens, and Arctostaphylos alpina and dwarf willows are common in these communities. Fruticose lichens such as Alectoria spp., Cladina spp., and Cetraria spp. often codominate with shrubs. Mosses such as Rhacomitrium spp., Hypnum spp., Polytrichum spp., Sphagnum spp., and Dicranum spp. are also common.

Needleleaf forests consist of black spruce (Picea mariana) and white spruce (P. glauca). Alder (Alnus spp.), willow (Salix spp.), birch (Betula glandulosa and B. nana), and ericaceous shrubs (Vaccinium vitis-idaea, Ledum decumbens, and Empetrum nigrum) may be found in the understory. Mosses such as Sphagnum spp., Dicranum spp., Hypnum spp., Polytrichum spp., Hylocomium splendens, and Pleurozium schreberi cover the ground.

### Wildfire

Occurrence of wildfires in the Subarctic Coastal Plains Ecoregion is low. Fires generally range in size from less than 1 ha to 4,050 ha. Mean burn size is 280 ha.

### Land Use and Settlement

Small permanent and seasonal settlements occur throughout the region, primarily adjacent to rivers or along the coast. The eastern end of Kotzebue Sound was settled by the Kotzebue Sound Inuit, who rely on small ocean mammals such as seals, land mammals such as caribou, fish such as salmon, and migratory birds and their eggs as important sources of food and materials. The western end of Kotzebue Sound and the northeastern portion of Norton Sound was settled by the Bering Strait Inuit, who depend more heavily on large marine mammals such as beluga whale, bowhead whale, and walrus. The remainder of the ecoregion was settled by the Yup'ik. The Yup'ik of St. Lawrence Island rely on walrus as a main source of food and materials. Bowhead whales and seals are also important. The Yukon-Kuskokwim Delta Yup'ik depend primarily on salmon, but other fish, seals, beluga whales, and terrestrial mammals are also important. Migratory waterfowl and their eggs provide resources during the spring. Edible and medicinal greens and berries are collected during summer.

Though mining is not extensive in this region, gold and silver have been extracted.

### **Delineation Methods**

The ecoregion boundary represents the coincidence of low and very low terrain roughness and the "Wet Tundra" and "Moist Tundra" ecosystems portrayed on the map of "Major Ecosystems of Alaska." In the Yukon-Kuskokwim portion, areas that are north of the Yukon River include both "Wet Tundra" and "Moist Tundra" and exclude the forests of the interior regions. South of the Yukon River, only "Wet Tundra" is included because the "Moist Tundra" grades into the adjacent Ahklun and Kilbuck Mountains Ecoregion. Transition zones eliminate "Moist Tundra" from the periphery of the Subarctic Coastal Plains Ecoregion.

### References

The information provided in this regional description has been compiled from: Beikman, 1980; Coulter and others, 1962; Ferrians, 1965; Gabriel and Tande, 1983; Joint Federal-State Land Use Planning Commission for Alaska, 1973; Karlstrom and others, 1964; Langdon, 1993; Larson and Bliss, written commun., 1992; Moore, written commun., 1993, Morgan, 1979; Ping, written commun., 1993; Reiger and others, 1979; Selkregg, 1974; U.S. Geological Survey, 1964; U.S. Geological Survey/EROS Data Center, Alaska Field Office, 1993; Viereck and Little, 1972; Viereck and others, 1992; Wahrhaftig, 1965; WeatherDisc Associates, Inc., 1990; and Wibbenmeyer and others, 1982.

Source: USGS, 1997

### 110. Seward Peninsula

- Distinctive Features
- Climate
- Terrain
- Soils
- Vegetation
- Wildfire
- Land Use and Settlement
- Delineation Methods
- References
- A representative photo

### **Distinctive Features**

Some of the oldest geologic formations in Alaska provide a backdrop for the 47,000 km2, predominantly treeless Seward Peninsula Ecoregion (fig. 21). Mesic graminoid herbaceous communities and low scrub communities occupy extensive areas. The ecoregion is surrounded on three sides by water, yet this has little ameliorating effect on the climate. Winters tend to be long and harsh and summers short and cool.

### Climate

Long, severe winters are typical of this ecoregion. Overall climatic characteristics range from maritime (a narrow strip along the coast), to transitional between maritime and continental influences (most of the region), to continental (in the eastern portion). Winds are persistent and strong throughout the region. Approximately ten weeks are frost-free each summer. All weather stations in the region are located at the lower elevations. Annual precipitation is heaviest in late summer and early fall, occurring as rain. Mean annual precipitation ranges from 250 mm to 510 mm at lower elevations, with 100 cm to 190 cm of snowfall occurring. Mean annual precipitation for the highlands, interpolated from lowland data, exceeds 1,000 mm, and snowfall may be as much as 250 cm. Average daily minimum temperature in winter ranges from -24¢C to -19¢C, and average daily maximum from -16¢C to -11¢C. Average daily minimum temperature in summer ranges from 1¢C to 6¢C, and maximum from 13¢C to 17¢C. Temperatures are generally warmer in the southern portions of the region.

### Terrain

The ecoregion has narrow strips of coastal lowlands that grade into extensive uplands of broad convex hills and flat divides. Small, isolated groups of rugged mountains occur in a few locations. Elevation ranges from sea level to 500 m for most of the region; the higher mountains climb to 1,400 m. Slope gradients are generally from 0ø to 5ø in the lowlands and hills, but typically from 5ø to 15ø in the mountains. Geologic parent materials include Paleozoic sediments and metamorphosed volcanic rocks, and Precambrian volcanic rocks. Highland areas are possible Cenezoic uplifts of these formations. An extensive area of Quaternary or Tertiary volcanic rock occurs in the northeastern portion of the ecoregion.

Permafrost is continuous throughout the ecoregion, ranging from a thin to moderately thick layer. Related features, such as gelifluction lobes (fig. 22) and stone stripes on sloping areas, frost scars on low knolls, and polygons in level valley bottoms, are common. Streams draining interior basins travel through narrow canyons across broad uplands. Lowlands have numerous thaw lakes, but lakes are rare in the highlands. Except for the highest elevations, the region was unglaciated during the Pleistocene epoch.

### Soils

Predominant soils are Histic Pergelic Cryaquepts, Pergelic Cryaquepts, Typic Cryochrepts, Pergelic Cryumbrepts, Lithic Cryorthents, and Pergelic Cryorthents. Soils are generally poorly drained and shallow over permafrost. Soils on hillslopes and ridges formed in very gravelly residual materials over weathered bedrock. Soils in valleys and on lower slopes formed mainly in colluvial and alluvial sediments.

### Vegetation

The coastal beaches, rolling hills, and mountains in this ecoregion provide a variety of climate and substrate characteristics. Mesic graminoid herbaceous communities (fig. 23) and low scrub communities occupy extensive areas on hills and lower mountain slopes. Saturated or flooded soils sustain wet graminoid herbaceous communities. Tall scrub vegetation occurs along streams and on floodplains. Ridgetops and higher elevations are barren or support dwarf scrub communities.

Mesic graminoid herbaceous communities are dominated by tussock-forming sedges. Low scrub communities result when woody species colonize the area between tussocks. Principal sedges are Eriophorum vaginatum and Carex bigelowii. Woody species include dwarf arctic birch (Betula nana), resin birch (B. glandulosa), mountain-cranberry (Vaccinium vitis-idaea), bog blueberry (V. uliginosum), diamondleaf willow (Salix planifolia), netleaf willow (S. reticulata), and crowberry (Empetrum nigrum). Mosses such as Pleurozium schreberi, Hylocomium splendens, Aulacomnium spp., and Sphagnum spp. are prevalent and lichens such as Cetraria cucullata, C. islandica, Cladonia spp., Cladina rangiferina, and Thamnolia subuliformis can be common.

Wet graminoid herbaceous communities consist of sedges such as Carex aquatilis, C. lyngbyaei, C. rostrata, C. saxatilis, C. sitchensis, and Eriophorum angustifolium and grasses including Calamagrostis canadensis and Arctophila fulva.

Tall scrub communities are dominated by willow species including Salix alaxensis, S. glauca, S. planifolia, and S. lanata). Birch (Betula nana) may codominate with willow in some areas. Other woody constituents include alder (Alnus sinuata and A. crispa) and shrubby cinquefoil (Potentilla fruticosa). A dense herb layer may be present, typically including oxytrope (Oxytropis spp.), vetch (Astragalus spp.), dwarf fireweed (Epilobium latifolium), wormwood (Artemisia spp.), and bluejoint (Calamagrostis canadensis). Mosses such as Polytrichum spp., Hylocomium splendens, and Drepanocladus uncinatus can be abundant.

Dwarf scrub communities are composed of low shrubs, grasses, and lichens. Communities are dominated by mountain-avens (Dryas octopetala and D. integrifolia), or codominated by a combination of mountain-avens and sedges including Carex scirpoidea, C. misandra, and C. bigelowii or mountain-avens and lichens including Alectoria spp., Cetraria spp., and Cladina spp.. Other typical shrubs occurring in these communities are willows (Salix reticulata and S. phlebophylla) and ericads such as Cassiope tetragona, Empetrum nigrum, Arctostaphylos spp., Vaccinium vitis-idaea, and V. uliginosum. Mosses including Tomenthypnum nitens, Rhytidium rugosum, and Hylocomium splendens can be common.

### Wildfire

Occurrence of wildfires in the Seward Peninsula Ecoregion is common. Burns range in size from less than 1 ha to 109,260 ha, with an average size of 2,815 ha. Mosses and lichens dry out during summer, allowing fire to spread readily through the tundra. Fire season is usually from June through August.

### Land Use and Settlement

Population is low and small settlements are scattered throughout the region. The land has been historically used for subsistence hunting and fishing by the Bering Strait Inuit. Their livelihood has depended on large marine mammals, such as bowhead whales, beluga whales, and walrus. Winter ice fishing and seal hunting are important to supplement spring and summer ocean catches. Away from the coast, streams provide sources of salmon and freshwater fish. Large game such as caribou and smaller mammals including rabbits, squirrels, muskrats, and beaver are also taken. Reindeer herding is unique to this area.

A number of metallic elements, including antimony, barium, gold, lead, silver, tin, tungsten, and zinc occur in the region. Numerous mines are scattered throughout large portions of the region, including many gold mining operations. Other important metals include: copper, mercury, platinum, and uranium. Antimony, bismuth, and coal have also been mined.

### **Delineation Methods**

The ecoregion boundary delineates a break between the forested ecosystems of interior Alaska, and the non-forested peninsula. One of the characteristic features of the Seward Peninsula is the age of the bedrock geologic formations; the transitional area on the ecoregion map excludes the more recent geologic formations along the eastern portion of the ecoregion from the older formations throughout the core of the region.

### References

The information provided in this regional description has been compiled from: Beikman, 1980; Coulter and others, 1962; Ferrians, 1965; Gabriel and Tande, 1983; Joint Federal-State Land Use Planning Commission for Alaska, 1973; Karlstrom and others, 1964; Langdon, 1993; Larson and Bliss, written commun., 1992; Moore, written commun., 1993; Morgan, 1979; Ping, written commun., 1993; Reiger and others, 1979; Selkregg, 1974; U.S. Geological Survey, 1964; Viereck and Little, 1972; Viereck and others, 1992; Wahrhaftig, 1965; and WeatherDisc Associates, Inc., 1990.

Source: USGS, 1997

# **APPENDIX B**

USACE Trip Report – Biological Sampling





DEPARTMENT OF THE ARMY U.S. ARMY ENGINEER DISTRICT, ALASKA P.O. BOX 898 ANCHORAGE, ALASKA 99506-0898

### CEPOA-EN-CW-ER (1105-2-10b)

### MEMORANDUM FOR RECORD: Final Draft printed, 6 September 2001.

SUBJECT: Northeast Cape, Saint Lawrence Island fish data collection report, August 18 through August 22, 2001.

### Introduction

A formally used defense site (FUDS) is located near the Northeast Cape of Saint Lawrence Island, Alaska. The site was abandoned in 1972 and a clean up of the facility is currently underway. Fuel spills were known to exist during the facility's operation and contamination from the spills and other sources may have contaminated fish resources in the Suqitughneq River drainage that originates at the site. The purpose of this field effort was to collect fish samples for human-risk analysis in accordance with the biological sampling plan (BSP). Anadromous Dolly Varden (*Salvelinus malma*), pink salmon (*Onchorhynchus gorbuscha*) and Alaska blackfish (*Dallia pectoralis*) were the target species.

### **Survey Location**

Locations of capture attempts were the Suqitughneq River, Tapisaghak River and the outlet of the Seepanpak Lagoon, Northeast Cape, Saint Lawrence Island, Alaska. The latitude and longitude of each data collection point is listed.

### Schedule

The data collection took place between 17 August and 22 August, 2001.

### Methods

Dolly Varden and Alaska blackfish were captured in baited hoop nets and minnow traps, and with gillnets. The traps were baited with salmon eggs preserved with a mixture of laundry borax, non-iodized table salt, sugar, and strawberry flavored jello. The salmon eggs used to bait the hoop nets were placed in a container designed to release scent and the fish captured in the hoop nets were not directly exposed to the bait. The blackfish captured in the minnow traps were directly exposed to the bait and could have ingested it while in the traps. Traps were soaked for approximately 24 hours.

Capture with sport gear was attempted, but no fish were caught with sport tackle.

### **Results and Discussion**

Dolly Varden and Alaska blackfish were caught as in the below table (Table 1). Only the fish listed in table 2 were retained. All others were released.

Date	Location	Trap #	N Lat.		W Lon.	Gear	Dolly V	arden	Black	fish	Pink Salmon
Date	Location					F	Num	mm	Num	mm	Num
8 Aug 01	Suqi River	1	63 1 45.0	8 1	68 56 38.2	HN	23	118- 208	0		
	Suqi River	2	63 50.6	18	168 56 59.9	HN	2	146- 207	0	1 1 1 1 1 10	
	Suqi River	3	63 52.9	18	168 56 59.9	HN	1	232	0		
	Suqi River	4	63 21.0	19	168 58 26.8	HN	0		0	-	
	Suqi Lagoon	5	63 36.4	19	168 57 54.4	HN	0				
	Suqi Lagoon	6	63 03.6		168 56 45.6	HN	0		0		
	Suqi Ditch	1	63 40.5	18	168 57 42.0	MT	0		0		
	Suqi Ditch	2	63 41.4	18	168 57 46.0	MT	0		0		
	Suqi Ditch	3	63 42.6	18	168 57 50.2	МТ			0		
	Suqi Ditch	4	63 49.1	18	168 57 46.6	MT			3	125- 137	
	Suqi Diich	5	63 50.4	18	168 57 45.6	MT			6	117- 210	
	Suqi Ditch	6	63 50.9	18	168 57 45.9	MT	0		3	118- 134	
19 Aug 01	Suqi River	1-A	63 46.1	18	168 56 41.6	HN	15	82-174	1	62	
	Suqi River	2-A	63 50.3	18	168 57 02.4	HN	28	98-285			
	Suqi River	3-A	63 52.9	18			0		0		
	Suqi Lagoon		63 36.4	19			1	153	0		
	Suqi Lagoon		63 03.6	20			0		0		
	Suqi Lagoon	7	63 01.4	20					0		
	Suqi Ditch	1-a	63 42.6	18	168 57 50.2				0		
	Suqi Ditch	2-a	63 42.6	18	168 57 50.2	2 MT	0	-	0		

 Table C-1
 Target Species Caught During the Survey

# Table C-1 (cont.) Target Species Caught During the Survey

Date	Location	Trap #	N Lat		W Lon.	Gear	Dolly	Varden	Black	kfish	Pink Salmon
							Num	mm	Num	mm	Num
	Suqi Ditch	3-a	63 49.1	18	168 57 46.6	MT	0		0		
	Suqi Ditch	4_a	63 49.1	18	168 57 46.6	MT	0		2	110- 125	
	Suqi Ditch	5-a	63 50.4	18	168 57 45.6	MT	0			107-	
	Sugi Ditch	6-a	63 50.9	18	168 57 45.9	MT	0		11	152	-
20 Aug 01	Sugi River	1-B	63 45.0	18	168 56 38.2	HN	51	82-218	0		
	Suqi River	2-B	63 50.3	18	168 57 02.4	HN	21	87-222	0		
	Suqi River	3-B	63 53.3	18	168 57 25.8	HN	4	190- 306	0		
	Tap River	4-B	63 57.7	18	168 50 51.7	HN	0		0		
	Tap River	5_b	63 57.7	18	168 50 51.7	HN	0		0		
	Tap River	6-B	63 52.0	18	168 51 174.9	HN	0		0		
	Suqi Ditch	1-b	63 53.4	18	168 57 44.1	MT					
	Suqi Ditch	2-ь	63 53.4	18	168 57 44.1	MT					
	Sugi Ditch	3-ь	63 53.4	18	168 57 44.1	MT		137-			
	Suqi Ditch	4-b	63 53.4	18	168 57 44.1	MT	3	155	16	82-150	
	Suqi Ditch	5-Ь	63 53.4	18	168 57 44.1	MT					
	Suqi Ditch	6-b	63 53.4	18	168 57 44.1	MT					
	Suqi Lagoon	1	63 35.7	19	168 57 51.4	GN	3	455- 480			
	Tap Lagoon	1	63 59.5	18	168 50 49.0	GN	0		0		4
21 Aug 01	Suqi River	3-C	63 53.3	18	8 168 57 25.8	HN	0		0	- 	
	Suqi River	8-C	63 52.4	18	3 168 57 21.5	HN	2	124- 213	2	132- 148	
	Suqi Lagoon	1	63	19	168 57 51.4	GN	8	415-	0	1	1

# Table C-1 (cont.) Target Species Caught During the Survey

Data Location	Location	cation Trap# NL:	N Lat. W Lon.	Gear	Dolly Varden		Blackfish		Pink Salmon		
Date	Location						Num	mm	Num	mm	Num
			35.7					477	1. A.	1	
	Tap Lagoon	1	63 59.5	18	168 50 49.0	GN	4	420- 464	0		3
	Seep Lagoon	1	63 42.7	20	169 16 12.1	GN	0		0		1
22 Aug 01	Suqi Lagoon	1	63 35.7	19	168 57 51.4	GN	8	420- 520	0		0

Suqi = Refers to locations within the Sugitughneq River drainage.

Tap Lagoon = Tapisaghak River Lagoon.

Seep Lagoon = Seepanpak Lagoon

Date	Location	Dolly V			kfish	Pink S	and the second division of the second divisio
		Length <sup>a</sup>	Wt. (g)	Length <sup>2</sup>	Wt. (g) <sup>b</sup>	Length <sup>a</sup>	Wt. (g)
18 Aug	Suqi River			125			
	Suqi River			137			
	Suqi River			210			
	Suqi River			135	1		
	Suqi River			138			
	Suqi River			139	415		
	Suqi River			122			
	Suqi River			117			
	Suqi River			134			
	Suqi River			128	1		
	Suqi River			118			
19 Aug	Suqi River	285	200	125			
	Suqi River	254	170	110			
	Suqi River	208	80	138			
	Suqi River	240	125	140			
	Suqi River	218	100	122			1
	Suqi River	215	.90	131			
	Suqi River			125	280		
	Suqi River			152	1.1.1		
	Suqi River		-	110			
	Suqi River			125		-	
	Suqi River			45			
	Suqi River	1.1		107			1
·	Suqi River			145			1.1.1.1
20 Aug	Suqi River		300	128		470	980
	Suqi River		800	12		445	880
	Suqi River		1100	119		463	1140
	Suqi River	480	1090	124		1	
	Suqi River			128			
	Suqi River			110			
	Suqi River			117		1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 -	
	Suqi River			133	660		
	Suqi River			129	000		
	Suqi River			102			
	Suqi River			142		4	
	Suqi River			118			
	Suqi River			140			
	Suqi River			128			
	Suqi River			122			
	Suqi River			120			

# Table C-2Fish from Table 1 that were Retained for Analysis<br/>(all others in Table 1 were released).

T		Dolly V	arden		kfish	Pink S	
Date	Location	Length <sup>a</sup>	Wt. (g)	Length <sup>a</sup>	Wt. (g) <sup>b</sup>	Length <sup>a</sup>	Wt. (g)
	Suqi River			124			
-	Suqi River			112			1
	Sugi River			116			
	Suqi River			135			
	Suqi River			135	]		
	Suqi River			128			
	Suqi River			135			
	Suqi River			112	660		
	Suqi River		1	150	000		
	Suqi River			125	7.	6	
	Suqi River			138			
	Suqi River			135	1		
	Suqi River		1.	110	1		
	Suqi River			119	1		
	Suqi River		1	108	1		
	Suqi River			82	1		
21 Aug	Suqi River		980				
0	Suqi River	and the second se	1220	1			
·····	Suqi River		930				
	Suqi River		640				
	Suqi River		780				
	Suqi River		950				
	Suqi River		900				
	Suqi River		740				
	Tap River	465	980				-
	Tap River	460	860				
	Tap River	490	1240				
22 Aug	Suqi River	450	860				
	Suqi River	440	900				
	Suqi River		780				
	Suqi River		1090				
	Suqi River		1320				
	Suqi River		830				
	Suqi River		680				_
	Suqi Rive	r 480	1170				

## Table C-2 (cont.) Fish from Table 1 that were Retained for Analysis (all others in Table 1 were released).

a.

Length is from tip of snout to fork of tail in millimeters for comparison between species (a statistical, mid-eye-to-fork-of-tail measurement was also taken, but not reported).

Composite live weight. b.

	Dolly Varden		Blac	:kfis <b>h</b>	Pink	Salmon
Drainage	Goal	Retained	Goal	Retained	Goal	Retained
Suqi River	10	10	300 grams <sup>a</sup>	1,355 grams <sup>a</sup>	2	0
Tap River	6	3	0	0	2	3
Additional Suqi River Samples	9	9	0	0	0	0
Suqi River Resident Fish Samples	0	8	N/A	N/A	N/A	N/A
Total	25	30	300	1,355	4	3

### Table C-3 Summary of Sample Goals

a - Live weight.

Note: Anadromous Dolly Varden of subsistence harvest size was preferred for analysis. Resident fish were retained for possible contaminant comparison.

The BSP called for sample weights of heads, filets, and roe of 100 grams from anadromous Dolly Varden of a size (approximately 7 + inches) that might typically be retained for human consumption. Recommended sample sizes and weights of Dolly Varden and Alaska blackfish from the Suqitughneq River were met, but the background sample size from the Tapisaghak River was short by three fish.

There is no known discharge data available from the Tapisaghak River, but during this survey it was approximately 30 feet wide and one foot deep when it is contained in one channel. The river appeared to be at normal stage and the water was exceptionally clear. The mouths of all lagoons at Northeast Cape, except perhaps the Seepanpak Lagoon, appear to berm with surf-deposited, sand and gravel during periods of brisk northerly winds. The Seepanpak Lagoon is reported to berm over, but it was open during our visits. The Tapisaghak River and Suqitughneq River lagoons were bermed during the survey, and it was not possible for fresh fish to enter the lagoons from the Bering Sea. Prior to the breaching of the Tapisaghak River berm, only one pink salmon was seen in the lagoon during several visits when we attempted to capture fish with hoop nets and sport tackle. We caught late-run pink salmon and Dolly Varden in the lower lagoon with a gillnet after the berm was breached and fresh fish entered the lagoon, but because of time and weather, only one gillnet set was possible after the berm was breached.

The Tapisaghak River (3.8 miles east of the Suqitughneq River) appears to support a reasonable sized run of pink salmon judged by the few hundred pink salmon estimated spawning up to about 3 miles upstream from the lagoon. The river is braided in places and shows definite signs of scouring, but it is probable that during an even-numbered year, even more pink salmon would spawn in this stream. Pink salmon are of questionable value for this study because of their short resident time in freshwater as fry, but three adult pink salmon were retained as possible background samples. Three sockeye salmon were also seen a few miles upstream in the Tapisaghak River, but they were considered strays to the drainage.

The Suqitughneq River normally lacks the discharge to breach the berm during northerly winds, and probably has never been able to support viable spawning runs of pink salmon because of it. Unlike in the Tapisaghak River where anadromous Dolly Varden that entered prior to berming had already moved upstream, anadromous Dolly Varden in the Suqitughneq River lagoon had not moved upstream and they were susceptible to the gillnet set in the lagoon.

The Suqitughneq River also supports a stock of resident Dolly Varden that do not appear to migrate to sea. These fish were noted to be sexually mature starting at about 6 inches in length. Resident fish might be expected to have higher contaminant levels present than the anadromous fish because of their continuous residence in the affected drainage. Resident fish from the Suqitughneq River were retained because: 1) we were not catching any anadromous fish during the first few field days and could not guarantee filling the sample goal with anadromous fish, and 2) they spend their lives in the Suqitughneq River, and could possibly be used to help fingerprint any specific Suqitughneq River contaminants that might be found in the anadromous fish.

The mouth of the Seepanpak Lagoon, 9.4 miles west of the Suqitughneq River mouth, was visited on several occasions in an attempt to collect background samples of anadromous Dolly Varden in the event collection attempts at the Tapisaghak River failed. We were informed by the local Natives that, similar to the other streams in the area, the run of anadromous Dolly Varden in the Seepanpak Lagoon drainages was several weeks past peak, but that we may get lucky and catch some late fish. Several angler hours of fishing with sport tackle and one 24 hour set of a 60 foot gillnet produced two strikes from Dolly Varden on sport tackle and the capture of one pink salmon and a large warty sculpin (Myoxocephalus verrucosus) in the gill net. According to the local Natives, late July through the first week of August is the best times to catch anadromous salmon and Dolly Varden as they enter the lagoons in this area of Saint Lawrence Island. We appeared to be about two weeks behind the run for this effort, and only low numbers of late-run fish appeared to be entering the rivers once the berms were breached.

A small lake at the head of the Suqitughneq River was visited several times during the survey. This lake appears to be very shallow (no more than about 5 feet deep) with a mud bottom. Although there are reports of fish in the lake, we saw none except the small resident Dolly Varden near the outlet. A flock of several dabbler ducks, possibly pintails, were observed tipping to feed in the center of the lake testifying to its shallowness. Additionally, the water is very clear and the substrate appears to have a uniform, gray appearance with no darker appearing holes when viewed from a higher vantage point. Unless large springs are present, this lake would most likely freeze to the bottom during winter and result in a winterkill of most fish. It is speculated that resident, and perhaps anadromous, Dolly Varden in the Suqitughneq River drainage overwinter in deeper holes and under the abundant cutbanks, or in the lagoon. Alaska blackfish are exceptionally hardy and can overwinter in muddy areas of the drainage with low oxygen concentrations.

A late run of chum salmon reportedly entered the Tapisaghak River and anadromous Dolly Varden were seen upstream in the Suqitughneq River after the COE biologists departed the area on 23 August 2001 (F. Kingeekuk Jr., personal communication to W. O'Connell). The extent of these reported sightings is unknown.

### Personnel

The following persons conducted this sampling effort in the field.

Larry Bartlett, Corps of Engineers. Lead biologist. Chris Hoffman, Corps of Engineers. Assisting biologist. William O'Connell, Montgomery-Watson-Harza. Fish sample recipient and shipping preparation. Floyd Kingeekuk Jr. Polar bear watch and local guide.

### This Trip Report was written by:

Larry D. Bartlett General Biologist En-Cw-Er

And review by:

Chris Hoffman General Biologist En-Cw-Er

### This trip report is electronically filed in:

G:\\En-Cw\En-Cw-Er\LarryB\NE Cape FUDS\trip report Aug 17-23-01.doc



Photo 5. Recovery of a Dolly Varden from a gillnet in the Suqitughneq River lagoon at Northeast Cape, Saint Lawrence Island, Alaska on 20 August 2001.



Photo 6. Catch of anadromous Dolly Varden from the Suqitughneq River lagoon at Northeast Cape, Saint Lawrence Island, Alaska on 21 August 2001.



Photo 3. Example of a resident female Dolly Varden (306 mm) in spawning condition from the Suqitughneq River at Northeast Cape, Saint Lawrence Island, Alaska during late August 2001.



Photo 4. Typical Alaska blackfish habitat in the Suqitughneq River drainage ditch at Northeast Cape, Saint Lawrence Island, Alaska during late August 2001.



Photo 1. Recovery of a hoop net trap from the Suqitughneq River at Northeast Cape, Saint Lawrence Island, Alaska on 20 August 2001.



Photo 2. Catch of resident and possibly pre-smolt Dolly Varden from the Suqitughneq River at Northeast Cape, Saint Lawrence Island, Alaska on 20 August 2001 with a baited hoop net trap.

# APPENDIX C

Community Surveys



### SUMMARY OF PRELIMINARY SURVEY RESULTS

5 Surveys returned

3 Male (ages 37,35,45), 1 Female (age 43), 1 married couple (no age given)

### FISH FROM SUQITUGHNEQ RIVER

The Suqi River currently supports a relatively small population of fish, compared to the Tapisaghak, Seepenpak, or other rivers on St. Lawrence Island.

What kinds of fish do you currently catch from the Suqi River?

Male	Female	Married Couple		
None (3)	None	Dolly's		

How many fish do you currently catch from the Suqi River?\_\_\_\_\_

Male	Female	Married Couple
None (3)	None	0

What kinds of fish do you catch from other rivers?

(including the Tapisaghak, Seepenpak, and others)

Male	Female	Married Couple
Dolly's (3), Silvers (3), Trout (1), Tom Cod (1), Humpies (2)	Dolly's, Tom Cod, Silvers	Dolly's, Humpies, Silvers, White

How many fish do you currently catch from other rivers?

Male	Female	Married Couple
About 200 (1), About 100 (2)	About 200	100+

How many people in your family eat the fish that you catch?\_\_\_\_\_

Male	Female	Married Couple
Whole family (3)	Whole family except 1	Whole family

Do you share the fish you caught with relatives?

Male	Female	Married Couple
Yes (3)	Yes	Yes

Before the 1960's, how many fish did you (or your family) catch from the Suqi River? More than today How much more?

 More than today	Hov
Less than today	

About the same

[	Male	Female	Married Couple
	Don't know (wasn't born) (2)		More than today. A lot more, don't fish anymore

Page 1

know how much more.

### What kinds of fish were caught from the Sudi River before the 1960's?

Male	Female	Married Couple	
Don't know (2), Dolly's (1)	Doesn't remember	Dolly's	

In the future, could the Suqi River support a significantly larger Dolly Varden population? 24 Imour/mouthe

YesNo	Don t know/maybe		٦.
Male	Female	Married Couple	
No (1), Don't know/maybe (2)	No	Yes	

In the future, could the Suqi support as many Dolly Varden as the Tapisaghak or Seepenpak rivers?

Yes No	Hard to Predict	Why?
Male	Female	Married Couple
No (1), Hard to Predict (2)	Hard to predict	Hard to Predict

# Do you harvest fish from the Suqitughneq River?

Yes Male	NO Female	Married Couple
No (3)	No	No

What proportion of the total fish you catch on the island comes from the Suqitughneq River only?

\_\_\_\_ Less than 25% (specify:\_\_\_\_\_)

\_\_\_\_ Equal to 25%

Greater than 25% (specify: \_\_\_\_\_)

Male	Female	Married Couple
Less than 25% (3). (0%)	Less than 25%	Less than 25% (0%)

What proportion of the fish you catch on the island comes from rivers other than the Suqitughneq?

(for ex: Tapisaghak, Seepenpak, others...) \_\_\_\_ Less than 75% (specify:\_\_\_\_\_) .

Equal to 75%

Greater than 75% (sp	ecity:)	
Male	Female	Married Couple
Greater than 75% (3) (100%)	Greater than 75%	Greater than 75% (100%)
Gicator than reve (c) (co		

### Consumption of fish

Fish are typically prepared as fried or boiled, with the skin on. Fillets represent the main food item. I disagree ----

I agree I Male	Female	Married Couple
Agree (3)	Agree	Agree

### I also prepare fish as follows:

Male	Female	Married Couple	
Dry (2), Bake (2), Fried (1)	Bake, half dried, frozen, etc.		

I eat fresh fish fillets during the summer months (mid-June to mid-September):

- \_\_\_\_\_ More than 3 times per week (Please specify how many times per week \_\_\_\_\_)
- About 3 times per week
  - Less than 3 times per week (Please specify how many times per week \_\_\_\_)

Male	Female	Married Couple
More than 3x per week (6 times) (1)	About 3X per week	Less than 3X per week (1X per week)
Less than 3x per week (1 time) (1)		
About 3 times per week		

### How many fish fillets do you consume in a month?

Male	Female	Married Couple
24 (1)	About 12	6
About 3 (2)		

Do you eat fresh fillets at other times of the year?

Male	Female	Married Couple
Yes (3)	Yes	Yes

Fish heads are also eaten in late summer, approximately 2 meals per month.

Male	Female	Married C	ouple	
Agree (2)	Agree	Agree		
Disagree (1) – More than 2				
meals per month		· · · · · · · · · · · · · · · · · · ·	5 B	

I eat fish heads approximately \_\_\_\_\_ meals per month, during the following months: \_\_\_\_\_

Male	Female	Married Couple
<ul><li>10 meals per month (June-Sept)</li><li>(1)</li><li>1 meal per month (June-Sept)</li></ul>	4 meals per month during June, Sept, Oct or 20 times per year	2 meals per month
<ul><li>(1)</li><li>2 meals per month (1)</li></ul>		

Fish eggs are also mixed with fish for eating.

I agree I disag		
Male	Female	Married Couple
Agree (3)	Agree	Agree

I eat fish eggs \_\_\_\_\_ about once every month or two

more than once every month or two (How much more?

Male	Female	Married Couple
About once every month or two (2)	More than once every month or two (about 4 to 5 times)	About once every month or two
Less than once every month or two (1) – only on birthdays		

What other fish parts are eaten?\_\_\_\_\_

for example, fish cheeks, heads, o Male	Female	Married Couple
Everything except the guts (1)	Fish cheeks, heads	All the parts
Everything except the guts, bones (1)		
Head, whole fish except the cartilage (1)		

I eat these fish parts approximately \_\_\_\_\_ meals per week, or \_\_\_\_\_ meals per month during the following months of the year:

Male	Female	Married Couple
	3 meals per week, during June to September	1 meal per week, 4 meals per month during June through September

Do you dry the fish you catch? \_\_\_\_\_ If so, how many fish are dried? \_\_\_\_\_

Male	Female	Married Couple
Yes (3). About 100+ (1) About <sup>1</sup> / <sub>2</sub> the catch (2)	Yes. About 1/2 the catch	Yes. About <sup>1</sup> / <sub>2</sub> the catch

### List types of fish dried:

Male	Female	Married Couple
Dolly's (1) Dolly's, silvers, and trout (1)	Dolly's, Silvers, Bull fish, Tom Cod	-

When do you usually eat dried fish?

\_\_\_\_ All year

Mostly in the fall/winter/spring (approximately 9 months of the year)

Other

Male	Female	Married Couple	
All year (2)	All year	All year.	
Mostly in the fall/winter/spring	84		
(1)			

)

Dried fish are eaten at a rate of 1 meal per week in the <u>non-summer</u> months (mid-September to mid-June).

Male	Female	Married Couple
Agree (3)	Agree	Agree

I eat dried fish approximately \_\_\_\_\_ meals per week, or \_\_\_\_\_ meals per month during the following times of the year:

Male	Female	Married Couple
1 meal per week (2)	1 meal per week whenever	1 meal per week during
3 meals per month (1)	available	September to June

Depending on the kind of fish, fish is frozen for future consumption.

I agree I disa	gree	
Male	Female	Married Couple
Agree (3)	Agree	Agree

What kinds of fish are frozen for future consumption?

Male	Female	Married Couple
Dolly's, Trout (3)	Dolly's, Tom Cod, Silvers, etc.	Dolly's, Steelhead salmon
Tom Cod (2)		

A portion of fish caught in the summer are frozen for eating during the remainder of the year (9 months). Frozen fish are eaten at a rate of 1 meal per week in the <u>non-summer</u> months.

I agree	I disagree.	
Male	Female	Married Couple
Agree (3)	Agree	Agree

I eat frozen fish approximately \_\_\_\_\_ meals per week, or \_\_\_\_\_ meals per month during the following times of year:

Male	Female	Married Couple	
1 meal per week (3)	1 meal per week	1 meal per week	
during Sept-June (1)			

Do you age fish for future consumption? What kinds of fish are aged?

Male	Female	Married Couple
No (2)	Yes. Dolly's, Trout	Yes. Just the heads.
Yes (1). Dolly's, Trout		

I eat aged fish approximately \_\_\_\_\_ meals per week, or \_\_\_\_\_ meals per month during the following times of year:\_\_\_\_\_\_

Male	Female	Married Couple
1 meal per month (1)	2 or 3 times a year	Once in a great while.
Don't eat (2)		

The average sized edible Dolly Varden collected from the Suqi River in 2001 weighed 2 pounds (whole) and was 18 inches long.

How many people does 1 Dolly Varden usually feed? adults, or children	(under age 8)
---	---------------

Male	Female	Married Couple
2 adults or 3 children (1)	2 adults or 3 children	2 adults or 3 children
1 adult or 2 children (1)	a - maran and a firm of	محمو محمد والمتحم محمو محمو محمو محمد و
1 or 2 adults or 4 children (1)	8	

How many meals (portions) would 1 typical sized Dolly Varden yield?

\_\_\_\_\_ as fresh fillets

\_\_\_\_\_ as dried fish

\_\_\_\_\_ as aged fish

as frozen fish

Male	Female	Married Couple
As fresh, frozen (3) As dried (2)	As fresh fillets, dried fish, frozen fish.	As fresh fillets, dried fish, frozen fish.

An adult eats 6 ounces of fish per meal, or approximately 1/3 pound.

Lagree I disagree. I eat approximately \_\_\_\_\_ pounds of fish per meal.

Male I agree I uisa	Female	Married Couple
Disagree (3) 1 pound of fish per meal (2) 34 pound of fish per meal (1)	Disagree. 1 pound of fish per meal.	Agree

A child eats 2 ounces of fish per meal, or approximately 1/8 pound.

I agree I disa	gree. Children eat approximately	pounds of fish per meal.
Male	Female	Married Couple
Disagree (3) <sup>1</sup> / <sub>2</sub> pound of fish per meal (2) <sup>3</sup> / <sub>4</sub> pound of fish per meal (1)	Disagree. <sup>1</sup> /2 pound of fish per meal	Agree

What is the history of the beach berm (physical barrier) at the Suqi River lagoon/estuary?

- \_\_\_\_\_Always occurs at least once in the summer months
  - Sometimes occurs during the summer months
  - Never occurred until recently

Yes

Male	Female	Married Couple
Sometimes occurs (3)	Sometimes occurs	Sometimes occurs

Does the beach berm at the Suqi River occur more often today than in previous years?

No Don't know

Male	Female	Married Couple
Don't know (3)	Don't know	Don't know

C C . h .........

Historically, did the Suqi River become periodically blocked by a berm during the summer months?

YesNo	If yes, how often? Female	Married Couple	_
No (2)	Yes. Not very often.	Yes. Once or twice.	
Don't know (1)			

When harvesting for subsistence foods at Northeast Cape, where do you stay?\_\_\_\_

Male	Female	Married Couple
Seepenpak (1)	Tamniq	Sepenpak
Alngiighyak (1)		
NE Cape uncle's house (1)		

Where do you get your water?

Male	Female	Married Couple	
Seepenpak (1)	A small creek by Tamniq Lake	Tapinsak	
Alngiighyak (1)			
Tapiisak (1)			 

## PLANTS HARVESTED AT NORTHEAST CAPE STUDY AREA (Drainage Area North of Main Complex)

I eat native plants (greens, roots or berries) during the <u>summer</u> months (mid-June to mid-September): \_\_\_\_\_\_More than 4 times per week (Please specify how many meals per week \_\_\_\_\_\_)

About 4 times per week

Less than 4 times r	er week (Please specify how n	nany meals per week)
Male	Female	Married Couple
About 4x per week (2)	About 4X per week	Less than 4X per week
Less than 4x per week (1)		

Harvested native plants are frozen for eating during the winter.

I disagree.	
Female	Married Couple
Agree	Agree
	Female

I also prepare native plants as follows:

Male	Female	Married Couple
N/A – berries (1)	Aqutaq, aged, fresh, frozen	
Don't know (2) - women		
usually prepare them		

In the winter months, I eat approximately \_\_\_\_\_ meals of native plants per week,

maale of notive plants per month

	or meals of halive plants per monuli.	
Male	Female	Married Couple
1 meal per month (1)	2 meals per month	2 meals per month
2 meals per month (1)		
1 meal per week (1)		

3 categories of native plants are eaten: berries, greens, and roots.

I agree	I disagree	
Male	Female	Married Couple
Agree (3)	Agree	Agree
Agree (5)		

An average adult eats nearly 1/2 pound\* of native plants per meal.

I agree	I disagree.	
Male	Female	Married Couple
Agree (3)	Agree	Agree
116100 (0)		

Leat pounds or cups	of native plants per meal. (* 1/2 pou	nd equals about 1 1/2 cups of berries)
I eat pounds or cups	Female	Married Couple
<sup>1</sup> / <sub>2</sub> pound (3)	<sup>1</sup> / <sub>2</sub> pound	1/2 pound
72 pound (5)		

Children eat native plants at a rate approximately 1/4<sup>th</sup> of adults.

I agree	I disagree.	
Male	Female	Married Couple
Agree (3)	Agree	Agree
1.0.00		

cups of native plants per meal. Children eat \_\_\_\_\_ pounds or **Married Couple** Female Male 1/4 pound 1/4 pound 1/4 pound (3)

The majority of locally harvested native plants are collected from outside the Northeast Cape Study Area (the drainage north of the Main Complex).

25% of locally harvested native plants and berries are obtained from within the Northeast Cape Area. I disagree. Lauree

Male1	Female	Married Couple
Agree (1)	Agree	Agree (less than 25%)
Disagree (2) – don't know/women harvest		

% of my native plants and berries from within the Northeast Cape Study Area. Currently, I harvest

Male	Female	Married Couple
30% (1)	10%	0%
0% (1)	and the second	
Don't know (1)		

Currently, I harvest	% of my native plants and berries from	n areas outside Northeast Cape.
Male	Female	Married Couple
70% (1)	90%	100%
0 % (1)	Comment: very poor with	
Don't know (1)	plants, berries	

If no contamination was present, I would harvest \_\_\_\_\_\_ % of my native plants and berries from within the Northeast Cape Study Area (the drainage north of the Main Complex).

Male	Female	Married Couple
100% (1)	100%	50%
0% (1)		
(1)		

People eat succulent greens (roseroot or *nunivak*), other greens (white arctic mountain heather or *kittmik*), berries (blackberry/crowberry, or *ququnqhaq* and *aqavzik*), *saqllak* and *allqegkaq* (sourdough).

Male I agree	Female	Married Couple
Agree (2)	Agree	Agree
(1)		

I also harvest and eat the following plants from within the Northeast Cape Study Area: \_\_\_\_\_

Male	Female	Married Couple
Berries.	Anylugrak	Hardly harvest.

Male \_\_\_\_ Female \_\_\_\_ Name (optional): \_\_\_\_\_ Age: \_\_\_\_\_ Contact phone (optional): \_\_\_\_\_

# APPENDIX C

Community Surveys





### Northeast Cape Site

The U.S. Army Corps of Engineers is investigating and remediating environmental conditions at the former military installation at Northeast Cape. In addition to the ongoing building demolition and hazardous waste removal activities, the Army Corps is conducting an analysis of potential risks to human health and the environment due to exposure to contaminants remaining at the site. As part of these efforts, additional fish sampling will be conducted in the Suqitughneq River.

Your help in answering the following questions will assist the Corps with planning the field investigation, and analyzing the potential for any site-related risks.

### Questions:

- 1. What fish species are present in the vicinity of Northeast Cape?
  - a. Current
  - b. Historically (pre-1960 spill)
- 2. During what time of year did you historically fish at Northeast Cape?

and for how many days per year were they harvested?

3. During what time of year are fish currently harvested at Northeast Cape?

and for how many days per year are they harvested?

4. Where specifically are the freshwater and saltwater species currently harvested? (Please mark on the attached map where the freshwater and the saltwater fish are harvested. Please use (F) for the freshwater and (S) for the saltwater.)

1



5. Do you harvest fish from the estuary/lagoon area at the mouth of the Suqitughneq River drainage?



- a. YES
- b. NO \_

c. If YES, what species?

6. Which freshwater fish species do you normally eat?

7. How often do you eat freshwater fish? Please indicate the number of:

meals/day

meals/week
meals/month

8. Which saltwater fish species do you normally eat?

9. How often do you eat saltwater fish? Please indicate the number of:

meals/day meals/week

meals/month

10. What percentage of your diet is freshwater fish?

- a. less than 25% \_\_\_\_\_\_
- c. 51-75%
- d. greater than 75%

11. What percentage of your diet is saltwater fish?

- a. less than 25% \_\_\_\_\_\_
- c. 51-75%
- d. greater than 75%

12. What percentage of your diet is fish harvested at Northeast Cape?

- a. less than 25%
- b. 26-50%
- c. 51-75%

d. greater than 75%



- 13. How do you prepare fish for eating? For each species eaten, please describe what you do and what parts you eat (e.g., whole body, fillets, specific body parts, other).

14. What marine mammal species (e.g., whale, polar bear, walrus, seal) do you harvest from near Northeast Cape for eating? \_\_\_\_\_

15. During what time of year are marine mammals harvested at Northeast Cape?

and for how many days per year are they harvested?

- 16. Where specifically are the marine mammals harvested? (Please mark on the attached map where the marine mammals are harvested. Please use (MM) for the locations.)
- 17. How do you prepare the marine mammals for eating? Please describe what you do for each species eaten and what parts you eat.

18. How often do you eat marine mammals? Please indicate the number of:

 meals/day
meals/week
 meals/month

19. What percentage of your diet consists of marine mammal species?

- a. less than 25% b. 26-50% c. 51-75%
- d. greater than 75%
- 20. What percentage of your diet consists of marine mammals harvested from the Northeast Cape?
  - a. less than 25% b. 26-50% c. 51-75% d. greater than 75%


- 21. What land mammal species (e.g., reindeer) do you harvest from the Northeast Cape or from the Island for eating?
  22. During what time of year are land mammals harvested at Northeast Cape?
  23. Where specifically are the land mammals harvested? (Please mark on the attached map where the land mammals are harvested. Please use (LM) for the locations.)
  - 24. How do you prepare the land mammals for eating? Please describe what you do for each species eaten and what parts you eat.

25. How often do you eat land mammals?

meals/day
meals/week
meals/month

26. What percentage of your diet consists of land mammal species?

- a. less than 25%
- b. 26-50%
- c. 51-75% \_\_\_\_\_
- d. greater than 75%
- 27. What percentage of your diet consists of land mammal species harvested from the Northeast Cape?
- 28. What plant species do you harvest from the Northeast Cape for eating?

for other uses (e.g., medicinal, spiritual, smoking, weaving, dying)?

29. What parts of the plants are consumed (e.g., leaves, stems, roots, berries)?

30. Which plants are usually found in lowland areas or near streams?

31. From where are the plants harvested? (Please mark on the attached map where the plants are harvested. Please use (P) for the plant locations.)

32. During what months are the plants harvested? \_\_\_\_\_

.

33. How often do you eat plants harvested from the Northeast Cape?

meals/day
meals/week
meals/month

34. What percentage of your diet consists of plants?

- a. less than 25%
- b. 26-50% c. 51-75%
- d. greater than 75%
- 35. What percentage of your diet consists of the plant species harvested from the Northeast Cape?
  - a. less than 25%
  - b. 26-50%
  - c. 51-75%
  - d. greater than 75%
- 36. Other than those food items already listed in you answers above, please list any other food items that are harvested from the Island's land or freshwater, or from the ocean surrounding the Island.





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## 37. Please provide any other observations, comments?

38. Date the survey was completed.

39. Your name and age (optional).

40. May we contact you with questions? How may we reach you?

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The U.S. Army Corps of Engineers is investigating and remediating environmental conditions at the former military installation at Northeast Cape. In addition to the ongoing building demolition and hazardous waste removal activities, the Army Corps is conducting an analysis of potential risks to human health and the environment due to exposure to contaminants remaining at the site. As part of these efforts, additional fish sampling will be conducted in the Suqitughneq River.

Your help in answering the following questions will assist the Corps with planning the field investigation, and analyzing the potential for any site-related risks.

#### Questions:

1. What fish species are present in the vicinity of Northeast Cape?

a. Current <u>Selmon</u>, Dolly Variling

- b. Historically (pre-1960 spill) <u>NA</u>
- 2. During what time of year did you historically fish at Northeast Cape?

and for how many days per year were they harvested?

3. During what time of year are fish currently harvested at Northeast Cape?

and for how many days per year are they harvested?

months July August 2

4. Where specifically are the freshwater and saltwater species currently harvested? (Please mark on the attached map where the freshwater and the saltwater fish are harvested. Please use (F) for the freshwater and (S) for the saltwater.)

- Sattwater Only

5. Do you harvest fish from the estuary/lagoon area at the mouth of the Suqitughneq River drainage?

. . .

- a. YES
- b. NO <u>x</u> c. If YES, what species?

6. Which freshwater fish species do you normally eat?

NA 7. How often do you eat freshwater fish? Please indicate the number of: NA meals/day meals/week meals/month 8. Which saltwater fish species do you normally eat? . 9. How often do you eat saltwater fish? Please indicate the number of: \_\_\_\_\_ meals/day meals/week 2 meals/month 10. What percentage of your diet is freshwater fish? a. less than 25% X b. 26-50% c. 51-75% d. greater than 75% 11. What percentage of your diet is saltwater fish? a. less than 25% X b. 26-50% c. 51-75% d. greater than 75% 12. What percentage of your diet is fish harvested at Northeast Cape? a. less than 25% X b. 26-50% c. 51-75%

d. greater than 75%

- 8
- 13. How do you prepare fish for eating? For each species eaten, please describe what you do and what parts you eat (e.g., whole body, fillets, specific body parts, other).

Fillet, Heads, Eggs, Row, Looked, Enid,

14. What marine mammal species (e.g., whale, polar bear, walrus, seal) do you harvest from near Northeast Cape for eating?



15. During what time of year are marine mammals harvested at Northeast Cape?

April May and for how many days per year are they harvested?

2 / Month

V

16. Where specifically are the marine mammals harvested? (Please mark on the attached map where the marine mammals are harvested. Please use (MM) for the locations.)

17. How do you prepare the marine mammals for eating? Please describe what you do for each species eaten and what parts you eat.

Walrus - liver, Ledment, intesting, heart, blubber Boiled , Frid Stal- N N N N Kidaw Bilid Friel, Dried

18. How often do you eat marine mammals? Please indicate the number of:



- 19. What percentage of your diet consists of marine mammal species?
  - a. less than 25% \_\_\_\_X b. 26-50%
  - c. 51-75%
  - d. greater than 75%
- 20. What percentage of your diet consists of marine mammals harvested from the Northeast Cape?
  - a. less than 25% X b. 26-50% \_\_\_\_\_\_ c. 51-75% \_\_\_\_\_
  - d. greater than 75%



21. What land mammal species (e.g., reindeer) do you harvest from the Northeast Cape or from the Island for eating?

Keinder

1

22. During what time of year are land mammals harvested at Northeast Cape?

Thanksqiving Fall and for how many days per year are they harvested?

23. Where specifically are the land mammals harvested? (Please mark on the attached map where the land mammals are harvested. Please use (LM) for the locations.)

24. How do you prepare the land mammals for eating? Please describe what you do for each species eaten and what parts you eat.

Boilid Frizd Reinchard, FAT, Mear, Hard, liver -

25. How often do you eat land mammals?

		_ meals/day
		_ meals/week
-	1	_ meals/month

26. What percentage of your diet consists of land mammal species?

- a. less than 25% /
- c. 51-75%

d. greater than 75%

- 27. What percentage of your diet consists of land mammal species harvested from the Northeast Cape?
- 28. What plant species do you harvest from the Northeast Cape

for eating? Sulmon Burries Crow Burries

4

· .



for other uses (e.g., medicinal, spiritual, smoking, weaving, dying)?

29. What parts of the plants are consumed (e.g., leaves, stems, roots, berries)?

Burrits

Ø

30. Which plants are usually found in lowland areas or near streams?

Salman Burriss, Crowburriss

31. From where are the plants harvested? (Please mark on the attached map where the plants are harvested. Please use (P) for the plant locations.)

V

32. During what months are the plants harvested?

July - August

33. How often do you eat plants harvested from the Northeast Cape?

\_\_\_\_\_ meals/day \_\_\_meals/week meals/month

34. What percentage of your diet consists of plants?

- a. less than 25% b. 26-50%
- c. 51-75%

d. greater than 75%

35. What percentage of your diet consists of the plant species harvested from the Northeast Cape?

a.	less than 25%	X
b.	26-50%	
c.	51-75%	
d.	greater than 75%	

36. Other than those food items already listed in you answers above, please list any other food items that are harvested from the Island's land or freshwater, or from the ocean surrounding the Island.

37. Please provide any other observations, comments?

ø -----.

38. Date the survey was completed.

6/22/01

39. Your name and age (optional).

Yes

Adeline Pungowiyi, Pary Pungowiyi

40. May we contact you with questions?

How may we reach you?



Ferry & Adrit Fingulury

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## Northeast Cape Site

The U.S. Army Corps of Engineers is investigating and remediating environmental conditions at the former military installation at Northeast Cape. In addition to the ongoing building demolition and hazardous waste removal activities, the Army Corps is conducting an analysis of potential risks to human health and the environment due to exposure to contaminants remaining at the site. As part of these efforts, additional fish sampling will be conducted in the Suqitughneq River.

Your help in answering the following questions will assist the Corps with planning the field investigation, and analyzing the potential for any site-related risks.

#### Questions:

1. What fish species are present in the vicinity of Northeast Cape?

a. Current <u>Salmon</u>, <u>Dolly Varden</u> <u>(Silvers, Chimaks, Reds</u>, <u>Pinks</u>) <u>Herning</u>, <u>Tom Lod</u>, from <u>Sexpanpalk & Tapisaghalk Riverks</u>

- b. Historically (pre-1960 spill) \_\_\_\_\_\_ Salmon + Dollys.
- 2. During what time of year did you historically fish at Northeast Cape?

SUMMA

and for how many days per year were they harvested?

Some a monthy All

3. During what time of year are fish currently harvested at Northeast Cape?

and for how many days per year are they harvested?

2 MMHS.

4. Where specifically are the freshwater and saltwater species currently harvested? (Please mark on the attached map where the freshwater and the saltwater fish are harvested. Please use (F) for the freshwater and (S) for the saltwater.)

No Frishwater Only Saltwater



- 5. Do you harvest fish from the estuary/lagoon area at the mouth of the Suqitughneq River drainage?
  - a. YES 🖌
  - b. NO
  - c. If YES, what species?

Salmon, Dollys Not much since spill 6. Which freshwater fish species do you normally eat? 7. How often do you eat freshwater fish? Please indicate the number of: meals/week meals/month 8. Which saltwater fish species do you normally eat? 9. How often do you eat saltwater fish? Please indicate the number of: \_\_\_\_\_ meals/day \_\_\_\_\_ meals/week \_\_\_\_ / /meal/week \_\_\_\_\_ meals/month 10. What percentage of your diet is freshwater fish? a. less than 25% b. 26-50% c. 51-75% d. greater than 75% 11. What percentage of your diet is saltwater fish? a. less than 25% X b. 26-50% c. 51-75% d. greater than 75% 12. What percentage of your diet is fish harvested at Northeast Cape? a. less than 25% X NEC b. 26-50% c. 51-75% d. greater than 75% X Scepaupak, Tapisaghak Rives

2

13. How do you prepare fish for eating? For each species eaten, please describe what you do

and what parts you eat (e.g., whole body, fillets, specific body parts, other). <u>Fileb, Eggs, Heads</u> Dired, Corked, Fried Bo, ted, Row Solme, Dollys <u>Whole</u> fried, Corked, Fried Bo, ted, Row Solme, Dollys <u>Whole</u> fried, Corked, Fried Bo, ted, Row Solme, Dollys

14. What marine mammal species (e.g., whale, polar bear, walrus, seal) do you harvest from near Northeast Cape for eating? Walrus

Scal Palai Bian - Viry Rare

15. During what time of year are marine mammals harvested at Northeast Cape?

Walrus + Scal April/May Aler Big cure but in April May before the us goes only or any time it stranded. and for how many days per year are they harvested?

2 1 Mmth

1

16. Where specifically are the marine mammals harvested? (Please mark on the attached map where the marine mammals are harvested. Please use (MM) for the locations.)

17. How do you prepare the marine mammals for eating? Please describe what you do for each species eaten and what parts you eat.

Walrus - liver, Redment, intesting, heard, blubber Boil, Fry, Seal - liver, Redment, intesting, heard, blubber, Kidnigs Boil, Fry, Durd Polar Bear - Ked Meat very careff. Caked very well

- 18. How often do you eat marine mammals? Please indicate the number of:
  - \_\_\_ meals/day \_ meals/week year road 3 meals/month
- 19. What percentage of your diet consists of marine mammal species? ×
  - a. less than 25%
  - b. 26-50%
  - c. 51-75%
  - d. greater than 75%
- 20. What percentage of your diet consists of marine mammals harvested from the Northeast Cape?

3

- a. less than 25%
- b. 26-50%
- d. greater than 75%

21. What land mammal species (e.g., reindeer) do you harvest from the Northeast Cape or from the Island for eating?

Lunder Only

22. During what time of year are land mammals harvested at Northeast Cape?

July August

and for how many days per year are they harvested?

1 of 2 Runders per howschold put year

23. Where specifically are the land mammals harvested? (Please mark on the attached map where the land mammals are harvested. Please use (LM) for the locations.)

24. How do you prepare the land mammals for eating? Please describe what you do for each species eaten and what parts you eat.

Ledment, heart, Kidnind, For Boiled, Fried, Loashed, Dried

25. How often do you eat land mammals?

meals/day meals/week \_\_\_\_\_/ August meals/month

26. What percentage of your diet consists of land mammal species?

- a. less than 25%
- b. 26-50%
- c. 51-75%
- d. greater than 75%
- 27. What percentage of your diet consists of land mammal species harvested from the Northeast Cape?
  - a. less than 25% b. 26-50%
  - c. 51-75%
  - d. greater than 75%
- 28. What plant species do you harvest from the Northeast Cape

for eating? - Crowburnies, Salmonburnes, Clordburies Loserved, Siberian Spring Beaky, Dock, Willow, Soxitrage, lowsworth Shakored Inshish com bory.

4

.



for other uses (e.g., medicinal, spiritual, smoking, weaving, dying)?

29. What parts of the plants are consumed (e.g., leaves, stems, roots, berries)?

Traves, Lasts, Berrizs.

30. Which plants are usually found in lowland areas or near streams?

Construits, Salmontunity, Claudburies, - Lose rout / Montains - Tapisaghak Rivit.

- 31. From where are the plants harvested? (Please mark on the attached map where the plants are harvested. Please use (P) for the plant locations.)
- 32. During what months are the plants harvested?

July August - Friende for Winher

33. How often do you eat plants harvested from the Northeast Cape?

\_\_\_\_\_ meals/day \_\_\_\_\_ meals/week \_\_\_\_3 meals/month

34. What percentage of your diet consists of plants?

- a. less than 25% b. 26-50%
- c. 51-75%
- d. greater than 75%
- 35. What percentage of your diet consists of the plant species harvested from the Northeast Cape?

a.	less than 25%	<u> </u>
b.	26-50%	
c.	51-75%	
d.	greater than 75%	

36. Other than those food items already listed in you answers above, please list any other food items that are harvested from the Island's land or freshwater, or from the ocean surrounding the Island.



37. Please provide any other observations, comments?

-38. Date the survey was completed. 39. Your name and age (optional). Eugene Toolie 62 Maria Toolia 53 How may we reach you? 40. May we contact you with questions? YES



" How Tak



Clarence Waghiji

### Northeast Cape Site

The U.S. Army Corps of Engineers is investigating and remediating environmental conditions at the former military installation at Northeast Cape. In addition to the ongoing building demolition and hazardous waste removal activities, the Army Corps is conducting an analysis of potential risks to human health and the environment due to exposure to contaminants remaining at the site. As part of these efforts, additional fish sampling will be conducted in the Sugitughned River.

Your help in answering the following questions will assist the Corps with planning the field investigation, and analyzing the potential for any site-related risks.

#### Questions:

1. What fish species are present in the vicinity of Northeast Cape?

a. Current \_\_\_\_\_ Tout, Aritic Chav b. Historically (pre-1960 spill) \_\_\_\_\_\_ Salara, Dolly. 2. During what time of year did you historically fish at Northeast Cape?

and for how many days per year were they harvested?

3. During what time of year are fish currently harvested at Northeast Cape?

and for how many days per year are they harvested? July / August

4. Where specifically are the freshwater and saltwater species currently harvested? (Please mark on the attached map where the freshwater and the saltwater fish are harvested. Please use (F) for the freshwater and (S) for the saltwater.)

1

M Saltwater



- 5. Do you harvest fish from the estuary/lagoon area at the mouth of the Suqitughneq River drainage?
  - a. YES \_\_\_\_\_ b. NO X

2

- c. If YES, what species?
- c. If TEO, what species:

6. Which freshwater fish species do you normally eat?

7. How often do you eat freshwater fish? Please indicate the number of:



8. Which saltwater fish species do you normally eat?

Odky, 1000

9. How often do you eat saltwater fish? Please indicate the number of:

meals/day meals/week 2 meals/month yrar

10. What percentage of your diet is freshwater fish?

- a. less than 25% b. 26-50%
- c. 51-75%

d. greater than 75%

#### 11. What percentage of your diet is saltwater fish?

- a. less than 25%
- b. 26-50% c. 51-75%
- d. greater than 75%

12. What percentage of your diet is fish harvested at Northeast Cape?

- 13. How do you prepare fish for eating? For each species eaten, please describe what you do and what parts you eat (e.g., whole body, fillets, specific body parts, other).

rat, How Eggs, Ocasional Arefri Char

- 14. What marine mammal species (e.g., whale, polar bear, walrus, seal) do you harvest from near Northeast Cape for eating? Walas
- 15. During what time of year are marine mammals harvested at Northeast Cape?

and for how many days per year are they harvested? 2 Months.

- 16. Where specifically are the marine mammals harvested? (Please mark on the attached map where the marine mammals are harvested. Please use (MM) for the locations.) -1/
- 17. How do you prepare the marine mammals for eating? Please describe what you do for each

species eaten and what parts you eat. Walrus, Lovel, Redmost intention, head, blubber. Lichneys (ranky), Scal, 11 (1 11 11 11 Kicking)

18. How often do you eat marine mammals? Please indicate the number of:

\_ meals/day 3 meals/week meals/month

- 19. What percentage of your diet consists of marine mammal species? \_\_\_X\_\_\_
  - a. less than 25%
    - b. 26-50%
  - c. 51-75%

Stat

- d. greater than 75%
- 20. What percentage of your diet consists of marine mammals harvested from the Northeast Cape?

3

- a. less than 25%
- b. 26-50%
- c. 51-75%
- d. greater than 75%

21. What land mammal species (e.g., reindeer) do you harvest from the Northeast Cape or from the Island for eating?

Leindred

22. During what time of year are land mammals harvested at Northeast Cape?

NN. Araust 1

1

and for how many days per year are they harvested?

23. Where specifically are the land mammals harvested? (Please mark on the attached map where the land mammals are harvested. Please use (LM) for the locations.)

24. How do you prepare the land mammals for eating? Please describe what you do for each species eaten and what parts you eat.

Lunder Only Meat, Heart, Lind, Fut, Raw, Cooled, Boiled, Fried

25. How often do you eat land mammals?



26. What percentage of your diet consists of land mammal species?

- a. less than 25%b. 26-50%
- c. 51-75%
- d. greater than 75%
- 27. What percentage of your diet consists of land mammal species harvested from the Northeast Cape?
  - a. less than 25% b. 26-50%

- c. 51-75%
- d. greater than 75%
- 28. What plant species do you harvest from the Northeast Cape

for eating? Salam Berries Chan Burnes.

8

for other uses (e.g., medicinal, spiritual, smoking, weaving, dying)?

29. What parts of the plants are consumed (e.g., leaves, stems, roots, berries)?

Bom?).

30. Which plants are usually found in lowland areas or near streams?

Salmonburge, Crowburges CB

31. From where are the plants harvested? (Please mark on the attached map where the plants are harvested. Please use (P) for the plant locations.)

32. During what months are the plants harvested?

August

33. How often do you eat plants harvested from the Northeast Cape?

meals/day meals/week meals/month

some for Winter

34. What percentage of your diet consists of plants?

- a. less than 25%
- c. 51-75%
- d. greater than 75%
- 35. What percentage of your diet consists of the plant species harvested from the Northeast Cape?

a. less	than 25%	X	
b. 26-5	0%	1	
c. 51-7	5%		
d. grea	ter than 75%		

36. Other than those food items already listed in you answers above, please list any other food items that are harvested from the Island's land or freshwater, or from the ocean surrounding the Island.





37. Please provide any other observations, comments?

38. Date the survey was completed. 39. Your name and age (optional). Clarence Waghiyi 693/4 40. May we contact you with questions? How may we reach you? Yes





## **Northeast Cape Site**

The U.S. Army Corps of Engineers is investigating and remediating environmental conditions at the former military installation at Northeast Cape. In addition to the ongoing building demolition and hazardous waste removal activities, the Army Corps is conducting an analysis of potential risks to human health and the environment due to exposure to contaminants remaining at the site. As part of these efforts, additional fish sampling will be conducted in the Suqitughneq River.

Your help in answering the following questions will assist the Corps with planning the field investigation, and analyzing the potential for any site-related risks.

#### Questions:

1. What fish species are present in the vicinity of Northeast Cape?

Current a. Historically (pre-1960 spill) trout white fish b. 2. During what time of year did you historically fish at Northeast Cape? year round and for how many days per year were they harvested? Summer - 4-5 days fail - 4-5 days 3. During what time of year are fish currently harvested at Northeast Cape? winter and for how many days per year are they harvested? 45 days 4. Where specifically are the freshwater and saltwater species currently harvested? (Please

4. Where specifically are the freshwater and saltwater species currently harvested? (Please mark on the attached map where the freshwater and the saltwater fish are harvested. Please use (F) for the freshwater and (S) for the saltwater.)



5. Do you harvest fish from the estuary/lagoon area at the mouth of the Suqitughneq River drainage?

a. YES b. NO

c. If YES, what species?

6. Which freshwater, fish species do you normally eat? trant white fish 7. How often do you eat freshwater fish? Please indicate the number of: meals/day meals/week 3 meals/month 8. Which saltwater fish species do you normally eat? Sculpin, halibut, palmon, rainbow trout. tom cods 9. How often do you eat saltwater fish? Please indicate the number of: meals/day meals/week 3 meals/month 10. What percentage of your diet is freshwater fish? a. less than 25% b. 26-50% c. 51-75% d. greater than 75% 11. What percentage of your diet is saltwater fish? a. less than 25% b. 26-50% c. 51-75% d. greater than 75% 12. What percentage of your diet is fish harvested at Northeast Cape? a. less than 25% b. 26-50% c. 51-75% d. greater than 75%

13. How do you prepare fish for eating? For each species eaten, please describe what you do and what parts you eat (e.g., whole body, fillets, specific body parts, other).

tom cods - eggs and liver esses are them Salmon openies everything Kcept eggs and lives these and au

14. What marine mammal species (e.g., whale, polar bear, walrus, seal) do you harvest from near Northeast Cape for eating?

minke whole; Gray whole; walrus, seals. mukluks. marres

15. During what time of year are marine mammals harvested at Northeast Cape?

and for how many days per year are they harvested?

16. Where specifically are the marine mammals harvested? (Please mark on the attached map where the marine mammals are harvested. Please use (MM) for the locations.)

17. How do you prepare the marine mammals for eating? Please describe what you do for each species eaten and what parts you eat.

whiles - ment; watrus everything werst the balls and ossike State, muklick some as watrus & birds meat 2 back and preast

18. How often do you eat marine mammals? Please indicate the number of:

meals/day meals/week meals/month

- 19. What percentage of your diet consists of marine mammal species?
  - a. less than 25%
  - b. 26-50%
  - c. 51-75%
  - d. greater than 75%
- 20. What percentage of your diet consists of marine mammals harvested from the Northeast Cape?
  - a. less than 25%
  - b. 26-50%
  - c. 51-75%
  - d. greater than 75%



21. What land mammal species (e.g., reindeer) do you harvest from the Northeast Cape or from the Island for eating?

reinder 22. During what time of year are land mammals harvested at Northeast Cape? and for how many days per year are they harvested? 23. Where specifically are the land mammals harvested? (Please mark on the attached map where the land mammals are harvested. Please use (LM) for the locations.) 24. How do you prepare the land mammals for eating? Please describe what you do for each species eaten and what parts you eat. reinder - everything but the innorth 25. How often do you eat land mammals? meals/day meals/week meals/month 26. What percentage of your diet consists of land mammal species? a. less than 25% b. 26-50% c. 51-75% d. greater than 75% 27. What percentage of your diet consists of land mammal species harvested from the Northeast Cape? a. less than 25% b. 26-50% c. 51-75% × d. greater than 75% 28. What plant species do you harvest from the Northeast Cape for eating?



for other uses (e.g., medicinal, spiritual, smoking, weaving, dying)?

29. What parts of the plants are consumed (e.g., leaves, stems, roots, berries)?

30. Which plants are usually found in lowland areas or near streams?



- 31. From where are the plants harvested? (Please mark on the attached map where the plants are harvested. Please use (P) for the plant locations.)
- 32. During what months are the plants harvested?

Spring; summer

33. How often do you eat plants harvested from the Northeast Cape?



34. What percentage of your diet consists of plants?

a. less than 25% \_\_\_\_\_ b. 26-50% \_\_\_\_\_ c. 51-75% \_\_\_\_\_

d. greater than 75%

- 35. What percentage of your diet consists of the plant species harvested from the Northeast Cape?
  - a. less than 25%
  - b. 26-50%
  - c. 51-75%
  - d. greater than 75%
- 36. Other than those food items already listed in you answers above, please list any other food items that are harvested from the Island's land or freshwater, or from the ocean surrounding the Island.

peacher i cucumber sul Dequired

37. Please provide any other observations, comments? sur an hur an perries 34 N.E worked at n . 0 . herti 01 ver dis 2 in Rit in

38. Date the survey was completed.

6-22-01

39. Your name and age (optional).

40. May we contact you with questions? How

How may we reach you?





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## **APPENDIX D**

Example Dose and Risk Calculations for Human and Ecological Receptors



#### HUMAN HEALTH EXPOSURE DOSE EQUATIONS

The example calculations below derive the total chemical-specific risk for Arsenic in soil at Site 9. This is a cancer risk calculation for a future permanent resident. Exposure parameters for this receptor are available in Table 3-6, Table 3-9, Table D-1 and Table D-2, where applicable.

#### INGESTION EXPOSURE PATHWAY

### CS x IR x CF x EF x ED

Ingestion Intake of Soil/Sediment/Dust (mg/kg-day) =

Where:

CS = Concentration in soil (milligrams per kilogram [mg/kg])

IR = Ingestion rate (milligrams [mg] soil/day)

- $CF = Conversion factor (10^{-6} kg/mg)$
- EF = Exposure frequency (days/year)
- ED = Exposure duration (years)
- BW = Body weight (kilogram [kg])
- AT = Averaging time (period over which exposure is averaged days)

The ingestion equation is used for both the adult and then the child receptors. The results are added together to attain an overall ingestion exposure pathway for human receptors.

#### <u>Adult: (17 mg/kg x 100 mg/kg-day x 10<sup>-6</sup>kg/mg x 270 days/year x 24 years)</u> = 6.2E-06 mg/kg-d (70 kg x 25,550 days)

# <u>Child:</u> (17 mg/kg x 200 mg/kg-day x $10^{-6}$ kg/mg x 270 days/year x 6 years) = 1.4E-05 mg/kg-d (15 kg x 25,550 days)

The adult and child soil ingestion doses are then added together to arrive at 2.1E-05 mg/kg-day. That value is then multiplied by the oral cancer slope factor for arsenic, 1.5E+00 (mg/kg-day)<sup>-1</sup>, to arrive at the pathway-specific cancer risk of 3.0E-05.

Soil ingestion pathway specific cancer risk	=	Soil Ingestion dose (mg/kg-day)	х	CSF (mg/kg-day) <sup>-1</sup>
3.1E-05		2.1E-05 mg/kg-d	х	1.5E+00 (mg/kg-day) <sup>-1</sup>

CSF = Cancer Slope Factor

#### DERMAL EXPOSURE PATHWAY

Dermal Intake for Soil/Sediment/Dust (mg/kg-day) =  $\frac{\text{CS x CF x SA x AF x ABS x EF x ED}}{\text{BW x AT}}$ 

Where:

- CS = Concentration in soil (mg/kg)
- $CF = Conversion factor (10^{-6} kg/mg)$
- SA = Skin surface area exposed (square centimeter [cm<sup>2</sup>])
- AF = Adherence factor of soil (mg/cm<sup>2</sup>-day)
- ABS = Skin absorption factor (unitless)
- EF = Exposure frequency (days/year)
- ED = Exposure duration (years)
- BW = Body weight (kg)
- AT = Averaging time (period over which exposure is averaged-days)

The dermal equation is used for both the adult and then the child receptors. The results are added together to attain an overall dermal exposure pathway for human receptors.


## <u>Adult:</u> (<u>17 mg/kg x 10<sup>-6</sup> kg/mg x 3,300 cm<sup>2</sup> x 0.2 mg/cm<sup>2</sup>-day x 0.03 x 270 days/yr x 24 yrs</u>) = 1.2E-06 mg/kg-d (70 kg x 25,550 days)

<u>Child:</u> (<u>17 mg/kg x 10<sup>-6</sup> kg/mg x 2,800 cm<sup>2</sup> x 0.2 mg cm<sup>2</sup>-day x 0.03 x 270 days/yr x 6 yrs</u>) = 1.2E-06 mg/kg-d (15 kg x 25,550 days)

The adult and child soil dermal doses are then added together to arrive at 2.4E-06 mg/kg-day. That value is then multiplied by the dermal cancer slope factor for arsenic, 1.5E+00 (mg/kg-day)<sup>-1</sup>, to arrive at the pathway-specific cancer risk of 3.6E-06.

Soil dermal pathway specific cancer risk = Soil Dermal dose (mg/kg-day) x  $CSF (mg/kg-day)^{-1}$ 3.6E-06 = 2.4E-06 (mg/kg-day) x 1.5E+00 (mg/kg-day)^{-1}

#### INHALATION EXPOSURE PATHWAY

Inhalation Intake for Indoor Dust (mg/kg-day) =  $\frac{CS \times (1/PEF) \times InhR \times EF \times ED}{BW \times AT}$ 

Where:

CS	= Concentration in soil (mg/kg)
PEF	= Particulate emission factor (1.3E+09) (cubic meters [m <sup>3</sup> ]/kg)
InhR	= Inhalation rate $(m^3/day)$
EF	= Exposure frequency (days/year)
ED	= Exposure duration (years)
BW	= Body weight (kg)
AT	= Averaging time (period over which exposure is averaged - days)

The inhalation equation is used for both the adult and then the child receptors. The results are added together to attain an overall inhalation exposure pathway for human receptors.

<u>Adult</u>:  $(17 \text{ mg/kg x } (1/1.3\text{E}+09 \text{ m}^3/\text{kg}) \text{ x } 20 \text{ m}^3/\text{day x } 270 \text{ days/yr x } 24 \text{ yrs}) = 9.5\text{E}-10 \text{ mg/kg-d}}{(70 \text{ kg x } 25,550 \text{ days})}$ 

<u>Child</u>:  $(17 \text{ mg/kg x} (1/1.3\text{E}+09 \text{ m}^3/\text{kg}) \times 10 \text{ m}^3/\text{day x} 270 \text{ days/yr x 6 yrs}) = 5.5\text{E}-10 \text{ mg/kg-d}}{(15 \text{ kg x} 25,550 \text{ days})}$ 

The adult and child soil inhalation doses are then added together to arrive at 1.5E-09 mg/kg-day. That value is then multiplied by the inhalation cancer slope factor for arsenic, 1.5E+01 (mg/kg-day)<sup>-1</sup>, to arrive at the pathway-specific cancer risk of 2.3E-08.

Soil inhalation pathway specific cancer risk = Soil inhalation dose  $(mg/kg-day) \times CSF (mg/kg-day)^{-1}$ 2.3E-08 = 1.5E-09  $(mg/kg-day) \times 1.5E+01 (mg/kg-day)^{-1}$ 

All three pathway-specific cancer risk values are then added together to obtain the chemical-specific risk for arsenic of 3.4E-05.

Ingestion risk(mg/kg-d) + Dermal risk(mg/kg-d) + Inhalation risk (mg/kg-d) = Chemical specific risk 3.1E-05 + 3.6E-06 + 2.3E-08 = 3.4E-05

This value is then summed with all other chemical-specific risks to attain the final incremental lifetime cancer risk (ILCR) for a particular receptor in a particular medium.



#### ECOLOGICAL EXPOSURE DOSE EQUATIONS

The example calculations below derive the total chemical-specific risk for Arsenic in soil at Site 9. Exposure parameters for ecological receptors are available in Table 3-21, Bioaccumulation Factors for use in Modeling Food Chain Exposures for Ecological Receptors are available in Table 3-22, and Ecological Toxicity Reference Values for Indicator Receptors are available in Tables 3-32 and 3-24, where applicable.

#### FOOD INGESTION RATE CALCULATIONS

Food ingestion rates (FIR) for each indicator receptor were calculated using allometric equations provided in USEPA's *Wildlife Exposure Factors Handbook* (USEPA, 1993) that are based on established relationships between body size and metabolic requirements. Food ingestion rates expressed in grams of food per day were calculated based on the following equations: 3-9 for the tundra vole 3-6 for the glaucous-winged gull, and 3-7 for the cross fox.

Equation 3-6 seabirds FIR  $(g/day) = 0.495 \times Wt^{0.704} (g)$ 

#### Equation 3-7 all mammals FIR $(g/day) = 0.235 \times Wt^{0.822} (g)$ or

FIR  $(kg/day) = 0.0687 \text{ x Wt}^{0.822} (kg)$ 

Equation 3-9 herbivores FIR  $(g/day) = 0.577 \times Wt^{0.727} (g)$ 

#### SKIN SURFACE AREA CALCULATIONS

The skin surface area (SSA) is an exposure parameter used to estimate dermal exposure of indicator receptors to soil COPECs. This parameter was calculated based on methods outlined in the *Wildlife Exposure Factors Handbook* (USEPA, 1993). Equation 3-22 was used to calculate exposure for mammals. Equation 3-21 was used to calculate exposure for birds. Exposed skin surface area was calculated assuming the area of the feet (4 percent of total skin surface area) for the tundra vole and the beak and legs (8 percent of total surface area) for the glaucous-winged gull. It was assumed that for the indicator receptors selected, fur or feathers would tend to protect other body surfaces from dermal exposure.

Equation 3-21 all birds  $SSA_{skin} (cm^2) = 10 \times Wt^{0.667} (g)$ 

Equation 3-22 all mammals  $SSA_{skin} (m^2) = 0.11 \text{ x Wt}^{0.65} (kg) \text{ or}$  $SSA_{skin} (cm^2) = 12.3 \text{ x Wt}^{0.65} (g)$ 

Notes:

FIR= Food Ingestion Rateg/day= Grams per daykg/day= Kilograms per dayWt= Average weight of indicator receptorSSA<sub>skin</sub>= Surface area of the receptor



#### WATER INGESTION RATE CALCULATIONS

The water ingestion rate is an exposure parameter used to estimate exposure of indicator receptors to surface water COPECs. This parameter was calculated based on methods outlined in the *Wildlife Exposure Factors Handbook* (USEPA, 1993). Equation 3-17 was used to calculate exposure for mammals. Equation 3-15 was used to calculate exposure for birds.

Equation 3-15 all birds WI (L/day) =  $0.059 \text{ x Wt}^{0.67}$  (kg)

Equation 3-17 all mammals WI (L/day) =  $0.099 \text{ x Wt}^{0.90}$  (kg)

Notes:

WI= Water Ingestion RateL/day= Liters per daykg= KilogramsWt= Average weight of indicator receptor

#### EXPOSURE DOSE CALCULATIONS

The initial step in calculating indicator receptor exposure doses is calculation of concentration in food items.

#### Average Concentrations of Chemicals of Potential Ecological Concern (COPEC) in Food Items

Food items include terrestrial plant tissues and herbivorous prey tissues. Actual concentrations in food items were used where available (i.e., plant and fish tissue sampled in site 28). For sites other than Site 28 – Drainage Basin (where plant and fish tissue concentrations were measured), estimating contaminant concentrations in plants is necessary for evaluating exposures to terrestrial indicator receptors. Estimating EPCs in plant and animal tissues were based on guidance in Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities (USEPA, 1999a). The media transfer and exposure dose equations presented in USEPA (1999a) are generic in nature, and are not specific to products of combustion (e.g., oxidized chemicals). USEPA (1999a) lists a variety of chemical classes that these methods are applicable to; these chemical classes are representative of the contaminant types present at the Northeast Cape Installation.

#### **Contaminant Concentration in Terrestrial Plant Tissues**

For the ecological assessment, COPEC concentrations in terrestrial plants ( $C_{PLANTS}$ ) were assumed to equal plant concentrations due to root uptake (Pr). The equation used to compute COPEC concentrations in terrestrial plants due to root uptake is:

#### $C_{PLANTS} = 0.12 \text{ x Pr}$

Where:

C <sub>PLANTS</sub> =	Total COPEC concentration in the plant (mg COPEC/kg wet tissue).
	Concentration of COPEC in the plant due to root uptake (mg/kg dry tissue)
0.12 =	Converts from dry tissue concentration to wet tissue concentration (USEPA, 1999a)

The concentration taken up by the roots is calculated by:

MWH

#### $Pr = C_{SOIL} \times BCF_{S-P}$

Where:		
P	r =	COPEC concentration in plant due to root uptake (mg/kg tissue)
	son. =	COPEC concentration in soil (mg/kg dry soil) Soil-to-terrestrial plant bioconcentration factor (kg dry soil/kg wet or dry tissue)

Because actual measured plant tissue concentrations were not taken at Site 9, we used the above presented equations to estimate plant concentrations.

0.12 x ( $C_{SOIL}$  x BCF<sub>S-P) = C<sub>PLANTS</sub> 0.12 x (17 mg/kg x 0.036) = 0.073 mg/kg</sub>

#### **Contaminant Concentrations in Herbivorous Prey Tissues**

The food chain model for indicator receptors considers one herbivorous prey species, the tundra vole. COPEC concentrations in herbivores depend on ingestion of abiotic media and plant matter. The equation for calculating COPEC concentrations in herbivores is:

$$C_{\text{HERB}} = (C_{\text{PLANT}} \times BCF_{\text{TL2/TL1}}) + (C_{\text{SOIL}} \times BCF_{\text{S-H}})$$

Where:

CHERB	=	COPEC concentration in herbivore (mg/kg wet tissue)
CPLANTS	=	Total COPEC concentration in the plant (mg COPEC/kg wet tissue)
BCFTL2/TL1	=	Plant-to-herbivore bioconcentration factor (kg wet plant tissue/kg wet herbivore
		tissue)
CSOIL	=	COPEC concentration in soil (mg/kg dry soil or dry sediment)
BCF <sub>S-H</sub>	=	Bioconcentration factor for soil-to-herbivore (kg dry media/kg wet tissue)

(0.073 mg/kg x 2.0E-03 + 17 mg/kg x 2.0E-03) = 0.034 (mg/kg wet tissue)

#### **Ingestion Dose Calculation**

Exposure dose calculation consolidates exposure pathways and routes, exposure point concentrations (EPCs), and exposure parameters into an equation that provides an exposure dose estimate in units of mg/kg-day.

Ingestion dose estimates were calculated using the following general equations derived from USEPA's Wildlife Exposure Factors Handbook (USEPA, 1993):

Dose 
$$_{\text{Ingestion}} = \frac{[(IR_{\text{Biotic}} \times C_{\text{Biotic}}) + (IR_{\text{Abiotic}} \times EPC_{\text{Abiotic}})] \times ED \times SUF \times UC}{BW}$$

Where:

•••		
	Dose Ingestion	= Estimated exposure dose from ingestion of food and ingestion of abiotic media (mg/kg-day)
	IR <sub>Biotic</sub>	= Food ingestion rate (mg/day)
	CBiotic	= Average concentration of COPEC in food items (mg/kg)
	IRAbiotic	= Abiotic media ingestion rate (mg/day)
	EPCAbiotic	= Concentration of COPEC in abiotic media (mg/kg) (referred to as C <sub>SOIL</sub> below)
	ED	= Exposure duration (unitless)
	SUF	= Site utilization factor (unitless)
	UC	= Unit conversion $10^{-6}$ kg/mg
	BW	= Body weight (kg)

#### Ingestion Dose for the Tundra Vole

 $= \frac{[(\text{IRplant x Cplant}) + (\text{IRsoil x Csoil}) + (\text{IRwater x Cwater})] \times \text{ED x SUF x 10^{-6}}}{(\text{BW})}$ 



## $= \frac{\left[(1.03\text{E}+04 \text{ mg/d x } 0.073 \text{ mg/kg}) + (2.47\text{E}+02 \text{ mg/d x } 17 \text{ mg/kg}) + (6.98\text{E}-03 \text{ L/d x } 0 \text{ mg/L})\right] \times 1 \times 1 \times 10^{-6}}{(5.25\text{E}-02 \text{ kg})}$

= 9.4E-02 mg/kg

#### **Ingestion Dose for the Cross Fox**

The ingestion dose equation for the Cross Fox includes modeling the concentration in the herbivore consumed by the fox. This concentration in represented by Canimal in the below presented dose equation. Canimal is calculated as follows:

Canimal = Cplant\*BCF<sub>TL2/TL1</sub>+Csoil\*BCF<sub>S-H</sub>

Where:

 $\begin{array}{ll} C_{animal} &= Modeled \ concentration \ in \ herbivorous \ prey \\ C_{plant} &= Concentration \ in \ plant \\ BCF_{TL2/TL1} = Biomagnification \ factor \ from \ trophic \ level \ 1 \ to \ trophic \ level \ 2 \\ C_{soil} &= Concentration \ in \ soil \\ BCF_{S-H} &= Bioconcentration \ factor \ from \ soil \ to \ herbivore \end{array}$ 

Canimal = 0.073 mg/kg x 0.002 mg tissue/kg herbivore tissue + 17 mg/kg x 0.002 mg tissue/kg herbivore tissue = 0.034 mg/kg

 $= \underline{[(\text{IRplant x Cplant}) + (\text{IRanimal x Canimal}) + (\text{IRsoil x Csoil}) + (\text{IRwater x Cwater})] \times \text{ED x SUF x 10}^{-6}}_{(BW)}$ 

 $= \frac{[(2.47E+05 mg/d x 0.073 mg/kg) + (2.23E+05 mg/d x 0.034 mg/kg) + (6.93E+03 mg/d x 17 mg/kg) + (4.02E-01 L/d x 0 mg/L)] x 1 x 6.80E-03 x 10^{-6}}{(1.122E-01)}$ 

(4.75E+00 kg)

= 1.8E-04 mg/kg

#### Ingestion Dose for the Glaucous-Winged Gull

 $= \frac{[(\text{IRplant x Cplant}) + (\text{IRanimal x Cfish}) + (\text{IRsoil x Csoil}) + (\text{IRwater x Cwater})] \times \text{ED x SUF x 10}^{-6}}{(\text{BW})}$ 

 $= [(4.08E+03 \text{ mg/d x } 0.073 \text{ mg/kg}) + (7.76E+04 \text{ mg/d x } 0 \text{ mg/kg}) + (7.80E+03 \text{ mg/d x } 17 \text{ mg/kg}) + (7.44E-02 \text{ L/d x } 0 \text{ mg/L})] \times 0.5 \times 9.5E-05 \times 10^{-6}$ 

(1.41 kg)

= 1.0E-08 mg/kg

Estimated exposure doses for each chemical and indicator receptor were compared to ecological TRVs to calculate a chemical-specific HQ and a total cumulative HI for each site. The equation for calculating HQ is:

 $HQ = \frac{Dose}{TRV}$ 

Where:

HQ= Hazard quotient (unitless)Dose= Modeled exposure dose for indicator species (mg/kg-day)TRV= Toxicity reference value for the indicator species (mg/kg-day)



**Tundra Vole:** = 9.4E-02 mg/kg = 0.0194.9E+00 mg/kg-d

Cross Fox: =  $\frac{1.8E-04 \text{ mg/kg}}{2.8E-01 \text{ mg/kg-d}} = 0.00064$ 

Glaucous-Winged Gull: = <u>1.0E-08 mg/kg</u> = 0.000000010 1.1E+00 mg/kg-d

HI were calculated by summing the HQs obtained from food chain modeling for all COPECs identified at Northeast Cape for each indicator receptor.

#### NOTES

Please note that the HQ calculations shown above include only two significant digits consistent with ADEC risk assessment policy. However actual calculations presented in Appendices F and H used more significant digits and rounding to two significant digits was not done at each step, but rather only done for presentation of the chemical-specific ecological HQ or cumulative human health HI.



#### **TABLE D-1**

Compound	ABS (unitless)	Source
norganics Arsenic	0.03	
Cadmium	0.001	a
All other inorganics	0	a
Organics		
Pentachlorophenol	0.25	а
Semivolatile organic compounds	0.10	а
All other Organic Compounds	0	а
PAHs		
Benzo(a)pyrene & other PAHs	0.13	а
PCBs		
Aroclors 1254/1242 & other PCBs	0.14	а
Dioxins & Furans	3 ·	
TCDD and other dioxins	0.03	а
Pesticides		
Chlordane	0.04	a
DDT	0.03	а
Lindane	0.04	а
Petroleum Hydrocarbons GRO (AK101)		
GRO Aliphatic	NA <sup>b</sup>	
GRO Aromatic	NA <sup>b</sup>	
DRO (AK102)		
DRO Aliphatic	NA <sup>b</sup>	
DRO Aromatic	NA <sup>b</sup>	
RRO (AK103) DRO Aliphatic	NA <sup>b</sup>	
DRO Aromatic	NA <sup>b</sup>	

#### DERMAL ABSORPTION FACTORS FOR CHEMICALS IN SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

#### Notes:

<sup>a</sup> Exhibit 3-4 from USEPA, 2001a. Risk Assessment Guidance for Superfund Voluem I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. Review Draft. September.

<sup>b</sup> Potential dermal exposures to DRO, GRO and RRO were not quantified in the HHRA due to uncertainties in route-to-route extrapolation methods (refer to Section 3.1.2.3.3). ABS - Dermal absorption factor.

#### DERMAL ABSORPTION FACTORS FOR CHEMICALS IN SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Compound	ABS (unitless)	Source
DRO - Diesel range organics.		
DDT - Dichlorodiphenyltrichloroethane.		
GRO - Gasoline range organics.		
NA - Not applicable.		
PAHs - Polynuclear aromatic hydrocarbons.		
PCBs - Polychlorinated biphenyls.		
RRO - Residual range organics.		
TCDD - Tetrachlorodibenzo-p-dioxin.		

#### TABLE D-2

#### PERMEABILITY COEFFICIENTS AND VOLATILITY FACTORS FOR COPCs IN WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Compound	Volatility Factor (m <sup>3</sup> /L) <sup>a</sup>	Permeabiltiy Coefficient (Kp) (cm/hr)	Kp Source
Inorganics			
Cadmium	NA	1.0E-03	b
Chromium VI	NA	2.0E-03	b
Cobalt	NA	4.0E-04	b
Lead	NA	1.0E-04	b
Mercury	NA	1.0E-03	b
Nickel	NA	2.0E-04	b
Potassium	NA	2.0E-03	b
Silver	NA	6.0E-04	b
Zinc Chloride	NA	6.0E-04	b
All other inorganics	NA	1.0E-03	b
Volatile Organic Compounds			
4-Isopropyltoluene	2.5E-03 °	1.2E-01	b
Benzene	1.2E-03	2.1E-02	b
Ethylbenzene	1.8E-03	7.4E-02	b
Methylene Chloride	4.8E-04	4.5E-03	b
n-Propylbenzene (Isocumene)	2.9E-03	3.1E-01	b
sec-Butylbenzene	4.1E-03 <sup>d</sup>	8.0E-02	b
Toluene	1.4E-03	4.5E-02	b
Trichloroethylene (TCE)	2.3E-03	1.6E-02	b
Semivolatile Organic Compounds bis(2-ethylexyl)phthalate (DEHP)	na 5.9E-08	na 2.5E-02	b
Polychlorinated Biphenyls Aroclor 1260	na	4.3E-01	b
Polynuclear Aromatic Hydrocarbons Naphthalene	NA	6.9E-02	b
Pesticides	NA	na	
Dioxins & Furans 2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD) Toxicity Equivalents (TEQ)	NA	8.1E-01	b
Petroleum Hydrocarbons			
GRO (AK101)	1.9E-03		
GRO Aliphatic	NA	Inc	
GRO Aromatic	NA	Inc	
DRO (AK102)	9.6E-05		
DRO Aliphatic	NA	Inc	
DRO Aromatic	NA	Inc	
RRO (AK103)	1.0E-07		
DRO Aliphatic	NA	Inc	
DRO Aromatic	NA	Inc	

#### TABLE D-2

#### PERMEABILITY COEFFICIENTS AND VOLATILITY FACTORS FOR COPCs IN WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

an (1990).			
	an (1990). 2001. Risk A		an (1990). 2001. Risk Assessment Guidance for Superfund

Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim. Review Draft - For Public Comment. September, 2001.

<sup>c</sup> Isopropylbenzene was used as a surrogate, based on similarities in chemical structure.

<sup>d</sup> Butylbenzene was used as a surrogate based on similar chemical structure.

## APPENDIX E

Human Health Tier 1 Screening Tables



## Table E-1 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 3

#### Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data					Regulatory	Regulatory COPC Screening	
	Maximum	Minimum	Number of		Detection	BUTL (mg/kg) <sup>a</sup>		Criteria <sup>b</sup>	Benchmark <sup>e</sup>	COPC?
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics										
Chromium	12	9.8	2	2	1.0	48	50	26	2.6	No
Copper	22	9	2	2	1.0	107	44	4,060	406	No
Lead	119	27	3	3	1.0	106	112	400 <sup>d</sup>	40	Yes
Nickel	16	8	2	2	1.0	59	30	87	8.7	No
Zinc	118	35	2	2	1.0	615	157	9,100	910	No
VOCs									0.0015	Vee
Methylene chloride	0.0093	0.0093	1	1	1.0	nc	nc	0.015	0.0015	Yes
PCBs										
PCB-1260 (Aroclor 1260)	0.75	0.29	2	2	1.0	nc	nc	10	1	No
PAHs										
Anthracene	10.29	10.29	3	1	0.3	nc	nc	4,300	430	No
Naphthalene	50.8	50.8	4	1	0.3	nc	nc	21	2.1	Yes
Petroleum Hydrocarbons										v
Diesel Range Organics (DRO)	3,760	314	6	5	0.8	nc	nc	250	25	Yes
TRPH	6,550	393	3	3	1.0	nc	nc	NA °	NA	No

Notes:

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons

TRPH - Total Residual Petroleum Hydrocarbons

Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

#### Table E-1

Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil

Site 3

		Soil Gra	vel Data				Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb		Detection Frequency	BUTL (mg/kg) <sup>a</sup> Soil Tundra Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>e</sup> (mg/kg)	COPC? (Yes/No)
Constituent <sup>b</sup> Regulatory Criteria is equal to the minin	Detect (Ing/kg/	leanun Level pro	posed by the	followin	g hierarchy:				
1. Minimum of 3 pathways listed in Tab	les B1 and B2. Un	der 40 inch zone:	ADEC, 200	3. 18 AA	C 75 Oil and				
Hazardous Substances Pollution Control.									
<ol> <li>Minimum of 3 pathways listed in Tab</li> </ol>	les B1 and B2. Un	der 40 inch zone:	ADEC, 200	2. Oil an	d Other				
Hazardous Substances Pollution Control.	Public Comment	Draft. 18 AAC 7	5. Decemb	er 14.					
3. Minimum of 3 pathways listed in Tab	les B1 and B2, Un	der 40 inch zone:	ADEC, 200	2. Cumu	lative Risk				
Guidance November 7									
4 Minimum of 3 pathways listed in Tab	les B1 and B2, Un	der 40 inch zone:	ADEC, 200	1. Calcul	lated Cleanup				
Levels for Compounds without Tabular	Values in Site Clea	nup Rules - Tech	nical Memor	randum 0	1-007.				
December 18.									
<sup>e</sup> Benchmark Criteria is equal to 1/10 the	e indicated regulate	ory criteria							
<sup>d</sup> Screening Criteria for lead is based on Procedures Manual guidance (18 AAC 7	residential cleanup	value calculated	according to	o Risk As	sessment				
<sup>c</sup> TRPH is excluded as a COPC due to o		ethods.							

#### Table Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 3

Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsur	face Water	Data				Regulatory	COPC Screening	CODCA
	Maximum	Minimum	Numb	Number of		Subsurface Wate	r BUTL (mg/L) *	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No
VOCs							nc	0.7	0.07	No
Ethylbenzene	0.066	0.066	1	1	1.0	nc			1	No
Xylenes	0.54	0.54	1	1	1	nc	nc	10	1	110
PAHs										Nie
Fluorene	0.0012	0.0012	1	1	1.0	nc	nc	1.46	0.146	No
Naphthalene	0.013	0.013	1	1	1.0	nc	nc	1.46	0.146	No
Naphulaiene	01010									
D. ()										
Petroleum Hydrocarbons		1.8	4	4	1.0	nc	nc	1.5	0.15	Yes
Diesel Range Organics (DRO)	14					nc	nc	1.1	0.11	Yes
Residual Range Organics (RRO)	8.1	1.3	3	3	1.0	nc	ne			

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

na - Not available.

nc - Not calculated.

PAH - Polynuclear Aromatic Hydrocarbons

VOC - Volatile Organic Compounds

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

#### Table E-3 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 4

Northeast Cape, St. Lawrence Island, Alaska

		Soil Tur	dra Data				Soil Gra	vel Data		Detection	BUTL (	mg/kg)*	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>°</sup>	COPC?
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)		ber of Detects	Detection Frequency	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)		Detects		the second se	Soil Gravel		(mg/kg)	(Yes/No)
Inorganics Lead	160	7.4	2	2	1.0	na	na	na	na	na	106	112	400 <sup>d</sup>	40	Yes
PAHs Anthracene Chrysene Fluorene	na na na	na na na	na na na	na na na	na na na	14 11 13	14 11 13	1 1 1	1 1 1	1.0 1.0 1.0	nc nc nc	nc nc nc	4,300 620 270	430 62 27	No No No
Petroleum Hydrocarbons Diesel Range Organics (DRO) Residual Range Organics (RRO) TRPH	5,300 na 47,000	150 na 690	3 na 3	3 na 3	1.0 na 1.0	459 3,420 na	459 3,420 na	l 1 na	1 1 na	1.0 1.0 na	nc nc nc	nc nc nc	250 10,000 NA *	25 1,000 NA	Yes Yes No

Notes:

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons TRPH - Total Residual Petroleum Hydrocarbons

 Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:
 Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and

1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 men 2010. Re-Hazardous Substances Pollution Control. January 30.

Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other

Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

 Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

<sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).

\* TRPH is excluded as a COPC due to outdated analysis methods.

#### Tab Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 4 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsurf	face Water	Data				Regulatory	COPC Screening	
			Numb	per of	Detection	Subsurface Wate	r BUTL (mg/L) *	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
VOCs										
Xylenes	0.0069	0.0069	1	1	1.0	nc	nc	10	1	No
Petroleum Hydrocarbons									0.15	Vee
Diesel Range Organics (DRO)	3.7	0.96	4	4	1.0	nc	nc	1.5	0.15	Yes
Residual Range Organics (RRO)	6.5	2.6	3	3	1.0	nc	nc	1.1	0.11	Yes

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liters.

na - Not available.

nc - Not calculated.

VOC - Volatile Organic Compounds

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).
\* Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

#### Table E-5

#### Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil

Site 6

Northeast Cape, St. Lawrence Island, Alaska

		Soil Tur	dra Data				Soil Gra	avel Data					Regulatory	COPC Screening	
			Num	ber of	Detection	Maximum	Minimum	Numb		Detection		mg/kg)	Criteria <sup>b</sup>		COPC?
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Samples	Detects	Frequency	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	COPC Screening Benchmark ( (mg/kg)	(Yes/No
Inorganics															¥
Aluminum	9,850	9,850	1	1	1.0	7,790	7,790	1	1	1.0	30,357	nc	na		Yes
Arsenic	4.1	4.1	1	1	1.0	1.6	1.6	1	1	1.0	7.8	11	2		No
Barium	53.8	53.8	1	1	1.0	53	53	1	1	1.0	174	nc	1,100		No
	0.8	0.8	4	1	0.25	1.3	0.6	9	2	0.22	3.8	nc	42		Yes
Beryllium	2,360	2,360	1	1	1.0	1,790	1,790	1	1	1.0	nc	nc	NA		No
Calcium	2,500	13.9	4	3	0.75	18	6	9	9	1.0	48	50	26	2.6	No
Chromium	5.1	5.1	1	1	1.0	2	2	1	1	1.0	49	nc	na		Yes
Cobalt	23	8	4	4	1.0	17	7.4	9	9	1.0	107	44	4,060		No
Copper		16,400	1	1	1.0	12,200	12,200	1	1	1.0	nc	nc	NA		No
Iron	16,400 34	13	4	4	1.0	71	8	9	9	1.0	106	112	400 <sup>d</sup>		No
Lead	2,900	2,900	1	1	1.0	1,530	1,530	1	1	1.0	nc	nc	NA	NA	No
Magnesium		164	1		1.0	72.7	72.7	1	1	1.0	1,589	nc	па		Yes
Manganese	164	9	4	3	0.75	10	5	9	9	1.0	59	30	87		No
Nickel	15	820	1	1	1.0	1,500	1,500	1	1	1.0	nc	nc	NA		No
Potassium	820		1	1	1.0	450	450	1	1	1.0	nc	nc	NA	NA	No
Sodium	160	160		1	1.0	16	16	1	1	1.0	73	nc	710	71	No
Vanadium	25.8	25.8	1		1.0	172	20	9	9	1.0	615	157	9,100	910	No
Zinc	93	29.8	4	4	1.0	172	20								
VOCs							1			0.11	na	na	5.5	0.55	No
Ethylbenzene	0.00088	0.00088	5	1	0.20	0.012	0.012	9	1	0.33		na	na		Yes
m,p-Xylene	0.0033	0.0033	2	1	0.50	0.044	0.044	3	1		па na	na	0.015		Yes
Methylene chloride	0.0076	0.0076	1	1	1.0	0.0079	0.0044	2	2	1.0		na	na		Yes
o-Xylene	0.001	0.001	2	1	0.50	0.014	0.014	3	1	0.33	na		5.4		No
Toluene	0.0047	0.0047	5	1	0.20	0.078	0.0052	9	3	0.33	na	na	5.4		
Petroleum Hydrocarbons													250	25	Yes
Diesel Range Organics (DRO)	4,660	34	4	4	1.0	102,000	12	13	13	1.0	na	na	10,000		Yes
Residual Range Organics (DRO)	370	220	1	1	1.0	8,500	880	5	5	1.0	na	na	NA <sup>e</sup>		No
TRPH	19,200	31	3	3	1.0	262,000	67	8	8	1.0	na	na	NA .		

Notes:

NA - Not available.

na - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit. mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons

TRPH - Total Residual Petroleum Hydrocarbons

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

\* Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

Tal Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 6 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tur	dra Data			Soil Gr	avel Data			-	Regulatory	COPC Screening	COPC?
Constituent	Maximum Detect (mg/kg)		Number of	Detection Frequency	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)		ber of Detects	Detection Frequency	BUTL (mg/kg) Soil Tundra Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark * (mg/kg)	(Yes/No)
Minimum of 3 pathways listed in ubstances Pollution Control. Januar Minimum of 3 pathways listed in	rv 30.												
Minimum of 3 pathways listed in ubstances Pollution Control. Public Minimum of 3 pathways listed in lovember 7.	c Comment Draft. 18 AAC	75. December 14.											
<ol> <li>Minimum of 3 pathways listed in Compounds without Tabular Values</li> </ol>	Tables B1 and B2, Under 44 in Site Cleanup Rules - Tec	0 inch zone: ADEC, hnical Memorandum	2001. Calculated Clean 01-007. December 18.	up Levels for									
Benchmark Criteria is equal to Screening Criteria for lead is ba	1/10 the indicated regulat ased on residential cleanu	ory criteria. p value calculated	according to Risk Ass	essment Proc	edures Manual gu	idance (18 AAC	75.340).						
TRPH is excluded as a COPC of	due to outdated analysis m	nethods.											
This analyte is excluded as a Co	OPC due to status as an es	ssential nutrient.											

### Table E-6 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 6

		Shallow Subsur	face Water	Data				Regulatory	COPC Screening	
			Numt		Detection	Subsurface Water	r BUTL (mg/L) *	Criteria b	Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect (mg/L)	Minimum Detect (mg/L)			Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total	<b>70 0</b>	70 7	1	1	1.0	nc	nc	na	na	Yes
Aluminum	78.3	78.3	1	1	1.0	0.025	nc	0.05	0.005	No
Arsenic	0.022	0.022		1	1.0	nc	nc	2	0.2	Yes
Barium	0.406	0.406	1		1.0	0.021	nc	0.004	0.0004	No
Beryllium	0.02	0.004	2	2	0.5	0.060	nc	0.005	0.0005	No
Cadmium	0.006	0.006	2	1		nc	nc	NA *	NA	No
Calcium	15.8	15.8	1	1	1.0	1.7	nc	0.1	0.01	No
Chromium	1.22	0.37	2	2	1.0		nc	na	na	Yes
Cobalt	0.052	0.052	1	1	1.0	0.011		1.3	0.13	Yes
Copper	0.27	0.26	2	2	1.0	0.087	nc	NA °	NA	No
Iron	98.8	98.8	- 1	1	1.0	nc	nc	0.015 <sup>d</sup>	0.0015	Yes
Lead	0.23	0.16	2	2	1.0	0.013	nc	NA °	NA	No
Magnesium	15.6	15.6	1	1	1.0	nc	nc		na	Yes
	1.58	1.58	1	1	1.0	0.20	nc	na	0.0002	No
Manganese	0.0001	0.0001	1	1	1.0	0.00041	nc	0.002	0.002	Yes
Mercury	1.68	0.23	2	2	1.0	0.056	nc	0.1		No
Nickel	7.92	7.92	1	1	1.0	nc	nc	NA °	NA	No
Potassium	17.7	17.7	1	1	1.0	nc	nc	NA °	NA	
Sodium	0.002	0.002	2	1	0.5	nc	nc	0.002	0.0002	Yes
Thallium		0.153	1	1	1.0	0.10	nc	0.26	0.026	Yes
Vanadium	0.153		2	2	1.0	0.29	nc	11	1.1	Yes
Zinc	17.7	0.8	2	2	110					
Inorganics, Dissolved								0.015	0.0015	Yes
Lead, Dissolved	0.002	0.002	1	1	1.0	nc	nc	0.015		
VOCs					0.50		na	22	2.2	No
2-Butanone	0.017	0.017	2	1	0.50	na	na	3.65	0.365	No
Acetone	0.035	0.0053	2	2	1.0	na	na	0.005	0.0005	Yes
Benzene	0.0035	0.0035	3	1	0.33	na		1.0	0.1	No
Toluene	0.0074	0.0074	3	1	0.33	na	na	1.0		
, crushe										
Petroleum Hydrocarbons		0.27	4	3	0.75	na	na	1.5	0.15	Yes
Diesel Range Organics (DRO)	1.7	0.27	4	5	0.70					

# Tab Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 6

Maximum         Number of         Detection         Subsurface water BOTE (mg/L)         Other Machine           Constituent         Detect (mg/L)         Detect (mg/L)         Samples         Detects         Frequency         Shallow         Deep         (mg/L)         (mg/L)         (Yes/			Shallow Subsur	face Water	Data			Regulatory	COPC Screening	
Constituent         Detect (mg/r.)         Detect (mg		-				•				COPC? (Yes/No)
Gasoline Range Organics (GRO)       0.08       0.08       5       1       0.33       1       0.43       1         Notes:       BUTL - Background upper tolerance limit.       COPC - Chemcial of Potential Concern.       1										No
BUTL - Background upper tolerance limit. COPC - Chemcial of Potential Concern. mg/L - Milligrams per liter. NA - Not applicable. na - Not available. na - Not available. na - Not available. na - Not available. na - Not available. NOC - Volatile Organic Compounds * Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003). * Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below. ADEC Groundwater Cleanup Levels Table C. ADEC Groundwater Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18. ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14. * Benchmark Criteria is equal to 11/10 the indicated regulatory criteria. * Genchmark Criteria is equal to 11/10 the indicated regulatory criteria.	Gasoline Range Organics (GRO)	0.08	0.08	3		0.33	lla	 		
COPC - Chemcial of Potential Concern.         mg/L - Milligrams per liter.         NA - Not applicable.         na - Not available.         ne - Not calculated.         VOC - Volatile Organic Compounds         * Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of         Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska         MWH, 2003).         * Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most         recent guidance documents, below.         ADEC, Groundwater Cleanup Levels Table C.         ADEC, Groundwater Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules -         Technical Memorandum 01-007. December 18.         ADEC, Groundwater Cleanup Levels Table C.         ADEC, Groundwater Cleanup Levels Table C.         ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75.         December 14.         * Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.         * Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment	Notes:									
mg/L - Milligrams per liter.         NA - Not applicable.         na - Not available.         ne - Not calculated.         VOC - Volatile Organic Compounds         * Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of         Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska         (MWH, 2003).         * Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most         recent guidance documents, below.         ADEC Groundwater Cleanup Levels Table C.         ADEC, Groundwater Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules -         Technical Memorandum 01-007. December 18.         ADEC Groundwater Cleanup Levels Table C.         ADEC, 2001. Calculated Cleanup Levels Pollution Control. Public Comment Draft. 18 AAC 75.         December 14.         * Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.         * Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment	BUTL - Background upper tolerance limit.	р. — — — — — — — — — — — — — — — — — — —								
<ul> <li>NA - Not applicable.</li> <li>na - Not available.</li> <li>nc - Not calculated.</li> <li>VOC - Volatile Organic Compounds</li> <li>* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li>* Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li>* Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li>* Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	COPC - Chemcial of Potential Concern.									
na - Not available. nc - Not calculated. VOC - Volatile Organic Compounds * Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003). * Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below. ADEC Groundwater Cleanup Levels Table C. ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18. ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14. * Benchmark Criteria is equal to 1/10 the indicated regulatory criteria. * Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment	mg/L - Milligrams per liter.									
<ul> <li>nc - Not calculated.</li> <li>VOC - Volatile Organic Compounds</li> <li>Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li>Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li>Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li>Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	NA - Not applicable.									
<ul> <li>VOC - Volatile Organic Compounds</li> <li>Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li>Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li>Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li>Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	na - Not available.									
<ul> <li>Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li><sup>b</sup> Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li><sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li><sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	nc - Not calculated.									
<ul> <li>Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li><sup>b</sup> Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C.</li> <li>ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C.</li> <li>ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li><sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li><sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	VOC - Volatile Organic Compounds									
<ul> <li>Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li><sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li><sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	recent guidance documents, below.	e C								
<ul> <li>ADEC Groundwater Cleanup Levels Table C.</li> <li>ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75.</li> <li>December 14.</li> <li><sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li><sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	Technical Memorandum 01-007. Dec	cember 18.								
<ul> <li><sup>c</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li><sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	ADEC, 2002. Oil and Other Hazardo	e C. us Substances Po	ollution Control. P	ublic Comr	nent Draft	. 18 AAC 75.				
<sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment		indicated regulate	ory criteria.							
	<sup>d</sup> Screening Criteria for lead is based on re	esidential cleanu		according t	o Risk Ass	essment				

## Table E-7 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 7

			Soil Tun	dra Data					Regulatory	COPC Screening	5
		Maximum	Minimum	Numb	er of	Detection	BUTL (1		Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent				Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics											V
Aluminum		12,000	3,640	5	5	1.0	30,357	nc	na	na	Yes
rsenic		50	2.0	18	18	1.0	7.8	11	2	0.2	Yes
arium		135	28	5	5	1.0	174	nc	1,100	110	No
eryllium		2.3	0.40	19	8	0.42	3.8	nc	42	4.2	No
		4.1	1.0	19	9	0.47	1.4	3.1	5	0.5	Yes
admium		5,070	1,780	5	5	1.0	nc	nc	NA °	NA	No
alcium		100	5.0	19	18	0.95	48	50	26	2.6	Yes
hromium		19	2.0	5	5	1.0	49	nc	na	na	Yes
obalt		320	6.6	19	19	1.0	107	44	4,060	406	No
opper			8,380	5	5	1.0	nc	nc	NA °	NA	No
on		152,000	10	20	20	1.0	106	112	400 <sup>d</sup>	40	Yes
ead		460		5	5	1.0	nc	nc	NA °	NA	No
lagnesium		3,180	740	5	5	1.0	1,589	nc	na	na	Yes
langanese		694	55.3		4	0.22	0.43	nc	1.4	0.14	Yes
fercury		0.56	0.10	18		0.22	59	30	87	8.7	Yes
lickel		280	5.0	19	16	1.0	nc	nc	NA °	NA	No
otassium		1,080	370	5	5	0.11	nc	nc	21	2.1	No
ilver		2.0	2.0	19	2		nc	nc	NA °	NA	No
odium		210	120	5	5	1.0	1.6	0.56	na	na	Yes
hallium		1.2	0.28	2	2	1.0			710	71	No
anadium		31	9.8	5	5	1.0	73	nc 157	9,100	910	No
Zinc		540	29	19	19	1.0	615	157	9,100	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
VOCs			0.14	10	3	0.30	na	na	1	0.1	Yes
,1,1-Trichle	oroethane	0.28	0.14	10	4	0.40	na	na	10	1	Yes
Acetone		1.4	0.048		5	0.40	na	na	na	na	Yes
Bromoethan	e	0.4	0.098	10		0.10	na	na	na	na	Yes
n,p-Xylene		0.13	0.13	10	1		na	na	0.015	0.0015	Yes
Methylene c		0.013	0.0065	9	4	0.44	па	na	0.0.0		

#### Tab Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil

Site 7

		Soil Tun	dra Data		-			Regulatory	COPC Screening	3
	Maximum	Minimum	Numb	er of	Detection	BUTL (		Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent		Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	kg) <sup>a</sup> Criteria (mg/kg)Benchmark c (mg/kg)na5.40.54na5.40.54nanananananana1700170na101na <th>(Yes/No)</th>	(Yes/No)	
Toluene	0.14	0.026	19	3	0.16	na	na	5.4	0.54	No
SVOCs										Ver
4-Methylphenol (p-Cresol)	3.9	1.7	14	3	0.21	na	na			Yes
Di-n-butyl phthalate	3.0	3.0	14	1	0.07	na	na	1700	170	No
PCBs										Yes
PCB-1260 (Aroclor 1260)	13	0.13	22	4	0.18	na	na	10	1 .	res
Dioxins & Furans										Ver
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00052	0.0000011	13	4	0.31	na	na	na		Yes
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.020	0.00000091	13	12	0.92	na	na	na		Yes
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.00016	0.00000043	12	4	0.33	na	na	na		Yes
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.0011	0.00000047	13	8	0.62	na	na	na		Yes
	0.0000013	0.0000013	13	1	0.08	na	na	na	na	Yes
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.000027	0.00000012	13	4	0.31	na	na	na	na	Yes
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0000020	0.0000020	13	1	0.08	na	na	na	na	Yes
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.000011	0.000011	13	1	0.08	na	na	na	na	Yes
1,2,3,6,7,8-Hexachlorodibenzofuran	0.000046	0.00000019	13	4	0.31	ňa	na	na	na	Yes
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0000040	0.00000040	13	1	0.08	na	na	na	na	Yes
1,2,3,7,8,9-Hexachlorodibenzofuran		0.0000001	13	2	0.15	na	na	na	na	Yes
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.000031	0.0000045	13	1	0.08	na	na	na	na	Yes
1,2,3,7,8-Pentachlorodibenzofuran	0.0000045	0.0000043	13	1	0.08	na	na	na	na	Yes
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0000015		13	8	0.62	na	na	na	na	Yes
2,3,4,6,7,8-Hexachlorodibenzofuran	0.000019	0.00000041	13	1	0.08	na	na	na	na	Yes
2,3,4,7,8-Pentachlorodibenzofuran	0.000012	0.000012	13	6	0.46	na	na	na	na	Yes
2,3,7,8-Tetrachlorodibenzofuran	0.000029	0.0000028		1	0.33	na	na	na	na	Yes
Total Heptachlorodibenzofurans (HpCDF)	0.00053	0.00053	3	2	0.55	na	na	na	na	Yes
Total Heptachlorodibenzo-p-dioxins (HpCDD)	0.0022	0.000095	3	2	0.33	na	na	na	na	Yes
Total Hexachlorodibenzofurans (HxCDF)	0.00019	0.00019	3	1	0.55					

# Table E-7 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 7 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data					Regulatory	COPC Screening	
	Maximum	Minimum	Numb	er of Detects	<b>Detection</b> Frequency	BUTL (1 Soil Tundra		Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Constituent	Detect (mg/kg)	Detect (mg/kg)	3	1	0.33	na	na	na	na	Yes
Total Hexachlorodibenzo-p-dioxins (HxCDD)	0.00034	0.00034	(****)	1	0.33	na	na	na	na	Yes
Total Pentachlorodibenzofurans (PeCDF)	0.00011	0.00011	3	1	0.33	na	na	na	na	Yes
Total Tetrachlorodibenzofurans (TCDF)	0.00015	0.00015	3	1				na	na	Yes
Total Tetrachlorodibenzo-p-dioxins (TCDD)	0.000039	0.000039	3	I	0.33	na	na	lia	ha	100
PAHs					0.053			43	4.3	No
2-Methylnaphthalene	0.047	0.047	19	1	0.053	na	na		0.1	No
Benzo(a)pyrene	0.082	0.082	19	1	0.053	na	na	1		No
Benzo(b)fluoranthene	0.014	0.014	19	1	0.053	na	na	11	1.1	No
Benzo(k)fluoranthene	0.014	0.014	19	1	0.053	na	na	110	11	
Chrysene	0.035	0.013	19	2	0.11	na	na	620	62	No
Naphthalene	0.027	0.027	20	1	0.050	na	na	21	2.1	No
Phenanthrene	0.014	0.014	19	1	0.053	na	na	4,300	430	No
	0.026	0.013	19	2	0.11	na	na	1,500	150	No
Pyrene	01020									
Petroleum Hydrocarbons								250	25	Yes
Diesel Range Organics (DRO)	32,000	11	24	21	0.88	na	na	250		Yes
Residual Range Organics (RRO)	3,900	620	7	7	1.0	na	na	10,000	1,000	
TRPH	156,000	18	14	14	1.0	na	na	NA	NA	No

Notes:

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons

TRPH - Total Residual Petroleum Hydrocarbons

Taur 2-7 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 7

			Soil Tur	dra Data		-	Regulatory	COPC Screening Benchmark <sup>c</sup> (mg/kg)	;
Constituent		Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Number of Samples Detects	_ Detection Frequency	BUTL (mg/kg) <sup>a</sup> Soil Tundra Soil Gravel	Criteria <sup>b</sup> (mg/kg)		COPC? (Yes/No)
Constituent									
<sup>a</sup> Please refer to Techni	cal Memorandum-Back	ground Determinat	ion for Risk Asse	ssment, Derivation o	f Ambient				
Concentrations for Abie	otic Media Associated w	with the Northeast C	ape, St. Lawrence	e Island, Alaska (MV	VH, 2003).				
<sup>b</sup> Regulatory Criteria is	equal to the minimum A	ADEC Soil Cleanup	Level proposed	by the following hier	archy:				
1. Minimum of 3 pathway	s listed in Tables B1 and	B2, Under 40 inch zo	ne: ADEC, 2003.	18 AAC 75 Oil and Ha	zardous				
Substances Pollution Con	trol. January 30.								
2. Minimum of 3 pathway	ys listed in Tables B1 and	B2, Under 40 inch zo	ne: ADEC, 2002.	Oil and Other Hazardou	is Substances				
Pollution Control. Public	Comment Draft. 18 AAC	75. December 14.	ADEC 2002	Cumulative Rick Guida	nce				
	ys listed in Tables B1 and	B2, Under 40 inch 20	me: ADEC, 2002.	Cullulative Risk Oulda	ince.				
November 7.	ys listed in Tables B1 and	B2 Under 40 inch zo	ne: ADEC. 2001.	Calculated Cleanup Le	vels for				
Compounds without Tabu	lar Values in Site Cleanup	Rules - Technical M	emorandum 01-00	7. December 18.					
	s equal to 1/10 the indic								
	-			line to Diele Assessm	ant Procedures				
	lead is based on reside	ntial cleanup value	calculated accord	ing to Risk Assessin	ent riocedures				
Manual guidance (18 A		2							
e This analyte is exclude	led as a COPC due to st	atus as an essential	nutrient.						
This unaryte is exerue	a COPC due to outdated								

### Table E-8 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 7 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsur			-			Regulatory	COPC Screening Benchmark <sup>e</sup>	COPC?
	Maximum	Maximum	Num	Detects	Detection Frequency	Subsurface Water Shallow	r BUTL (mg/L) " Deep	Criteria <sup>b</sup> (mg/kg (mg/L)	Benchmarк (mg/L)	(Yes/No)
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Trequency	Unanow				
Inorganics, Total										Yes
Aluminum	26	11	3	3	1.0	nc	nc	na	na	
Arsenic	0.010	0.0040	4	3	0.75	0.025	nc	0.05	0.005	No
Barium	0.13	0.13	3	3	1.0	nc	nc	2	0.2	Yes
Beryllium	0.0020	0.0020	4	1	0.25	0.021	nc	0.004	0.0004	No
Calcium	7.6	4.0	3	3	1.0	nc	nc	NA °	NA	No
Chromium	0.26	0.014	4	3	0.75	1.7	nc	0.1	0.01	No
Cobalt	0.064	0.0040	3	3	1.0	0.011	nc	na	na	Yes
Copper	0.067	0.011	4	3	0.75	0.087	nc	1.3	0.13	No
Iron	47	11	3	3	1.0	nc	nc	NA °	NA	No
Lead	0.040	0.005	4	4	1.0	0.013	nc	0.015 <sup>d</sup>	0.0015	Yes
Magnesium	3.8	3.6	3	3	1.0	nc	nc	NA °	NA	No
	0.59	0.060	3	3	1.0	0.20	nc	na	na	Yes
Manganese	0.00020	0.00020	4	2	0.50	0.00041	nc	0.002	0.0002	No
Mercury	3.5	3.5	4	1	0.25	0.056	nc	0.1	0.01	Yes
Nickel Potassium	5.3	1.6	3	3	1.0	nc	nc	NA °	NA	No
Sodium	13	8.5	3	3	1.0	nc	nc	NA °	NA	No
Vanadium	0.079	0.029	3	3	1.0	0.10	nc	0.26	0.026	No
Zinc	2.5	0.020	4	3	0.75	0.29	nc	11	1.1	Yes
VOCs					0.05		nc	22	2.2	No
2-Butanone	0.013	0.013	4	1	0.25	nc		3.65	0.365	No
Acetone	0.028	0.019	4	2	0.50	nc	nc	0.005	0.0005	Yes
Benzene	0.0021	0.0021	5	1	0.20	nc	nc	0.005	010000	
SVOCs								146	14.6	No
Benzoic acid	0.021	0.021	1	1	1.0	nc	nc	140		
Dioxins & Furans										Yes
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.0000023	0.0000023	1	1	1.0	nc	nc	na	na	1 05
The second se										
Petroleum Hydrocarbons	0.66	0.39	4	3	0.75	nc	nc	1.5	0.15	Yes
Diesel Range Organics (DRO)	0.00	0.57	-	5						

# Ta Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 7

		Shallow Subsur	face Water	Data				Regulatory	COPC Screening	
	Maximum	Maximum	Numb		Detection	Subsurface Wa	ater BUTL (mg/L) *	Criteria	Benchmark	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/kg; (mg/L)	(mg/L)	(Yes/No)
Residual Range Organics (RRO)	2.7	1.1	3	3	1.0	nc	nc	1.1	0.11	Yes
Notes:										
BUTL - Background upper tolerance limit.										
COPC - Chemcial of Potential Concern.										
mg/L - Milligrams per liters.										
NA - Not applicable.										
na - Not available.										
nc - Not calculated.										
SVOC - Semivolatile Organic Compounds										
VOC - Volatile Organic Compounds										
guidance documents, below. ADEC Groundwater Cleanup Levels Table 0 ADEC, 2001. Calculated Cleanup Level Technical Memorandum 01-007. Decer ADEC Groundwater Cleanup Levels Table 0 ADEC, 2002. Oil and Other Hazardous December 14.	ls for Compounds nber 18.									
<sup>o</sup> Benchmark Criteria is equal to 1/10 the ind	dicated regulatory	criteria.								
<sup>d</sup> Screening Criteria for lead is based on resi Procedures Manual guidance (18 AAC 75.34	dential cleanup v		cording to R	isk Assess	ment					
e This analyte is excluded as a COPC due to	o status as an esse	ntial nutrient.								
· · · · · · · · · · · · · · · · · · ·										

#### Table E-9 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 9 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data			-		Regulatory	COPC Screenin	g
	Maximum	Minimum	Numb	er of	Detection	BUTL (r	ng/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics										Yes
Aluminum	0.0000036	0.000036	5	1	0.20	30,357	nc	na	na	Yes
Antimony	14	14	15	1	0.067	nc	nc	3.6	0.36	Yes
Arsenic	20	3.6	15	7	0.47	7.8	11	2	0.2	No
Beryllium	3.55	0.70	15	5	0.33	3.8	nc	42	4.2	Yes
Cadmium	7.0	0.75	15	4	0.27	1.4	3.1	5	0.5	
Calcium	4,940	1,910	5	5	1.0	nc	nc	NA	NA	No
Chromium	60	5.0	15	14	0.93	48	50	26	2.6	Yes
Cobalt	38	4.0	5	4	0.80	49	nc	na	na	Yes
	429	6.0	15	15	1.0	107	44	4,060	406	Yes
Copper	483,000	13,000	5	5	1.0	nc	nc	NA °	NA	No
Iron	630	20	15	14	0.93	106	112	400 <sup>d</sup>	40	Yes
Lead	3,220	930	5	5	1.0	nc	nc	NA °	NA	No
Magnesium	970	51	5	5	1.0	1,589	nc	na	na	Yes
Manganese	0.60	0.60	15	1	0.07	0.43	nc	1.4	0.14	Yes
Mercury	110	7.7	15	11	0.73	59	30	87	8.7	Yes
Nickel	1,060	650	5	4	0.80	nc	nc	NA °	NA	No
Potassium		1.0	15	1	0.07	nc	nc	3.5	0.35	Yes
Selenium	1.0	180	5	5	1.0	nc	nc	NA <sup>e</sup>	NA	No
Sodium	280	0.28	2	1	0.50	1.6	0.56	na	na	Yes
Thallium	0.28		5	4	0.80	73	nc	710	71	No
Vanadium	44	21		15	1.0	615	157	9,100	910	Yes
Zinc	1,790	15	15	15	1.0	015	107	,,		
VOCs										
1,1,1-Trichloroethane	0.20	0.20	8	1	0.13	nc	nc	1	0.1	Yes
	0.00018	0.000040	15	3	0.20	nc	nc	2	0.2	No
1,2,4-Trichlorobenzene	0.000010	0.0000097	8	2	0.25	nc	nc	na	na	Yes
1,2-Dibromoethane	0.00010	0.0000016	15	7	0.47	nc	nc	7	0.7	No
1,2-Dichlorobenzene 1,2-Dichloroethane	0.00079	0.000014	8	5	0.63	nc	nc	0.015	0.0015	No

#### Table 2-2 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 9

		Soil Tun	dra Data					Regulatory	COPC Screening	5
	Maximum	Minimum	Numb		Detection	BUTL (I		Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC? (Yes/No)
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples			Soil Tundra		(mg/kg)	(mg/kg)	No
1,2-Dichloropropane	0.00040	0.0000070	8	4	0.50	nc	nc	0.017	0.0017	No
1,3,5-Trimethylbenzene	0.00018	0.0000013	8	5	0.63	nc	nc	25	2.5	
1,3-Dichlorobenzene	0.068	0.0000025	15	7	0.47	nc	nc	0.26	0.026	Yes
1,3-Dichloropropane	0.000097	0.00000059	8	5	0.63	nc	nc	na	na	Yes
1,4-Dichlorobenzene	0.025	0.000014	15	3	0.20	nc	nc	0.8	0.08	
2,2-Dichloropropane	0.00000092	0.0000092	8	1	0.13	nc	nc	na	na	Yes
2-Butanone	0.0000045	0.00000059	8	2	0.25	nc	nc	60	6	Yes
2-Chloroethyl vinyl ether	0.0000026	0.00000054	5	2	0.40	nc	nc	na	na	Yes
2-Chlorotoluene	0.0000045	0.0000013	8	2	0.25	nc	nc	na	na	Yes
2-Hexanone	0.0000087	0.0000078	5	2	0.40	nc	nc	na	na	Yes
4-Bromophenyl phenyl ether	0.0000024	0.0000012	10	2	0.20	nc	nc	na	na	Yes
4-Chlorophenyl phenyl ether	0.0000029	0.00000064	10	2	0.20	na	na	na	na	Yes
4-Isopropyltoluene	0.0000047	0.00000077	8	3	0.38	nc	nc	na	na	No
Acetone	0.000013	0.0000048	8	2	0.25	nc	nc	10	1	Yes
Bromomethane	0.36	0.36	8	1	0.13	nc	nc	na	na	No
Styrene	0.014	0.014	8	1	0.13	nc	nc	1.3	0.13	
Toluene	6	0.23	16	2	0.13	nc	nc	5.4	0.54	Yes
2,4,5-Trichlorophenol	0.0000032	0.0000032	10	1	0.10	nc	nc	90	9	No
2,4,6-Trichlorophenol	0.0000025	0.0000011	10	2	0.20	nc	nc	0.6	0.06	No
2,4-Dichlorophenol	0.0000015	0.0000034	10	2	0.20	nc	nc	0.45	0.045	No
•	0.0000014	0.0000014	10	1	0.10	nc	nc	4	0.4	No
2,4-Dimethylphenol	0.0000016	0.0000016	10	1	0.10	nc	nc	0.2	0.02	No
2,4-Dinitrophenol	0.0000016	0.0000016	10	1	0.10	nc	nc	0.005	0.0005	No
2,4-Dinitrotoluene	0.0000016	0.0000016	10	1	0.10	nc	nc	0.0044	0.00044	No
2,6-Dinitrotoluene	0.0000010	0.00000022	10	3	0.30	nc	nc	na	na	Yes
2-Methyl-4,6-dinitrophenol	0.0000035	0.00000035	10	1	0.10	nc	nc	7	0.7	No
2-Methylphenol (o-Cresol)	0.00000055	0.00000055	10	1	0.10	nc	nc	0.02	0.002	No
3,3-Dichlorobenzidine	0.0000019	0.00000080	10	2	0.20	nc	nc	na	na	Yes
3-Nitroaniline		0.00000080	10	2	0.20	nc	nc	0.5	0.05	No
4-Chloroaniline	0.0000026	0.0000001	10	-	5180					

#### Table E-9 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 9 Northeast Cape, St. Lawrence Island, Alaska

Maximum Detect (mg/kg) 0.025 0.000030 0.00013 1.0 0.13	Minimum Detect (mg/kg) 0.00000043 0.0000030 0.0000088 1.0 0.13	Numb Samples 8 10 10 10 10		Detection Frequency 0.50 0.10 0.30 0.10	BUTL (r Soil Tundra nc nc nc nc		Criteria <sup>b</sup> (mg/kg) na na na 590	Benchmark <sup>c</sup> (mg/kg) na na na 59	COPC? (Yes/No) Yes Yes Yes No
Detect (mg/kg) 0.025 0.000030 0.00013 1.0	Detect (mg/kg) 0.00000043 0.000030 0.0000088 1.0	8 10 10 10	4 1 3	0.50 0.10 0.30	nc nc nc	nc nc nc	na na na	na na na	Yes Yes Yes
0.025 0.000030 0.00013 1.0	0.00000043 0.000030 0.0000088 1.0	10 10 10	1 3	0.10 0.30	nc nc	nc nc	na na	na na	Yes Yes
0.00013	0.0000088 1.0	10 10	3	0.30	nc	nc	na	na	Yes
1.0	1.0	10							
1.0			1	0.10	nc	nc	590	59	No
0.13	0.13	15							NO
0.13	0.13	15							
0.13	0.13	15	100				10	1	No
			1	0.067	nc	nc	10	1	110
							25	3 5	No
0.0000019			-						No
0.0000016			-						No
0.00000054	0.00000017	10	3	0.30	nc	nc	24	2.4	110
0.00012	0.000038	10	6	0.60	nc	nc	na	na	Yes
				0.90	nc	nc	na	na	Yes
			7	0.70	nc	nc	na	na	Yes
		T	8		nc	nc	na	na	Yes
		. 9	1	0.11	nc	nc	na	na	Yes
			4	0.40	nc	nc	na	na	Yes
			4	0.40	nc	nc	na	na	Yes
			2	0.20	nc	nc	na	na	Yes
		9	2	0.22	nc	nc	na	na	Yes
			1	0.10	nc	nc	na	na	Yes
			4	0.40	nc	nc	na	na	Yes
			3	0.30	nc	nc	na	na	Yes
			1		nc	nc	na	na	Yes
					nc	nc	na	na	Yes
					nc	nc	na	na	Yes
		0.0000016         0.0000016           0.00000054         0.0000017           0.00012         0.0000038           0.0011         0.0000070           0.000030         0.0000025           0.00012         0.0000025           0.00012         0.0000023           0.000023         0.0000023           0.0000066         0.0000023           0.0000016         0.0000011           0.0000045         0.00000059           0.0000038         0.0000038           0.0000038         0.0000038           0.0000035         0.0000038           0.0000035         0.0000035           0.0000035         0.00000035           0.0000032         0.00000035	0.0000016         0.0000016         10           0.00000054         0.00000017         10           0.0000054         0.00000017         10           0.00012         0.0000038         10           0.0011         0.0000070         10           0.000030         0.0000025         10           0.00012         0.0000023         9           0.0000023         0.0000023         10           0.0000029         0.0000011         10           0.0000045         0.0000059         9           0.0000045         0.00000059         9           0.0000038         0.0000038         10           0.0000035         0.0000038         10           0.0000035         0.0000035         9           0.0000035         0.0000035         9	0.0000015         0.0000016         10         1           0.00000054         0.0000016         10         1           0.00000054         0.00000017         10         3           0.00012         0.0000038         10         6           0.0011         0.0000070         10         9           0.00012         0.0000025         10         7           0.00012         0.0000025         10         7           0.00012         0.0000023         9         1           0.0000023         0.0000023         10         4           0.0000029         0.0000011         10         4           0.0000045         0.0000059         9         2           0.0000045         0.0000059         9         2           0.0000038         0.0000038         10         1           0.0000038         0.0000038         10         4           0.0000035         0.0000035         9         1           0.0000035         0.0000035         9         1           0.0000032         0.0000035         9         1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0.0000019       0.0000016       10       1       0.10       nc         0.00000054       0.00000017       10       3       0.30       nc         0.00012       0.0000038       10       6       0.60       nc         0.0011       0.0000070       10       9       0.90       nc         0.00012       0.00000025       10       7       0.70       nc         0.00012       0.00000025       10       7       0.70       nc         0.00012       0.00000023       9       1       0.11       nc         0.000023       0.0000023       9       1       0.11       nc         0.0000029       0.0000011       10       4       0.40       nc         0.0000016       0.0000014       10       2       0.20       nc         0.0000038       0.0000038       10       1       0.10       nc         0.0000038       0.0000038       10       1       0.10       nc         0.0000035       0.0000035       9       1       0.11       nc         0.0000035       0.0000035       9       1       0.11       nc         0.0000032       0.0000035 <td>0.000015         0.000016         10         1         0.10         nc         nc           0.0000054         0.0000017         10         3         0.30         nc         nc           0.00012         0.0000017         10         3         0.30         nc         nc           0.0011         0.0000070         10         9         0.90         nc         nc           0.00012         0.0000070         10         9         0.90         nc         nc           0.00012         0.0000025         10         7         0.70         nc         nc           0.00012         0.0000025         10         7         0.70         nc         nc           0.000023         0.0000023         9         1         0.11         nc         nc           0.0000023         0.0000023         10         4         0.40         nc         nc           0.0000029         0.0000014         10         2         0.20         nc         nc           0.0000045         0.0000038         10         1         0.10         nc         nc           0.0000038         0.0000038         10         1         0.10         nc</td> <td>0.0000019       0.0000016       10       1       0.10       nc       nc       24         0.0000054       0.00000017       10       3       0.30       nc       nc       24         0.00012       0.0000038       10       6       0.60       nc       nc       nc       24         0.0011       0.0000070       10       9       0.90       nc       nc       na         0.00012       0.00000025       10       7       0.70       nc       nc       na         0.00012       0.00000059       10       8       0.80       nc       nc       na         0.000023       0.0000023       9       1       0.11       nc       nc       na         0.000029       0.0000011       10       4       0.40       nc       nc       na         0.0000029       0.0000014       10       2       0.20       nc       nc       na         0.0000038       0.0000038       10       1       0.10       nc       nc       na         0.0000038       0.0000038       10       1       0.10       nc       nc       na         0.00000035       0.0000035       &lt;</td> <td>0.000019       0.0000016       10       1       0.10       nc       nc       24       2.4         0.0000054       0.0000017       10       3       0.30       nc       nc       24       2.4         0.00012       0.0000038       10       6       0.60       nc       nc       na       na         0.0011       0.0000070       10       9       0.90       nc       nc       na       na         0.00012       0.0000070       10       9       0.90       nc       nc       na       na         0.00012       0.0000025       10       7       0.70       nc       nc       na       na         0.00012       0.0000023       10       8       0.80       nc       nc       na       na         0.000023       0.0000023       10       4       0.40       nc       nc       na       na         0.000029       0.000011       10       4       0.40       nc       nc       na       na         0.0000029       0.000014       10       2       0.20       nc       nc       na       na         0.0000038       0.0000038       10       1</td>	0.000015         0.000016         10         1         0.10         nc         nc           0.0000054         0.0000017         10         3         0.30         nc         nc           0.00012         0.0000017         10         3         0.30         nc         nc           0.0011         0.0000070         10         9         0.90         nc         nc           0.00012         0.0000070         10         9         0.90         nc         nc           0.00012         0.0000025         10         7         0.70         nc         nc           0.00012         0.0000025         10         7         0.70         nc         nc           0.000023         0.0000023         9         1         0.11         nc         nc           0.0000023         0.0000023         10         4         0.40         nc         nc           0.0000029         0.0000014         10         2         0.20         nc         nc           0.0000045         0.0000038         10         1         0.10         nc         nc           0.0000038         0.0000038         10         1         0.10         nc	0.0000019       0.0000016       10       1       0.10       nc       nc       24         0.0000054       0.00000017       10       3       0.30       nc       nc       24         0.00012       0.0000038       10       6       0.60       nc       nc       nc       24         0.0011       0.0000070       10       9       0.90       nc       nc       na         0.00012       0.00000025       10       7       0.70       nc       nc       na         0.00012       0.00000059       10       8       0.80       nc       nc       na         0.000023       0.0000023       9       1       0.11       nc       nc       na         0.000029       0.0000011       10       4       0.40       nc       nc       na         0.0000029       0.0000014       10       2       0.20       nc       nc       na         0.0000038       0.0000038       10       1       0.10       nc       nc       na         0.0000038       0.0000038       10       1       0.10       nc       nc       na         0.00000035       0.0000035       <	0.000019       0.0000016       10       1       0.10       nc       nc       24       2.4         0.0000054       0.0000017       10       3       0.30       nc       nc       24       2.4         0.00012       0.0000038       10       6       0.60       nc       nc       na       na         0.0011       0.0000070       10       9       0.90       nc       nc       na       na         0.00012       0.0000070       10       9       0.90       nc       nc       na       na         0.00012       0.0000025       10       7       0.70       nc       nc       na       na         0.00012       0.0000023       10       8       0.80       nc       nc       na       na         0.000023       0.0000023       10       4       0.40       nc       nc       na       na         0.000029       0.000011       10       4       0.40       nc       nc       na       na         0.0000029       0.000014       10       2       0.20       nc       nc       na       na         0.0000038       0.0000038       10       1

#### Ta \_\_\_\_\_) Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil

Site 9

Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data					Regulatory	COPC Screening	OPC Screening	
	Maximum	Minimum	Numb		Detection	BUTL (1		Criteria <sup>b</sup>	Benchmark °	COPC?	
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No	
2,3,7,8-Tetrachlorodibenzofuran	0.0000066	0.0000026	10	7	0.70	nc	nc	na	na	Yes	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0000017	0.0000028	10	3	0.30	nc	nc	na	na	Yes	
Total Heptachlorodibenzofurans (HpCDF)	0.000095	0.000095	3	1	0.33	nc	nc	na	na	Yes	
Total Heptachlorodibenzo-p-dioxins (HpCDD)	0.00018	0.000040	3	2	0.67	nc	nc	na	na	Yes	
Total Tetrachlorodibenzofurans (TCDF)	0.00001	0.0000097	3	2	0.67	nc	nc	na	na	Yes	
PAHs											
2-Methylnaphthalene	0.0000021	0.0000011	16	2	0.13	nc	nc	43	4.3	No	
Acenaphthene	0.000029	0.0000088	16	8	0.50	nc	nc	210	21	No	
Acenaphthylene	0.000055	0.00000099	16	7	0.44	nc	nc	210	21	No	
Anthracene	0.0092	0.0092	16	1	0.063	nc	nc	4,300	430	No	
Benzo(k)fluoranthene	0.057	0.057	16	1	0.063	nc	nc	110	11	No	
	0.064	0.064	16	1	0.063	nc	nc	620	62	No	
Chrysene Fluoranthene	0.023	0.023	16	1	0.063	nc	nc	2,100	210	No	
	0.018	0.018	16	1	0.063	nc	nc	11	1.1	No	
Indeno(1,2,3-cd)pyrene	0.010	0.024	16	1	0.063	nc	nc	4,300	430	No	
Phenanthrene	0.041	0.041	16	1	0.063	nc	nc	1,500	150	No	
Pyrene	0.041	0.041									
B ( ) The law sectors											
Petroleum Hydrocarbons	510	8.9	16	16	1.0	nc	nc	250	25	Yes	
Diesel Range Organics (DRO)		53	6	6	1.0	nc	nc	10,000	1,000	Yes	
Residual Range Organics (RRO)	2,100		10	10	1.0	nc	nc	na <sup>f</sup>	na	No	
TRPH	5,260	169	10	10	1.0	ne					

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons

 Table E-9

 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil

 Site 9

		Soil Tun	dra Data		-	Regulatory	COPC Screening	g
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Number of Samples Detects	Detection Frequency	BUTL (mg/kg) <sup>a</sup> Soil Tundra Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
TRPH - Total Residual Petroleum Hydrod								
Please refer to Technical Memorandum Concentrations for Abiotic Media Associa	ated with the Northeast C	Cape, St. Lawrence	e Island, Alaska (MV	vH, 2003).				
<ul> <li><sup>b</sup> Regulatory Criteria is equal to the minim</li> <li>1. Minimum of 3 pathways listed in Tables B</li> <li>Substances Pollution Control. January 30.</li> <li>2. Minimum of 3 pathways listed in Tables B</li> <li>Pollution Control. Public Comment Draft. 13</li> <li>3. Minimum of 3 pathways listed in Tables B</li> </ul>	1 and B2, Under 40 inch zo	one: ADEC, 2003.	18 AAC 75 Oil and Ha Oil and Other Hazardo	zardous us Substances				
<ol> <li>Minimum of 3 pathways listed in Tables B November 7.</li> <li>Minimum of 3 pathways listed in Tables B Compounds without Tabular Values in Site C</li> </ol>	1 and B2. Under 40 inch zo	one: ADEC, 2001.	Calculated Cleanup Le					•
<ul> <li><sup>c</sup> Benchmark Criteria is equal to 1/10 the</li> <li><sup>d</sup> Screening Criteria for lead is based on Procedures Manual guidance (18 AAC 7)</li> </ul>	indicated regulatory crit residential cleanup value	eria.		ent				
<sup>e</sup> This analyte is excluded as a COPC due		nutrient.						

#### Table E-10 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 9 Northeast Cape, St. Lawrence Island, Alaska

			Shallow Subsur	face Water	Data				Regulatory	COPC Screening	
		Maximum	Minimum	Numb	er of	Detection	Subsurface Water	BUTL (mg/L) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	·	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total											
Aluminum		164	49	2	2	1.0	nc	nc	na	na	Yes
Antimony		0.12	0.12	5	1	0.20	nc	nc	0.006	0.0006	Yes
Arsenic		0.025	0.0060	5	4	0.80	0.025	nc	0.05	0.005	No
Barium		1.2	0.27	2	2	1.0	nc	nc	2	0.2	Yes
Beryllium		0.014	0.0040	5	2	0.40	0.021	nc	0.004	0.0004	No
Cadmium		0.0040	0.0020	5	2	0.40	0.060	nc	0.005	0.0005	No
Calcium		59	8.0	2	2	1.0	nc	nc	NA °	NA	No
Chromium		0.099	0.030	5	4	0.80	1.7	nc	0.1	0.01	No
Cobalt		0.037	0.012	2	2	1.0	0.011	nc	na	na	Yes
Copper		0.068	0.030	5	4	0.80	0.087	nc	1.3	0.13	No
ron		322	77	2	2	1.0	nc	nc	NA °	NA	No
ead		0.30	0.019	5	5	1.0	0.013	nc	0.015 <sup>d</sup>	0.0015	Yes
Aagnesium		39	8.6	2	2	1.0	nc	nc	NA °	NA	No
Aanganese		2.2	0.33	2	2	1.0	0.20	nc	na	na	Yes
Aercury		0.00040	0.00020	5	2	0.40	0.00041	nc	0.002	0.0002	No
lickel		0.11	0.080	5	2	0.40	0.056	nc	0.1	0.01	Yes
Potassium		16	3.0	2	2	1.0	nc	nc	NA °	NA	No
Sodium		47	9.1	2	2	1.0	nc	nc	NA °	NA	No
		0.15	0.097	2	2	1.0	0.10	nc	0.26	0.026	Yes
Vanadium		0.15	0.090	5	4	0.80	0.29	nc	11	1.1	No
Zinc		0.51	0.090	5	-	0.00	0.27				
VOCs											
		0.0096	0.0069	5	3	0.60	nc	nc	22	2.2	No
-Butanone		0.0090	0.0009	5	3	0.60	nc	nc	3.65	0.365	No
Acetone		0.0012	0.0012	8	1	0.13	nc	nc	0.005	0.0005	Yes
Benzene				5	1	0.20	nc	nc	10	1.0	No
n,p-Xylene		0.0019	0.0019		2	0.20		nc	1.0	0.1	No
Toluene		0.0014	0.0012	8	2	0.25	nc	ne	1.0		

SVOCs

#### Table E-10 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 9 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsur	face Water	r Data		•		Regulatory	COPC Screening	
	Maximum	Minimum	Numb	er of	Detection	Subsurface Water	BUTL (mg/L) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
Benzoic acid	0.18	0.040	3	2	0.67	nc	nc	146	14.6	No
Sector and the sector of the s										
Dioxins & Furans		0.00000011	2	2	1.0	nc	nc	na	na	Yes
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00000060	0.000000044		2	1.0	nc	nc	na	na	Yes
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin		0.0000033	2	2			nc	na	па	Yes
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.00000037	0.00000037	2	1	0.50	nc		na	na	Yes
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.0000013	0.00000048	2	2	1.0	nc	nc			Yes
2,3,7,8-Tetrachlorodibenzofuran	0.00000036	0.00000036	2	1	0.50	nc	nc	na	na	103
Petroleum Hydrocarbons										
Diesel Range Organics (DRO)	7.7	0.51	6	5	0.83	nc	nc	1.5	0.15	Yes
	4.2	4.2	2	1	0.50	nc	nc	1.1	0.11	Yes
Gasoline Range Organics (GRO) TRPH	2.2	2.2	3	1	0.33	nc	nc	NA <sup>f</sup>	NA	No

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

SVOC - Semivolatile Organic Compounds

VOC - Volatile Organic Compounds

TRPH - Total Residual Petroleum Hydrocarbons

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.

#### Taure E-10

Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 9

		Shallow Subsur	face Water	r Data			COPC Screening	:		
Constituent	Maximum Detect (mg/L)	Minimum Detect (mg/L)	Numb Samples		Detection Frequency	Subsurface Water Shallow	BUTL (mg/L) <sup>a</sup> Deep	Criteria <sup>b</sup> (mg/L)	Benchmark <sup>c</sup> (mg/L)	COPC? (Yes/No)
ADEC Groundwater Cleanup Levels Table ADEC, 2001. Calculated Cleanup Levels Technical Memorandum 01-007. Dea	evels for Compound	s without Tabula	r Values in	Site Clean	up Rules -					
ADEC Groundwater Cleanup Levels Table ADEC, 2002. Oil and Other Hazardo December 14.	le C.	ution Control. Pu	iblic Comm	ent Draft.	18 AAC 75.					
<ul> <li><sup>e</sup> Benchmark Criteria is equal to 1/10 the</li> <li><sup>d</sup> Screening Criteria for lead is based on r</li> <li>Procedures Manual guidance (18 AAC 75</li> </ul>	residential cleanup	y criteria. value calculated a	ccording to	Risk Asso	essment					
e This analyte is excluded as a COPC due		ential nutrient.								

#### Table E-11 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 10 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data	ан. К.		-		Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb	Detects	Detection Frequency	BUTL (1 Soil Tundra		Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Constituent	Dettet (ing ing/									
Inorganics					100 co-100 co-10			-	0.5	No
Cadmium	2.0	1.7	5	3	0.60	1.4	3.1	5	0.5	
Chromium	18	8.4	5	5	1.0	48	50	26	2.6	No
Copper	35	14	5	5	1.0	107	44	4,060	406	No
Lead	84	30	5	5	1.0	106	112	400 <sup>d</sup>	40	No
Nickel	12	5.1	5	5	1.0	59	30	87	8.7	No
	0.34	0.34	1	1	1.0	1.6	0.56	na	na	Yes
Thallium Zinc	183	47	5	5	1.0	615	157	9,100	910	No
VOCs Toluene	0.0032	0.0032	6	1	0.17	na	na	5.4	0.54	No
Petroleum Hydrocarbons										Var
Diesel Range Organics (DRO)	26,500	59	11	11	1.0	na	na	250	25	Yes
Diesel Range Organics_ Aromatic	38	38	1	1	1.0	na	na	100	10	Yes
	340	340	1	1	1.0	na	na	7,200	720	No
Diesel Range Organics_Aliphatic	980	980	1	1	1.0	na	na	10,000	1,000	No
Residual Range Organics (RRO)		160	1	1	1.0	na	na	3,000	300	No
Residual Range Organics_Aromatic TRPH	160 119,000	130	11	11	1.0	na	na	NA °	NA	No

Notes:

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

TRPH - Total Residual Petroleum Hydrocarbons

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

#### Table E-1

Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 10 Northeast Cape, St. Lawrence Island, Alaska

			-	Soil Cr:	avel Data			Regulatory	COPC Scr	eening	
Constituent			Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Number of	Detection	BUTL (mg/kg Soil Tundra Soil	Criteria <sup>b</sup> (mg/kg)	Benchm: (mg/k		COPC? (Yes/No)
	athmour listed i	n Tables B			2003. 18 AAC 75 Oil						
and Hazardous Subs	stances Pollutio	n Control.	January 30.		2002. Oil and Other		· .				
Hazardous Substand	ces Pollution Co	ontrol. Pub	lic Comment Draft.	18 AAC 75. Dece	ember 14. 2002. Cumulative Risk						
Guidance. Novemb	er 7. athways listed i	n Tables B	1 and B2, Under 40	inch zone: ADEC,	2001. Calculated						
Cleanup Levels for 007. December 18.		thout Tabul	lar Values in Site C	leanup Rules - Tech	nical Memorandum 01-						
<sup>e</sup> Benchmark Crit		o 1/10 the	indicated regulat	ory criteria							
<sup>d</sup> Screening Criter to Risk Assessme	ria for lead is nt Procedures	based on a Manual g	uidance (18 AAC	p value calculated 75.340).	according						
• TRPH is exclud											
				25.0							
				12							
											•
### Table E-12 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 11 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data					Regulatory	COPC Screening	
	Maximum	Minimum	Numb	er of	Detection	BUTL (1		Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent		Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics										
Cadmium	2.1	2.1	3	1	0.33	1.4	3.1	5	0.5	No
Chromium	19	18	3	3	1.0	48	50	26	2.6	No
	24	15	3	3	1.0	107	44	4,060	406	No
Copper	67	26	3	3	1.0	106	112	400 <sup>d</sup>	40	No
Lead	12	10	3	3	1.0	59	30	87	8.7	No
Nickel	61	49	3	3	1.0	615	157	9,100	910	No
Zinc	01	47	5	5						
VOCs										1.1
Ethylbenzene	0.85	0.85	9	1	0.11	na	na	5.5	0.55	Yes
Xylenes	3.0	3.0	9	1	0.11	na	na	78	7.8	No
Aylenes										
PCBs										
PCB-1254 (Aroclor 1254)	0.79	0.32	3	2	0.67	na	na	10	1	No
FCB-1254 (Alociol 1254)										
Petroleum Hydrocarbons								0.50	25	Yes
Diesel Range Organics (DRO)	69,100	11	9	9	1.0	na	na	250	30	Yes
Gasoline Range Organics (GRO)	192	192	9	1	0.11	na	na	300 NA °	NA	No
TRPH	32,100	76	9	9	1.0	na	na	NA °	NA	No
Notes:									а. 19.	
na - Not available.										
NA - Not applicable.										
nc - Not calculated.										
BUTL - Background upper tolerance lim	ш									
mg/kg - Milligram per kilogram. COPC - Chemical of Potential Concern										
PAH - Polynuclear Aromatic Hydrocarb	ons									
TRPH - Total Residual Petroleum Hydro	ocarbons									

# Tab J Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 11 Northeast Concern St. June

		Soil Gra	vel Data			-	Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb Samples		Detection Frequency	BUTL (mg/kg) <sup>a</sup> Soil Tundra Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
<sup>a</sup> Please refer to Technical Memorandum- Assessment, Derivation of Ambient Conce the Northeast Cape, St. Lawrence Island, A <sup>b</sup> Regulatory Criteria is equal to the minim	entrations for Abic Alaska (MWH, 20 uum ADEC Soil C	otic Media Associ 03). leanup Level proj	ated with posed by the	e following	g hierarchy:				
<ol> <li>Minimum of 3 pathways listed in Tables B AAC 75 Oil and Hazardous Substances Polluti</li> <li>Minimum of 3 pathways listed in Tables B and Other Hazardous Substances Pollution Co</li> </ol>	and B2, Under 40 on Control. January and B2, Under 40	inch zone: ADEC, 30. inch zone: ADEC,	2003. 18 2002. Oil						
<ul> <li>December 14.</li> <li>Minimum of 3 pathways listed in Tables B Cumulative Risk Guidance. November 7.</li> <li>Minimum of 3 pathways listed in Tables B Calculated Cleanup Levels for Compounds wi Technical Memorandum 01-007. December 1</li> </ul>	1 and B2, Under 40 thout Tabular Value	inch zone: ADEC,	2001.						
<ul> <li><sup>c</sup> Benchmark Criteria is equal to 1/10 the</li> <li><sup>d</sup> Screening Criteria for lead is based on r Assessment Procedures Manual guidance</li> <li><sup>e</sup> TRPH is excluded as a COPC due to ou</li> </ul>	indicated regulato esidential cleanup (18 AAC 75.340)	value calculated	according t	o Risk					
<sup>f</sup> This analyte is excluded as a COPC due	to status as an ess	ential nutrient.							

#### Table E-13 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 11 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsur						Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>c</sup>	COPC?
	Maximum	Maximum	Numb	oer of	Detection	Subsurface Water				(Yes/No)
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(165/110)
VOCs									0.195	No
1,3,5-Trimethylbenzene	0.031	0.031	2	1	0.50	nc	nc	1.85	0.185	
Benzene	0.010	0.010	4	1	0.25	nc	nc	0.005	0.0005	Yes
	0.070	0.070	4	1	0.25	nc	nc	0.7	0.07	No.
Ethylbenzene	0.014	0.014	2	1	0.50	nc	nc	3.65	0.365	No
Isopropylbenzene	0.060	0.060	2	1	0.50	nc	nc	10	1	No
m,p-Xylene		0.000	2	1	0.50	nc	nc	0.005	0.0005	Yes
Methylene chloride	0.011		2	1	0.50	nc	nc	na	na	Yes
n-Propylbenzene	0.016	0.016		1	0.25	nc	nc	1	0.1	No
Toluene	0.0065	0.0065	4	1		nc	nc	10	1	No
Xylenes	0.015	0.015	2	1	0.50	ne	ne			
PAHs	0.39	0.39	2	1	0.50	nc	nc	1.46	0.146	Yes
Naphthalene	0.39	0.57	2							
Petroleum Hydrocarbons								1.5	0.15	Yes
Diesel Range Organics (DRO)	45	0.34	4	4	1.0	nc	nc	1.3	0.13	Yes
Gasoline Range Organics (GRO)	1.1	1.1	2	1	0.50	nc	nc		NA	No
TRPH	6.6	6.6	2	1	0.50	nc	nc	NA <sup>d</sup>	NA	

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

PAH - Polynuclear Aromatic Hydrocarbons

VOC - Volatile Organic Compounds

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

#### Tal 3

### Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 11

		Shallow Subsur	face Water	Data				Regulatory	COPC Screening	11
	Maximum	Maximum	Numb	per of	Detection	Subsurface Water	BUTL (mg/L) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>e</sup>	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
<sup>b</sup> Benchmark Criteria is equal to the minin	num ADEC Groun	ndwater Cleanup I	evel propos	sed by the	two most					
recent guidance documents, below.										
ADEC Groundwater Cleanup Levels Tab										
ADEC, 2001. Calculated Cleanup Le		ds without Tabula	r Values in	Site Clean	up Rules -					
Technical Memorandum 01-007. De	cember 18.									
ADEC Groundwater Cleanup Levels Tab				and Duefe	10 4 4 6 75					
ADEC, 2002. Oil and Other Hazardo December 14.	ous Substances Pol	lution Control. Pi	iblic Comm	ent Draft.	18 AAC 75.					
	in directed an exclusion									
<sup>e</sup> Benchmark Criteria is equal to 1/10 the	ē									
d TRPH is excluded as a COPC due to or	utdated analysis me	ethods.								

## Table E-14 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 13 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data			_		Regulatory	COPC Screening	
	Maximum	Minimum	Numb		Detection		(mg/kg) <sup>a</sup> a Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	rrequency	Son Tunura	i bon oruver	(8/8/		
Inorganics								24	2.6	No
Chromium	42	4.5	14	14	1.00	48	50	26	40	No
Lead	62	4.7	24	24	1.0	106	112	400		No
Zinc	93	20	14	14	1.0	615	157	9,100	910	NO
	· · ·									
VOCs									0.002	Yes
Benzene	0.043	0.018	29	3	0.10	nc	nc	0.02	0.002	
Ethylbenzene	1.4	0.11	29	12	0.41	nc	nc	5.5	0.55	Yes
m,p-Xylene	4	0.15	24	13	0.54	nc	nc	na	na	Yes
o-Xylene	1.5	0.010	24	13	0.54	nc	nc	na	na	Yes
Toluene	0.86	0.018	29	7	0.24	nc	nc	5.4	0.54	Yes
Xylenes	2.4	0.037	5	2	0.40	nc	nc	78	7.8	No
Aylenes										
PCBs										
PCB-1260 (Aroclor 1260)	115	0.0065	33	23	0.70	nc	nc	10	1.0	Yes
FCB-1200 (Alociol 1200)										
PAHs										
Acenaphthene	0.21	0.00038	24	15	0.63	nc	nc	210	21	No
Acenaphthylene	0.052	0.00055	24	2	0.08	nc	nc	210	21	No
• •	0.0165	0.00030	24	15	0.63	nc	nc	4,300	430	No
Anthracene	0.030	0.00023	24	14	0.58	nc	nc	6	0.6	No
Benzo(a)anthracene	0.028	0.00028	24	6	0.25	nc	nc	1	0.1	No
Benzo(a)pyrene	0.028	0.00032	24	18	0.75	nc	nc	11	1.1	No
Benzo(b)fluoranthene	0.039	0.00032	24	13	0.54	nc	nc	1,500	150	No
Benzo(g,h,i)perylene	0.023	0.00013	24	5	0.21	nc	nc	110	11	No
Benzo(k)fluoranthene	0.023	0.00017	24	18	0.75	nc	nc	620	62	No
Chrysene		0.00042	24	2	0.08	nc	nc	1	0.1	No
Dibenzo(a,h)anthracene	0.0043		24	18	0.75	nc	nc	2,100	210	No
Fluoranthene	0.0808	0.00044		14	0.75	nc	nc	270	27	No
Fluorene	0.69	0.00087	24	14	0.0	lie				

#### Tal 4 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 13

Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data			-		Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb	per of Detects	Detection	BUTL ( Soil Tundra		Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Indeno(1,2,3-cd)pyrene	0.016	0.00017	24	7	0.29	nc	nc	11	1.1	No
Naphthalene	15	0.0037	24	19	0.8	nc	nc	21	2.1	Yes
Phenanthrene	0.29	0.00081	24	18	0.8	nc	nc	4,300	430	No
Pyrene	0.090	0.00066	24	20	0.83	nc	nc	1,500	150	No
Petroleum Hydrocarbons Diesel Range Organics (DRO) Gasoline Range Organics (GRO)	12,000 294	21 3.0	29 29	29 20	1.0 0.69 1.0	nc nc nc	nc nc nc	250 300 10,000	25 30 1,000	Yes Yes Yes
Residual Range Organics (RRO) TRPH	3,400 36,300	7.4 551	24 8	24 8	1.0	nc	nc	NA °	NA	No

Notes:

NA - Not applicable.

na - Not available.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons

TRPH - Total Residual Petroleum Hydrocarbons

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.

2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds

without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

<sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).

 Table E-14

 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil

 Site 13

 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data	3 <sup>- 1</sup>	-	Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb Samples	Detection Frequency	BUTL (mg/kg) <sup>a</sup> Soil Tundra Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)

\* TRPH is excluded as a COPC due to outdated analysis methods.

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		Shallow Subsurf	ace Water	Data				Regulatory	COPC Screening	
	Maximum	Maximum	Numb	er of		Subsurface Wate		Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC? (Yes/No)
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(165/10)
Inorganics, Total										
Arsenic	0.073	0.036	2	2	1.0	0.025	nc	0.05	0.005	Yes
Chromium	0.24	0.14	2	2	1.0	1.7	nc	0.1	0.01	No
Copper	0.21	0.14	2	2	1.0	0.087	nc	1.3	0.13	Yes
Lead	0.45	0.33	2	2	1.0	0.013	nc	0.015 <sup>d</sup>	0.0015	Yes
Nickel	0.17	0.12	2	2	1.0	0.056	nc	0.1	0.01	Yes
Zinc	0.66	0.49	2	2	1.0	0.29	nc	11	1.1	No
Inorganics, Dissolved									0.005	No
Arsenic, Dissolved	0.011	0.011	2	1	0.50	0.015	nc	0.05		Yes
Lead, Dissolved	0.015	0.015	2	1	0.50	nc	nc	0.015	0.0015	Tes
VOCs										
Benzene	0.12	0.00012	8	5	0.63	nc	nc	0.005	0.0005	Yes
Ethylbenzene	0.15	0.018	8	8	1.0	nc	nc	0.7	0.07	Yes
	0.14	0.016	4	4	1.0	nc	nc	10	1	No
m,p-Xylene	0.071	0.00064	4	4	1.0	nc	nc	10	1	No
o-Xylene	0.17	0.00011	8	5	0.63	nc	nc	1	0.1	Yes
Toluene		0.056	4	4	1.0	nc	nc	10	1	No
Xylenes	0.59	0.050	-		110					
Petroleum Hydrocarbons								16	0.15	Yes
Diesel Range Organics (DRO)	100	6.1	8	8	1.0	nc	nc	1.5	0.13	Yes
Gasoline Range Organics (GRO)	4	0.52	6	6	1.0	nc	nc	1.3		Yes
Residual Range Organics (RRO)	2.3	0.18	5	4	0.80	nc	nc	1.1	0.11	No
TRPH	190	24	2	2	1.0	nc	nc	NA *	NA	INO

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

NA - Not applicable.

#### Table E-15

Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 13

Maximum         Maximum         Number of Samples         Detection         Subsurface Water BUTL (mg/L)*         Criteria*         Benchmark *         COPC?           na - Not available.         re - Not calculated.         Shallow         Deep         (mg/L)         (mg/L)         (reg/No)           SVOC - Scmivolatile Organic Compounds         VOC - Volatile Organic Canpounds         VOC - Volatile Organic Canpounds			Shallow Subsur	face Water	Data		-		Regulatory	COPC Screening	
Constituent         Detect (mg/L)         Detect (mg/L)         Samples         Detects         Frequency         Shallow         Deep         (mg/L)         (mg/L) </th <th>-</th> <th>Maximum</th> <th>Maximum</th> <th>Num</th> <th>ber of</th> <th>Detection</th> <th>Subsurface Wate</th> <th>er BUTL (mg/L) *</th> <th>· · · · · · · · · · · · · · · · · · ·</th> <th></th> <th></th>	-	Maximum	Maximum	Num	ber of	Detection	Subsurface Wate	er BUTL (mg/L) *	· · · · · · · · · · · · · · · · · · ·		
nc - Not calculated. SVOC - Semivolatile Organic Compounds VOC - Volatile Organic Compounds TRPH - Total Residual Petroleum Hydrocarbons * Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003). * Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below. ADEC Groundwater Cleanup Levels Table C. ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14. * Benchmark Criteria is equal to 1/10 the indicated regulatory criteria * Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).	Constituent		-	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
<ul> <li>SVOC - Semivolatile Organic Compounds</li> <li>VOC - Volatile Organic Compounds</li> <li>TRPH - Total Residual Petroleum Hydrocarbons</li> <li>* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media</li> <li>Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li>* Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most</li> <li>recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C.</li> <li>ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C.</li> <li>ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75.</li> <li>December 14.</li> <li>* Benchmark Criteria is equal to 1/10 the indicated regulatory criteria</li> <li>* Sereening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).</li> </ul>	na - Not available.										
<ul> <li>VOC - Volatile Organic Compounds TRPH - Total Residual Petroleum Hydrocarbons</li> <li>Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li>Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li>Benchmark Criteria is equal to 1/10 the indicated regulatory criteria</li> <li>Sereening Criteria is or lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).</li> </ul>	nc - Not calculated.										
<ul> <li>TRPH - Total Residual Petroleum Hydrocarbons</li> <li>Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li>Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li>Benchmark Criteria is equal to 1/10 the indicated regulatory criteria</li> <li>Sereening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).</li> </ul>	SVOC - Semivolatile Organic Compounds										
<ul> <li><sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li><sup>b</sup> Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li><sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria</li> <li><sup>e</sup> Serening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).</li> </ul>	VOC - Volatile Organic Compounds										
<ul> <li>Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li><sup>b</sup> Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table C.</li> <li>ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li>ADEC Groundwater Cleanup Levels Table C.</li> <li>ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li><sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria</li> <li><sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).</li> </ul>	TRPH - Total Residual Petroleum Hydroca	arbons									
<sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (To The Forestor), e TRPH is excluded as a COPC due to outdated analysis methods.	<ul> <li><sup>b</sup> Benchmark Criteria is equal to the minim recent guidance documents, below.</li> <li>ADEC Groundwater Cleanup Levels Table ADEC, 2001. Calculated Cleanup Level Technical Memorandum 01-007. Dec</li> <li>ADEC Groundwater Cleanup Levels Table ADEC, 2002. Oil and Other Hazardon December 14.</li> </ul>	num ADEC Groun e C. vels for Compour ember 18. e C. us Substances Pol	ndwater Cleanup I nds without Tabula Ilution Control. P	Level propo ar Values in ublic Comm	n Site Clean nent Draft.	nup Rules - 18 AAC 75.	edurar Manual quid	ance (18 AAC 75.34(	р.		
	<sup>d</sup> Screening Criteria for lead is based on re e TRPH is excluded as a COPC due to ou	esidential cleanup tdated analysis m	value calculated nethods.	according to	O KISK ASS	essment rioce			,		

#### Taure E-16 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 15 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data			-		Regulatory	COPC Screening	
	Maximum	Minimum	Numb		Detection		(mg/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark	COPC? (Yes/No
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/INO
Inorganics										
Chromium	16	6.7	2	2	1.0	48	50	26	2.6	No
Lead	30	12	2	2	1.0	106	112	400 <sup>d</sup>	40	No
Zinc	61	47	2	2	1.0	615	157	9100	910	No
VOCs									0.55	Yes
Ethylbenzene	1.0	0.025	4	2	0.50	na	na	5.5		Yes
m,p-Xylene	1.8	0.043	2	2	1.0	na	na	na	na	Yes
o-Xylene	0.015	0.015	2	1	0.50	na	na	na	na 0.54	No
Toluene	0.032	0.0037	4	2	0.50	na	na	5.4	0.54	NO
PAHs					. 10		na	210	21	No
Acenaphthene	0.85	0.11	2	2	1.0	na	na	4,300	430	No
Anthracene	0.043	0.011	2	2	1.0	na	na	6	0.6	No
Benzo(a)anthracene	0.0017	0.00037	2	2	1.0	na		1	0.1	No
Benzo(a)pyrene	0.00041	0.00041	2	1	0.50	na	na	11	1.1	No
Benzo(b)fluoranthene	0.0017	0.00042	2	2	1.0	na	na	1,500	150	No
Benzo(g,h,i)perylene	0.00045	0.00045	2	1	0.50	na	na	1,500	11	No
Benzo(k)fluoranthene	0.0016	0.0016	2	1	0.50	na	na	620	62	No
Chrysene	0.0038	0.00094	2	2	1.0	na	na		210	No
Fluoranthene	0.0058	0.0017	2	2	1.0	na	na	2,100	210	No
Fluorene	2.7	0.47	2	2	1.0	na	na	270	1.1	No
Indeno(1,2,3-cd)pyrene	0.00019	0.00019	2	1	0.50	na	na	11		Yes
Naphthalene	28	0.9	2	2	1.0	na	na	21	2.1	No
Phenanthrene	0.95	0.27	2	2	1.0	na	na	4,300	430	No
Pyrene	0.010	0.0035	2	2	1.0	na	na	1,500	150	NO
Petroleum Hydrocarbons								250	25	Yes
Diesel Range Organics (DRO)	16,000	2,190	4	4	1.0	nc	nc	250	23	100

#### Table E-16 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 15 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data			-		Regulatory	COPC Screening	
	Maximum	Minimum	Numb	er of	Detection	BUTL (I	ng/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/kg)		Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Gasoline Range Organics (GRO)	110	60	4	2	0.50	nc	nc	300	30	Yes
Residual Range Organics (RRO)	33	12	2	2	1.0	nc	nc	10,000	1,000	No
TRPH	20,500	535	2	2	1.0	nc	nc	NA °	NA	No

Notes:

NA - Not applicable.

na - Not available.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons

PCB - Polychlorinated Hydrocarbons

TRPH - Total Residual Petroleum Hydrocarbons

VOC - Volatile Organic Compounds

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.

2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

<sup>6</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

<sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).

\* TRPH is excluded as a COPC due to outdated analysis methods.

#### Tat\_\_\_\_! Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 15 Northeast Cape, St. Lawrence Island, Alaska

×		Shallow Subsurf	face Water	Data				Regulatory	COPC Screening	
	Maximum	Maximum	Numb	er of	Detection		r BUTL (mg/L) *	Criteria <sup>b</sup>	Benchmark <sup>e</sup>	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total										
Arsenic	0.11	0.11	1	1	1.0	0.025	nc	0.05	0.005	Yes
Beryllium	0.020	0.020	1	1	1.0	0.021	nc	0.004	0.0004	No
Chromium	0.070	0.070	1	1	1.0	1.7	nc	0.1	0.01	No
Copper	0.060	0.060	1	1	1.0	0.087	nc	1.3	0.13	No
Lead	0.68	0.68	1	1	1.0	0.013	nc	0.015 <sup>d</sup>	0.0015	Yes
Nickel	0.20	0.20	1	1	1.0	0.056	nc	0.1	0.01	Yes
	1.0	1.0	1	1	1.0	0.29	nc	11	1.1	No
Zinc	1.0	1.0								
Inorganics, Dissolved									0.005	Yes
Arsenic, Dissolved	0.0060	0.0060	1	1	1.0	nc	nc	0.05	0.005	res
VOCs								10	1	No
Xylenes	0.025	0.025	2	1	0.50	nc	nc	10	1	110
Petroleum Hydrocarbons					11111201			1.5	0.15	Yes
Diesel Range Organics (DRO)	960	9.3	2	2	1.0	nc	nc		0.11	Yes
Residual Range Organics (RRO)	3.8	3.8	1	1	1.0	nc	nc	1.1		No
TRPH	31	31	1	1	1.0	nc	nc	NA °	NA	NO

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

VOC - Volatile Organic Compounds

TRPH - Total Residual Petroleum Hydrocarbons

#### Table E-17

Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 15

		Shallow Subsurf	ace Water	Data				Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)		Detects	Frequency	Subsurface Wa Shallow	ter BUTL (mg/L) <sup>a</sup> Deep	Criteria <sup>b</sup> (mg/L)	Benchmark <sup>c</sup> (mg/L)	COPC? (Yes/No)
<sup>a</sup> Please refer to Technical Memorandum Ambient Concentrations for Abiotic Med (MWH, 2003).	ia Associated with	the Northeast Car	e, St. Lawr	ence Islan	d, Alaska					
<sup>b</sup> Benchmark Criteria is equal to the minin recent guidance documents, below. ADEC Groundwater Cleanup Levels Tab		ndwater Cleanup I	evel propo	sed by the	two most					
ADEC, 2001. Calculated Cleanup L Technical Memorandum 01-007. De	evels for Compoun	ds without Tabula	r Values in	Site Clear	up Rules -					
ADEC Groundwater Cleanup Levels Tab ADEC, 2002. Oil and Other Hazard December 14.	ole C. ous Substances Pol	lution Control. Pu	iblic Comm	ent Draft.	18 AAC 75.					
<ul> <li><sup>a</sup> Benchmark Criteria is equal to 1/10 the</li> <li><sup>d</sup> Screening Criteria for lead is based on Procedures Manual guidance (18 AAC 7)</li> </ul>	residential cleanup 5.340).	value calculated a	according to	Risk Asso	essment					
e TRPH is excluded as a COPC due to o	utdated analysis m	ethods.								

## Tab Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 16 Site 16

		Soil Gra	vel Data			_		Regulatory	COPC Screening	
	Maximum	Minimum	Numb	er of	Detection		mg/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent		Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics									0.36	Yes
Antimony	21	14	13	2	0.15	nc	nc	3.6	0.2	Yes
Arsenic	12	3.3	13	13	1.0	7.8	11	2		Yes
Beryllium	1.2	1.1	13	2	0.15	3.8	nc	42	4.2	Yes
Cadmium	7.2	1.4	13	4	0.31	1.4	3.1	5	0.5	Yes
Chromium	147	8.9	13	13	1.0	48	50	26	2.6	No
Copper	26	6.1	13	13	1.0	107	44	4060	406	Yes
Lead	822	18	15	15	1.0	106	112	400 <sup>d</sup>	40	No
Nickel	23	5.0	13	13	1.0	59	30	87	8.7	
Thallium	0.26	0.19	13	2	0.15	1.6	0.56	na	na	Yes
Zinc	12,100	41	13	13	1.0	615	157	9100	910	Yes
Line										
VOCs				1	0.25	nc	nc	10	1	No
Acetone	0.018	0.018	4		0.50	nc	nc	0.015	0.0015	Yes
Methylene chloride	0.0072	0.0061	4	2		nc	nc	5.4	0.54	No
Toluene	0.015	0.0066	4	2	0.50	lic	ne			
SVOCs		1.3	13	1	0.077	nc	nc	390	39	No
Benzoic acid	1.3		13	5	0.38	nc	nc	1700	170	No
Di-n-butyl phthalate	2.1	0.47	15	5	0.50					
PCBs		0.00	15	1	0.067	nc	nc	10	1	No
PCB-1254 (Aroclor 1254)	0.20	0.20	15	6	0.40	nc	nc	10	1	Yes
PCB-1260 (Aroclor 1260)	1.4	0.019	15	0	0.40					
Pesticides									3.46	No
	0.0060	0.0060	14	1	0.071	nc	nc	34.6		
4,4'-DDD	0.0050	0.0050	14	1	0.071	nc	nc	24	2.4	No
4,4'-DDE		0.0030	14	2	0.14	nc	nc	24	2.4	No
4,4'-DDT	0.12	0.011	14		13					

### Table E-18 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil

Site 16

		Soil Gra	vel Data					Regulatory	COPC Screening	
-	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb		Detection Frequency	BUTL ( Soil Tundra		Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Constituent	0.0025	0.0025	2	1	0.50	nc	nc	7	0.7	No
Endosulfan I	0.0025	0.0020								
lotes:										
a - Not applicable.										
c - Not calculated.										
BUTL - Background upper tolerance limit	t.									
ng/kg - Milligram per kilogram.										
COPC - Chemical of Potential Concern										
CB - Polychlorinated Hydrocarbons										
VOC - Semivolatile Organic Compounds	S									
VOC - Volatile Organic Compounds		8								
Please refer to Technical Memorandum- Derivation of Ambient Concentrations for	-Background Dete r Abiotic Media A	ermination for Ris ssociated with the	k Assessme e Northeast	ent, Cape, St.						
Please refer to Technical Memorandum- Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). Regulatory Criteria is equal to the minim	r Abiotic Media A	ssociated with the	e Northeast	Cape, St.	g hierarchy:					
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). Regulatory Criteria is equal to the minim	r Abiotic Media A num ADEC Soil C	ssociated with the Cleanup Level pro	posed by th	cape, St.						
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). Regulatory Criteria is equal to the minim Minimum of 3 pathways listed in Tables B	r Abiotic Media A num ADEC Soil C 1 and B2, Under 40	ssociated with the Cleanup Level pro inch zone: ADEC,	posed by th 2003. 18 A	cape, St. e following AC 75 Oil a	nd Hazardous					
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). Regulatory Criteria is equal to the minim I. Minimum of 3 pathways listed in Tables B Substances Pollution Control. January 30. 2. Minimum of 3 pathways listed in Tables B	r Abiotic Media A num ADEC Soil C 11 and B2, Under 40 11 and B2, Under 40	ssociated with the Cleanup Level pro inch zone: ADEC, inch zone: ADEC, 5. December 14.	posed by th 2003. 18 A. 2002. Oil an	Cape, St. e following AC 75 Oil a nd Other Ha	nd Hazardous					
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). Regulatory Criteria is equal to the minim Minimum of 3 pathways listed in Tables B Substances Pollution Control. January 30. Minimum of 3 pathways listed in Tables B Substances Pollution Control. Public Comme Minimum of 3 pathways listed in Tables B	r Abiotic Media A num ADEC Soil C 11 and B2, Under 40 11 and B2, Under 40	ssociated with the Cleanup Level pro inch zone: ADEC, inch zone: ADEC, 5. December 14.	posed by th 2003. 18 A. 2002. Oil an	Cape, St. e following AC 75 Oil a nd Other Ha	nd Hazardous					
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). Regulatory Criteria is equal to the minim I. Minimum of 3 pathways listed in Tables B Substances Pollution Control. January 30. 2. Minimum of 3 pathways listed in Tables B Substances Pollution Control. Public Comme 3. Minimum of 3 pathways listed in Tables B	r Abiotic Media A num ADEC Soil C 1 and B2, Under 40 11 and B2, Under 40 21 and B2, Under 40 11 and B2, Under 40	ssociated with the Cleanup Level pro inch zone: ADEC, inch zone: ADEC, 5. December 14. inch zone: ADEC,	posed by th 2003. 18 A. 2002. Oil at 2002. Cum	Cape, St. e following AC 75 Oil a nd Other Ha ulative Risk	nd Hazardous zardous Guidance.					
<ul> <li>Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003).</li> <li>Regulatory Criteria is equal to the minim</li> <li>Minimum of 3 pathways listed in Tables B</li> <li>Substances Pollution Control. January 30.</li> <li>Minimum of 3 pathways listed in Tables B</li> <li>Substances Pollution Control. Public Comme</li> <li>Minimum of 3 pathways listed in Tables B</li> <li>November 7.</li> <li>Minimum of 3 pathways listed in Tables B</li> <li>Compounds without Tabular Values in Site C</li> </ul>	r Abiotic Media A num ADEC Soil C 1 and B2, Under 40 1 and B2, Under 40 ent Draft. 18 AAC 7 1 and B2, Under 40 1 and B2, Under 40 1 and B2, Under 40 21 and B2, Under 40	ssociated with the Cleanup Level pro inch zone: ADEC, inch zone: ADEC, inch zone: ADEC, inch zone: ADEC, nincal Memorandun	posed by th 2003. 18 A/ 2002. Oil at 2002. Cum 2001. Calcu	Cape, St. e following AC 75 Oil a nd Other Ha ulative Risk ulated Clean	nd Hazardous izardous Guidance. uup Levels for					
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). <sup>7</sup> Regulatory Criteria is equal to the minim 1. Minimum of 3 pathways listed in Tables B Substances Pollution Control. January 30. 2. Minimum of 3 pathways listed in Tables B Substances Pollution Control. Public Comme 3. Minimum of 3 pathways listed in Tables B November 7. 4. Minimum of 3 pathways listed in Tables B Compounds without Tabular Values in Site C <sup>6</sup> Banchmark Criteria is equal to 1/10 the	r Abiotic Media A num ADEC Soil C 1 and B2, Under 40 1 and B2, Under 40 ent Draft. 18 AAC 7 1 and B2, Under 40 1 and B2, Under 40 Cleanup Rules - Tech	ssociated with the Cleanup Level pro inch zone: ADEC, inch zone: ADEC, 5. December 14. inch zone: ADEC, inch zone: ADEC, nical Memorandun ory criteria.	2003. 18 A. 2003. 01 at 2002. Oil at 2002. Cum 2001. Calcu n 01-007. Do	Cape, St. e following AC 75 Oil au nd Other Ha ulative Risk ulated Clean	nd Hazardous izardous Guidance. uup Levels for					
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). <sup>1</sup> Regulatory Criteria is equal to the minim 1. Minimum of 3 pathways listed in Tables B Substances Pollution Control. January 30. 2. Minimum of 3 pathways listed in Tables B Substances Pollution Control. Public Comme 3. Minimum of 3 pathways listed in Tables B November 7. 4. Minimum of 3 pathways listed in Tables B Compounds without Tabular Values in Site Cl <sup>2</sup> Benchmark Criteria is equal to 1/10 the <sup>4</sup> Screening Criteria for lead is based on r	r Abiotic Media A num ADEC Soil C 1 and B2, Under 40 21 and 22, Under 40 21 and 22, Under 40 21 and 22, Under 40 21 and 20, Under 40 21 and 21 and 20, Under 40 21 and 21 an	ssociated with the Cleanup Level pro inch zone: ADEC, inch zone: ADEC, 5. December 14. inch zone: ADEC, inch zone: ADEC, nical Memorandun ory criteria. p value calculated	2003. 18 A. 2003. 01 at 2002. Oil at 2002. Cum 2001. Calcu n 01-007. Do	Cape, St. e following AC 75 Oil au nd Other Ha ulative Risk ulated Clean	nd Hazardous izardous Guidance. uup Levels for					
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). <sup>1</sup> Regulatory Criteria is equal to the minim 1. Minimum of 3 pathways listed in Tables B Substances Pollution Control. January 30. 2. Minimum of 3 pathways listed in Tables B Substances Pollution Control. Public Comme 3. Minimum of 3 pathways listed in Tables B November 7. 4. Minimum of 3 pathways listed in Tables B Compounds without Tabular Values in Site Cl <sup>2</sup> Benchmark Criteria is equal to 1/10 the <sup>4</sup> Screening Criteria for lead is based on r	r Abiotic Media A num ADEC Soil C 1 and B2, Under 40 21 and 22, Under 40 21 and 22, Under 40 21 and 22, Under 40 21 and 20, Under 40 21 and 21 and 20, Under 40 21 and 21 an	ssociated with the Cleanup Level pro inch zone: ADEC, inch zone: ADEC, 5. December 14. inch zone: ADEC, inch zone: ADEC, nical Memorandun ory criteria. p value calculated	2003. 18 A. 2003. 01 at 2002. Oil at 2002. Cum 2001. Calcu n 01-007. Do	Cape, St. e following AC 75 Oil au nd Other Ha ulative Risk ulated Clean	nd Hazardous izardous Guidance. uup Levels for					
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). <sup>7</sup> Regulatory Criteria is equal to the minim 1. Minimum of 3 pathways listed in Tables B Substances Pollution Control. January 30. 2. Minimum of 3 pathways listed in Tables B Substances Pollution Control. Public Comme 3. Minimum of 3 pathways listed in Tables B November 7. 4. Minimum of 3 pathways listed in Tables B Compounds without Tabular Values in Site C <sup>6</sup> Banchmark Criteria is equal to 1/10 the	r Abiotic Media A num ADEC Soil C 1 and B2, Under 40 21 and 22, Under 40 21 and 22, Under 40 21 and 22, Under 40 21 and 20, Under 40 21 and 21 and 20, Under 40 21 and 21 an	ssociated with the Cleanup Level pro inch zone: ADEC, inch zone: ADEC, 5. December 14. inch zone: ADEC, inch zone: ADEC, nical Memorandun ory criteria. p value calculated	2003. 18 A. 2003. 01 at 2002. Oil at 2002. Cum 2001. Calcu n 01-007. Do	Cape, St. e following AC 75 Oil au nd Other Ha ulative Risk ulated Clean	nd Hazardous izardous Guidance. uup Levels for					
Derivation of Ambient Concentrations for Lawrence Island, Alaska (MWH, 2003). <sup>1</sup> Regulatory Criteria is equal to the minim 1. Minimum of 3 pathways listed in Tables B Substances Pollution Control. January 30. 2. Minimum of 3 pathways listed in Tables B Substances Pollution Control. Public Comme 3. Minimum of 3 pathways listed in Tables B November 7. 4. Minimum of 3 pathways listed in Tables B Compounds without Tabular Values in Site Cl <sup>2</sup> Benchmark Criteria is equal to 1/10 the <sup>4</sup> Screening Criteria for lead is based on r	r Abiotic Media A num ADEC Soil C 1 and B2, Under 40 21 and 22, Under 40 21 and 22, Under 40 21 and 22, Under 40 21 and 20, Under 40 21 and 21 and 20, Under 40 21 and 21 an	ssociated with the Cleanup Level pro inch zone: ADEC, inch zone: ADEC, 5. December 14. inch zone: ADEC, inch zone: ADEC, nical Memorandun ory criteria. p value calculated	2003. 18 A. 2003. 01 at 2002. Oil at 2002. Cum 2001. Calcu n 01-007. Do	Cape, St. e following AC 75 Oil au nd Other Ha ulative Risk ulated Clean	nd Hazardous izardous Guidance. uup Levels for					

### Table E-19 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 16 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsur	face Water	Data				Regulatory	COPC Screening	
	Maximum	Maximum	Numb		Detection	Subsurface Wate	r BUTL (mg/L) *	Criteria <sup>b</sup>	Benchmark <sup>e</sup>	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total										
Beryllium	0.040	0.020	3	2	0.67	0.021	nc	0.004	0.0004	Yes
Cadmium	0.060	0.060	3	1	0.33	0.060	nc	0.005	0.0005	Yes
Chromium	0.52	0.14	3	3	1.0	· 1.7	nc	0.1	0.01	No
Copper	0.50	0.16	3	3	1.0	0.087	nc	1.3	0.13	Yes
Lead	0.67	0.0029	5	5	1.0	0.013	nc	0.015	0.0015	Yes
Nickel	0.42	0.11	3	3	1.0	0.056	nc	0.1	0.01	Yes
Zinc	1.5	0.54	3	3	1.0	0.29	nc	11	1.1	Yes
Inorganics, Dissolved										
Lead, Dissolved	0.0040	0.0040	3	1	0.33	nc	nc	0.015	0.0015	Yes
VOCs										
1,2,4-Trimethylbenzene	0.053	0.00080	5	3	0.60	na	na	1.85	0.185	No
1,3,5-Trimethylbenzene	0.016	0.0093	5	2	0.40	na	na	1.85	0.185	No
2-Butanone	0.0048	0.0048	5	1	0.20	na	na	22	2.2	No
4-Isopropyltoluene	0.0066	0.0066	5	1	0.20	na	na	na	na	Yes
Ethylbenzene	0.0047	0.0041	5	2	0.40	na	na	0.7	0.07	No
Isopropylbenzene	0.0047	0.0027	5	2	0.40	na	na	3.65	0.365	No
m,p-Xylene	0.010	0.0035	5	2	0.40	na	na	10	1	No
n-Propylbenzene	0.0049	0.0043	5	2	0.40	na	na	na	na	Yes
sec-Butylbenzene	0.0040	0.0040	5	1	0.20	na	na	na	na	Yes
Toluene	0.0010	0.0010	5	1	0.20	na	na	1 -	0.1	No
Trichloroethene	0.0033	0.0033	. 5	1	0.20	na	na	0.005	0.0005	Yes
Xylenes	0.0035	0.0035	2	1	0.50	na	па	10	. 1	No
SVOCs	0.015	0.015	5	1	0.20	na	na	146	14.6	No
Benzoic acid	0.015	0.013	5	3	0.60	na	na	0.006	0.0006	Yes
bis-(2-ethylhexyl)phthalate	0.025	0.0014	5	5	0.00					
PAHs					0.17		na	2.2	0.22	No
Acenaphthene	0.000050	0.000050	6	1	0.17	na		1.46	0.146	No
Fluorene	0.000080	0.000080	6	1	0.17	na	na			

#### Table E-19

Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water

Site 16

Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsur				Subsurface Water	BUTL (mg/L) <sup>a</sup>	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>e</sup>	COPC?
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)	Numb Samples	er of Detects	Detection Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
Naphthalene	0.088	0.0015	8	3	0.38	na	na	1.46	0.146	No

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

PAH - Polynuclear Aromatic Hydrocarbons

SVOC -Semivolatile Organic Compounds

VOC - Volatile Organic Compounds

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules -Technical Memorandum 01-007. December 18.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

<sup>d</sup> This analyte is excluded as a COPC due to status as an essential nutrient.

<sup>e</sup> Total PCBs used as a surrogate.

<sup>f</sup> Alpha-BHC used as a surrogate.

<sup>8</sup> Endrin used as a surrogate.

<sup>h</sup> Screening criteria is currently not available for dioxins and furans. These analytes are therefore carried through as COPCs.

<sup>i</sup> RRO\_aliphatic is non soluable and is therefore excluded as a COPC.

<sup>j</sup> TRPH is excluded as a COPC due to outdated analysis methods.

### Tal 0 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 19 Northeast Cape, St. Lawrence Island. Alaska

		Soil Gra	vel Data					Regulatory	COPC Screening	
	Maximum	Minimum	Numb	er of	Detection	BUTL (	mg/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/kg)	-	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics										N
Arsenic	4.4	3.9	3	3	1.0	7.8	11	2	0.2	No
Cadmium	3.2	2.9	8	2	0.25	1.4	3.1	5	0.5	Yes
Chromium	59	4.4	16	16	1.0	48	50	26	2.6	Yes
Copper	38	13	8	8	1.0	107	44	4,060	406	No
Lead	329	14	16	16	1.0	106	112	400 <sup>d</sup>	40	Yes
Nickel	20	7.8	8	8	1.0	59	30	87	8.7	No
Zinc	282	36	16	16	1.0	615	157	9,100	910	No
VOCs					0.07		nc	0.02	0.002	Yes
Benzene	0.74	0.74	15	1	0.067	nc		5.5	0.55	Yes
Ethylbenzene	3.0	0.22	15	2	0.13	nc	nc	na	na	Yes
m,p-Xylene	0.20	0.20	8	1	0.13	nc	nc	5.4	0.54	Yes
Toluene	3.1	3.1	15	1	0.067	nc	nc	78	7.8	Yes
Xylenes	17.3	8.0	7	2	0.29	nc	nc	10		
PAHs					0.10	51 0		210	21	No
Acenaphthene	0.14	0.14	8	1	0.13	nc	nc	4,300	430	No
Anthracene	0.032	0.032	8	1	0.13	nc	nc		0.6	No
Benzo(a)anthracene	0.0011	0.00051	8	2	0.25	nc	nc	6	1.1	No
Benzo(b)fluoranthene	0.0018	0.00023	8	8	1.0	nc	nc	11	150	No
Benzo(g,h,i)perylene	0.00065	0.00014	8	3	0.38	nc	nc	1,500	62	No
Chrysene	0.0027	0.00018	8	6	0.75	nc	nc	620	0.1	No
Dibenzo(a,h)anthracene	0.00048	0.00048	8	. 1	0.13	nc	nc	1	210	No
Fluoranthene	0.0041	0.0041	8	1	0.13	nc	nc	2,100		No
Fluorene	0.35	0.00022	8	2	0.25	nc	nc	270	27	
Indeno(1,2,3-cd)pyrene	0.00048	0.00024	8	2	0.25	nc	nc	11	1.1	No
	1.3	0.00038	8	8	1.0	nc	nc	21	2.1	No
Naphthalene Phenanthrene	0.45	0.00026	8	5	0.63	nc	nc	4,300	430	No

#### Table E-20 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 19 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data					Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb	er of Detects	Detection Frequency	BUTL (r Soil Tundra		Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Pyrene	0.011	0.00014	8	5	0.63	nc	nc	1,500	150	No
Petroleum Hydrocarbons	13,300	7.0	16	14	0.88	nc	nc	250	25	Yes
Diesel Range Organics (DRO) Gasoline Range Organics (GRO)	6,650	4.9	16	5	0.31	nc	nc	300	30 1,000	Yes No
Residual Range Organics (RRO) TRPH	120 28,800	6.0 389	8 8	8 8	1.0 1.0	nc	nc	10,000 NA <sup>e</sup>	NA	No

#### Notes:

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons

TRPH - Total Residual Petroleum Hydrocarbons

**VOC** - Volatile Organic Compounds

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.

 Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

<sup>c</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

<sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).

#### Tal.....0 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 19 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data		-	Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb	Detection Frequency	BUTL (mg/kg) <sup>a</sup> Soil Tundra Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)

\* TRPH is excluded as a COPC due to outdated analysis methods.

#### Table E-21 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 19 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsurf	face Water	Data				Regulatory	COPC Screening	
	Maximum	Maximum	Numb		Detection		r BUTL (mg/L) *	Criteria <sup>b</sup>	Benchmark <sup>c</sup> (mg/L)	COPC? (Yes/No
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(103/10
Inorganics, Total	0.0000	0.0060	1	1	1.0	0.025	nc	0.05	0.005	No
Arsenic	0.0060	0.0080	2	1	0.50	1.7	nc	0.1	0.01	No
Chromium	0.080		2	2	1.0	0.087	nc	1.3	0.13	Yes
Copper	0.20	0.040	2	2	1.0	0.013	nc	0.015 <sup>d</sup>	0.0015	Yes
Lead	0.42	0.14	2	1	1.0	nc	nc	NA °	NA	No
Magnesium	9.5	9.5	1	2	1.0	0.29	nc	11	1.1	No
Zinc	0.43	0.18	2	2	1.0	0.27				
VOCs			0		0.50	na	na	0.005	0.0005	Yes
Benzene	0.025	0.00057	8	4			na	na	na	Yes
Ethane	0.0017	0.0017	4	1	0.25	na		0.7	0.07	No
Ethylbenzene	0.025	0.00034	8	2	0.25	na	na	10	1	No
m,p-Xylene	0.02	0.00022	4	3	0.75	na	na	10	1	No
o-Xylene	0.00013	0.000080	4	3	0.75	na	na	1	0.1	No
Toluene	0.026	0.00024	8	4	0.50	na	na	10	1	No
Xylenes	0.064	0.00080	4	3	0.75	na	na	10	· ·	
										•
Petroleum Hydrocarbons								1.5	0.15	Yes
Diesel Range Organics (DRO)	34	0.71	8	8	1.0	na	na	1.3	0.13	Yes
Gasoline Range Organics (GRO)	6.1	0.024	6	4	0.67	na	na	1.5	0.11	Yes
Residual Range Organics (RRO)	1.3	0.22	6	3	0.50	na	na	NA <sup>f</sup>	NA	No
TRPH	9.7	9.7	2	1	0.50	na	na	NA	100	110

#### Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

# Tal Tal II Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 19 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsur	ace Water	Data				Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)	Numb		Detection Frequency	Subsurface Water I Shallow	BUTL (mg/L) <sup>a</sup> Deep	Criteria <sup>b</sup> (mg/L)	Benchmark <sup>e</sup> (mg/L)	COPC? (Yes/No)
<ul> <li>Please refer to Technical Memorar Ambient Concentrations for Abiotic (MWH, 2003).</li> </ul>	dum-Background Deter	mination for Risk	Assessmen	nt, Derivati	ion of					
<sup>b</sup> Regulatory Criteria is equal to the r recent guidance documents, below.	ninimum ADEC Groun	dwater Cleanup L	evel propos	ed by the	wo most					
ADEC Groundwater Cleanup Levels ADEC, 2001. Calculated Cleanu Technical Memorandum 01-007	up Levels for Compoun	ds without Tabula	r Values in	Site Clean	up Rules -					
ADEC Groundwater Cleanup Levels ADEC, 2002. Oil and Other Ha December 14.	Table C. zardous Substances Pol	lution Control. Pu	iblic Comm	ent Draft.	18 AAC 75.					
<sup>e</sup> Benchmark Criteria is equal to 1/1 <sup>d</sup> Screening Criteria for lead is based			ecording to	Risk Asso	essment					
Procedures Manual guidance (18 AA	C 75.340).		Ð							
e This analyte is excluded as a COP f TRPH is excluded as a COPC due										

## Table E-22 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 21 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data			_		Regulatory	COPC Screening	
	Maximum	Minimum .	Numb		Detection	BUTL (n Soil Tundra		Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Son Tundra	Don Oran			
Inorganics						20.257		-	na	Yes
Aluminum	33,100	3,975	10	10	1.00	30,357	nc	na	0.36	Yes
Antimony	38	38	19	1	0.053	nc	nc	3.6	0.2	Yes
Arsenic	170	2.8	19	19	1.0	7.8	11	2	110	Yes
Barium	193	0.83	10	10	1.0	174	nc	1,100	4.2	No
Beryllium	1.8	0.30	19	9	0.47	3.8	nc	42	0.5	Yes
Cadmium	69	0.40	19	8	0.42	1.4	3.1	5 NA <sup>e</sup>		No
Calcium	6,910	1,320	10	10	1.0	nc	nc	NA	NA	Yes
Chromium	93	4.0	19	19	1.0	48	50	26	2.6	
Cobalt	14.2	2.5	10	10	1.0	49	nc	na	na	Yes
	130	4.0	19	19	1.0	107	44	4,060	406	No
Copper	57,400	12,700	10	10	1.0	nc	nc	NA °	NA	No
ron	88	6.1	20	18	0.90	106	112	400 <sup>d</sup>	40	No
Lead	8,770	1,320	10	10	1.0	nc	nc	NA °	NA	No
Magnesium		77	10	10	1.0	1,589	nc	na	na	Yes
Manganese	786	0.070	19	6	0.32	0.43	nc	1.4	0.14	Yes
Mercury	4.8		19	14	0.74	59	30	87	8.7	No
Nickel	44	9.8	19	10	1.0	nc	nc	NA	NA	No
Potassium	3,670	560	10	3	0.16	nc	nc	3.5	0.35	Yes
Selenium	2.0	1.0		3	0.16	nc	nc	21	2.1	Yes
Silver	6.7	0.90	19	10	1.0	nc	nc	NA °	NA	No
Sodium	580	170	10		0.1	1.6	0.56	na	na	Yes
Thallium	0.53	0.53	19	1		73	nc	710	71	Yes
Vanadium	81	8.5	10	10	1.0	615	157	9,100	910	Yes
Zinc	1,130	24	19	19	1.0	015	157	2,100		
VOCs					0.25	20	nc	1	0.1	No
1,1,1-Trichloroethane	0.016	0.016	4	1	0.25	nc			na	Yes
1,2,4-Trimethylbenzene	0.19	0.032	4	2	0.50	nc	nc	na	2.5	No
1,3,5-Trimethylbenzene	0.071	0.012	4	2	0.50	nc	nc	25	2.5	

#### Tat 2 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 21 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data			-		Regulatory	COPC Screening	
	Maximum Detect (mg/kg)	Minimum	Numb	er of Detects	Detection Frequency		(mg/kg) <sup>a</sup> a Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>e</sup> (mg/kg)	COPC? (Yes/No
Constituent 2-Butanone	0.18	0.043	5	3	0.60	nc	nc	60	6	No
	0.53	0.036	4	4	1.0	nc	nc	10	1	No
Acetone	0.0067	0.0067	19	1	0.053	nc	nc	5.5	0.55	No
Ethylbenzene	0.0007	0.013	4	1	0.25	nc	nc	227	22.7	No
Isopropylbenzene	0.015	0.0074	14	7	0.50	nc	nc	na	na	Yes
m,p-Xylene		0.0060	4	1	0.25	nc	nc	0.015	0.0015	Yes
Methylene chloride	0.0060	0.062	4	1	0.25	nc	nc	na	na	Yes
n-Butylbenzene	0.062		4	1	0.25	nc	nc	na	na	Yes
n-Propylbenzene	0.040	0.040		1	0.25	nc	nc	na	na	Yes
o-Xylene	0.0063	0.0063	14			nc	nc	na	na	Yes
sec-Butylbenzene Toluene	0.036 0.14	0.036 0.0060	4 19	1 13	0.25 0.68	nc	nc	5.4	0.54	No
SVOCs					0.11	nc	nc	0.5	0.05	Yes
4-Chloroaniline	5.47	5.47	9	1			nc	590	59	No
bis-(2-ethylhexyl)phthalate	0.98	0.84	9	2	0.22	nc	nc	1,700	170	No
Di-n-butyl phthalate	5.69	0.90	9	4	0.44	nc	lic	1,700		
PCBs		0.14	19	2	0.11	nc	nc	10	1	No
PCB-1254 (Aroclor 1254)	0.14	0.14	19	4	0.21	nc	nc	10	1	Yes
PCB-1260 (Aroclor 1260)	3.1	0.15	19	4	0.21	ne				
Petroleum Hydrocarbons					0.04		nc	250	25	Yes
Diesel Range Organics (DRO)	3,800	46	19	16	0.84	nc	nc	10,000	1,000	Yes
Residual Range Organics (RRO)	3,700	25	10	10	1.0	nc	nc	NA f	NA	No
TRPH	15,700	85	9	9	1.0	nc	nc	NA	100	

Notes:

na - Not available. NA - Not applicable.

nc - Not calculated.

#### Table E-22 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 21 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data			_	Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numl		Detection Frequency	BUTL (mg/kg) <sup>a</sup> Soil Tundra Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
BUTL - Background upper tolerance limit									
mg/kg - Milligram per kilogram.									
COPC - Chemical of Potential Concern									
PCB - Polychlorinated Biphenyls									
SVOC - Semivolatile Organic Compound	S								
VOC - Volatile Organic Compounds TRPH - Total Residual Petroleum Hydrod	arbons								
* Please refer to Technical Memorandum Ambient Concentrations for Abiotic Medi (MWH, 2003).	ia Associated with	the Northeast Ca	pe, St. Law	rence Islan	id, Alaska				
<sup>b</sup> Regulatory Criteria is equal to the minim	num ADEC Soil C	Cleanup Level pro	posed by th	e following	g hierarchy:				
<ol> <li>Minimum of 3 pathways listed in Tables B Substances Pollution Control. January 30.</li> <li>Minimum of 3 pathways listed in Tables B Substances Pollution Control. Public Comme 3. Minimum of 3 pathways listed in Tables B November 7.</li> </ol>	and B2, Under 40 ant Draft, 18 AAC 7	inch zone: ADEC, 5. December 14.	2002. Oil an	nd Other Ha	zardous				
<ul> <li>4. Minimum of 3 pathways listed in Tables B Compounds without Tabular Values in Site C</li> </ul>	1 and B2, Under 40 Ieanup Rules - Tech	inch zone: ADEC, nical Memorandum	2001. Calcu 1 01-007. De	ulated Clean ecember 18.	up Levels for				
<sup>c</sup> Benchmark Criteria is equal to 1/10 the									
<sup>d</sup> Screening Criteria for lead is based on Procedures Manual guidance (18 AAC 75	residential cleanup	value calculated	according	to Risk Ass	sessment				
<sup>e</sup> This analyte is excluded as a COPC due	e to status as an es	sential nutrient.							
f TRPH is excluded as a COPC due to ou	tdated analysis me	ethods.							

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#### Ta 3 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 21 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsurf	face Water	Data				Regulatory	COPC Screening	
	Maximum	Maximum	Numb	er of	Detection	Subsurface Water	r BUTL (mg/L) *	Criteria <sup>b</sup>	Benchmark <sup>e</sup>	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total									0.005	Ver
Arsenic	0.072	0.041	2	2	1.0	0.025	nc	0.05	0.005	Yes
Chromium	0.23	0.090	2	2	1.0	1.7	nc	0.1	0.01	No
Copper	0.26	0.10	2	2	1.0	0.087	nc	1.3	0.13	Yes
Lead	0.26	0.10	2	2	1.0	0.013	nc	0.015 <sup>d</sup>	0.0015	Yes
Mercury	0.00060	0.00060	2	1	0.50	0.00041	nc	0.002	0.0002	Yes
Nickel	0.18	0.10	2	2	1.0	0.056	nc	0.1	0.01	Yes
Zinc	5.1	0.65	2	2	1.0	0.29	nc	11	1.1	Yes
Inorganics, Dissolved									0.005	No
Arsenic, Dissolved	0.010	0.010	2	1	0.50	0.015	nc	0.05	0.005	NO
VOCs								22	2.2	No
2-Butanone	0.0029	0.0029	2	1	0.50	na	na	22		No
Acetone	0.0063	0.0063	2	1	0.50	na	na	3.65	0.365	Yes
n-Propylbenzene	0.0011	0.0011	2	1	0.50	na	na	na	na	res
SVOCs						я.				No
Benzoic acid	0.029	0.029	2	1	0.50	na	na	146	14.6	No
Petroleum Hydrocarbons	4 20							1.5	0.15	Yes
Diesel Range Organics (DRO)	1.0	0.59	2	2	1.0	na	na	1.5		

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

 Table E-23

 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 21

	1	Shallow Subsur	face Water	Data				Regulatory	<b>COPC Screening</b>	
	Maximum	Maximum	Numb		Detection	Subsurface Wa	ater BUTL (mg/L) *	Criteria <sup>b</sup>	Benchmark <sup>e</sup>	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
<ul> <li>Please refer to Technical Memory Ambient Concentrations for Abiot (MWH, 2003).</li> <li><sup>b</sup> Regulatory Criteria is equal to the</li> </ul>	randum-Background Deter ic Media Associated with e minimum ADEC Groun	the Northeast Cap	be, St. Lawr	ence Island	i, Alaska					
recent guidance documents, below										
ADEC Groundwater Cleanup Lev ADEC, 2001. Calculated Cle Technical Memorandum 01-0	anup Levels for Compoun	ds without Tabula	r Values in	Site Clean	up Rules -					
ADEC Groundwater Cleanup Lev ADEC, 2002. Oil and Other December 14.	els Table C. Hazardous Substances Pol	lution Control. Pr	ublic Comm	nent Draft.	18 AAC 75.					
<ul> <li>Benchmark Criteria is equal to 1</li> <li><sup>d</sup> Screening Criteria for lead is ba</li> </ul>	sed on residential cleanup	ry criteria. value calculated a	according to	Risk Asse	essment					
Procedures Manual guidance (18	AAC 75.340).									

#### Table E-24 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 22 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data			-		Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb		Detection Frequency	BUTL (1 Soil Tundra		Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC: (Yes/No
							1	3		
Inorganics					1.0			3.6	0.36	No
Antimony	34	34	1	1	1.0	nc 48	nc 50	26	2.6	No
Chromium	16	7.7	5	5	1.0	48 107	30 44	4,060	406	No
Copper	22	22	1	1	1.0 1.0	107	112	4,000 <sup>d</sup>	400	Yes
lead	497	5	9	9		59	30	87	8.7	No
Nickel	13	13	1	1	1.0 1.0	615	157	9,100	910	No
Zinc	169	60	5	5	1.0	615	157	9,100	910	NO
VOCs										
-Xylene	0.3705	0.149	8	3	0.375	nc	nc	na	na	Yes
WOCs										
Di-n-butyl phthalate	3.5	3.5	1	1	1.0	nc	nc	1,700	170	No
PAHs										
Acenaphthene	0.0861	0.00763	11	4	0.36	nc	nc	210	21	No
Anthracene	0.01180	0.00020	11	3	0.27	nc	nc	4,300	430	No
Benzo(a)anthracene	0.0200	0.0015	11	3	0.27	nc	nc	6	0.6	No
Senzo(a)pyrene	0.35	0.35	11	1	0.09	nc	nc	1	0.1	Yes
Benzo(b)fluoranthene	0.42	0.00035	11	4	0.36	nc	nc	11	1.1	No
	0.015	0.00015	11	4	0.36	nc	nc	1,500	150	No
Benzo(g,h,i)perylene	0.015	0.00020	11	7	0.64	nc	nc	620	62	No
Chrysene	0.00032	0.00032	11	1	0.09	nc	nc	1	0.1	No
Dibenzo(a,h)anthracene	0.00032	0.00032	11	7	0.64	nc	nc	2,100	210	No
luoranthene	0.0481	0.00020	11	3	0.27	nc	nc	270	27	No
luorene		0.00020	11	1	0.09	nc	nc	11	1.1	No
ndeno(1,2,3-cd)pyrene	0.00032			8	0.09	nc	nc	21	2.1	No
Naphthalene	1.2005	0.00031	11		0.73			4,300	430	No
henanthrene	0.2090	0.00022	11	8		nc	nc	67	6.7	No
Phenol	0.74	0.74	1	1	1.0	nc	nc	07	0.7	

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#### Table E-24 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 22 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data			-1)		Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb	per of Detects	Detection Frequency	BUTL ( Soil Tundra	mg/kg) <sup>a</sup> Soil Gravel	Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Pyrene	0.1011	0.00018	11	7	0.64	nc	nc	1,500	150	No
Petroleum Hydrocarbons Diesel Range Organics (DRO) Gasoline Range Organics (GRO) Residual Range Organics (RRO) TRPH	4,070 38.45 3,815 5,920	284 24.1 5.4 5,920	10 10 8 1	5 3 7 1	0.50 0.30 0.88 1.0	nc nc nc	nc nc nc	250 300 10,000 NA	25 30 1,000 NA	Yes Yes Yes No

Notes:

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons

SVOC - Semivolatile Organic Compounds

TRPH - Total Residual Petroleum Hydrocarbons

<sup>\*</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.

2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

<sup>c</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

#### Taure 2-24 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 22 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data			-	Regulatory	COPC Screening	
	Maximum	Minimum	Numb	er of	Detection	BUTL (mg/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/kg)		Samples	Detects	Frequency	Soil Tundra Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
<sup>d</sup> Screening Criteria for lead is based	l on residential cleanup	value calculated	according to	Risk Ass	essment				

Procedures Manual guidance (18 AAC 75.340).

<sup>e</sup> TRPH is excluded as a COPC due to outdated analysis methods.

#### Table E-25 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 22 Northeast Cape, St. Lawrence Island, Alaska

	Deep S	ubsurface Water	r Concentra	ation (mg/	L)			Regulatory	COPC Screening	
	Maximum	Maximum	Numb		Detection	Subsurface Wate Shallow	r BUTL (mg/L) Deep	Criteria <sup>a</sup> (mg/L)	Benchmark <sup>b</sup> (mg/L)	COPC? (Yes/No)
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Snanow	Deep	(ing is)	(119 2)	(,
Tetal										
Inorganics, Total		•		2	1.0		nc	NA d	NA	No
Iron	45	2.8	3	3	1.0	nc		na	na	Yes
Manganese	0.20	0.12	3	3	1.0	0.20	nc	na	na	100
norganics, Dissolved										
Iron, dissolved	1.8	1.8	3	1	0.33	nc	nc	NA d	NA	No
	0.17	0.089	3	3	1.0	nc	nc	na	na	Yes
Manganese, dissolved	0.17	0.089	5		110					
Petroleum Hydrocarbons			÷					1.5	0.15	Yes
Diesel Range Organics (DRO)	1.4	0.28	4	2	0.50	na	na		0.11	Yes
Residual Range Organics (RRO)	2.8	2.8	3	1	0.33	na	na	1.1	0.11	103

Notes:

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/L - Milligram per liter.

COPC - Chemical of Potential Concern

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanur

Rules - Technical Memorandum 01-007. December 18.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft.

18 AAC 75. December 14.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria

<sup>d</sup> This analyte is excluded as a COPC due to status as an essential nutrient

## Table E-24 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 22

		Soil Gra	vel Data					Regulatory	COPC Screening	
	Maximum	Minimum	Numb	per of	Detection	BUTL (r	mg/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent		Detect (mg/kg)				Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics										
Antimony	34	34	1	1	1.0	nc	nc	3.6	0.36	No
Chromium	16	7.7	5	5	1.0	48	50	26	2.6	No
Copper	22	22	1	1	1.0	107	44	4,060	406	No
Lead	497	5	9	9	1.0	106	112	400 <sup>d</sup>	40	Yes
Nickel	13	13	1	1	1.0	59	30	87	8.7	No
linc	169	60	5	5	1.0	615	157	9,100	910	No
/OCs										Yes
-Xylene	0.3705	0.149	8	3	0.375	nc	nc	na	na	res
VOCs								1 700	170	No
Di-n-butyl phthalate	3.5	3.5	1	1	1.0	nc	nc	1,700	170	NO
AHs										Na
Acenaphthene	0.0861	0.00763	11	4	0.36	nc	nc	210	21	No
Anthracene	0.01180	0.00020	11	3	0.27	nc	nc	4,300	430	No
Benzo(a)anthracene	0.0200	0.0015	11	3	0.27	nc	nc	6	0.6	No
enzo(a)pyrene	0.35	0.35	11	1	0.09	nc	nc	1	0.1	Yes
enzo(b)fluoranthene	0.42	0.00035	11	4	0.36	nc	nc	11	1.1	No
enzo(g,h,i)perylene	0.015	0.00015	11	4	0.36	nc	nc	1,500	150	No
Chrysene	0.77	0.00020	11	7	0.64	nc	nc	620	62	No
Dibenzo(a,h)anthracene	0.00032	0.00032	11	1	0.09	nc	nc	1	0.1	No
luoranthene	0.0481	0.00070	11	7	0.64	nc	nc	2,100	210	No
luorene	0.03563	0.00020	11	3	0.27	nc	nc	270	27	No
ndeno(1,2,3-cd)pyrene	0.00032	0.00032	11	1	0.09	nc	nc	11	1.1	No
Vaphthalene	1.2005	0.00031	11	8	0.73	nc	nc	21	2.1	No
Phenanthrene	0.2090	0.00022	11	8	0.73	nc	nc	4,300	430	No
Phenol	0.74	0.74	1	1	1.0	nc	nc	67	6.7	No

#### Table E-24 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 22 Northeast Cape, St. Lawrence Island, Alaska

· .	-	Soil Gra	vel Data			-		Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb	er of Detects	Detection Frequency	BUTL (1 Soil Tundra		Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>e</sup> (mg/kg)	COPC? (Yes/No)
Constituent Pyrene	0.1011	0.00018	11	7	0.64	nc	nc	1,500	150	No
Petroleum Hydrocarbons Diesel Range Organics (DRO) Gasoline Range Organics (GRO) Residual Range Organics (RRO) TRPH	4,070 38.45 3,815 5,920	284 24.1 5.4 5,920	10 10 8 1	5 3 7 1	0.50 0.30 0.88 1.0	nc nc nc nc	nc nc nc	250 300 10,000 NA °	25 30 1,000 NA	Yes Yes Yes No

Notes:

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PAH - Polynuclear Aromatic Hydrocarbons

SVOC - Semivolatile Organic Compounds

TRPH - Total Residual Petroleum Hydrocarbons

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.

2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

#### Table E-24 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 22

#### Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data			_	Regulatory	COPC Screening	
Constituent	Maximum	Minimum	Numb	er of	Detection	BUTL (mg/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)

<sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).

<sup>e</sup> TRPH is excluded as a COPC due to outdated analysis methods.

#### Table E-25 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 22 Northeast Cape, St. Lawrence Island, Alaska

	Deep S	Subsurface Water	r Concentra	ation (mg/	L)			Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)	Numb	oer of	Detection Frequency	Subsurface Water BU Shallow	er BUTL (mg/L) Deep	Criteria <sup>a</sup> (mg/L)	Benchmark <sup>b</sup> (mg/L)	COPC? (Yes/No)
Inorganics, Total						•		NA <sup>d</sup>	NA	No
Iron Manganese	45 0.20	2.8 0.12	3 3	3 3	1.0 1.0	nc 0.20	nc	na	na	Yes
Inorganics, Dissolved Iron, dissolved	1.8	1.8 0.089	3	1	0.33 1.0	nc nc	nc nc	NA <sup>d</sup> na	NA na	No Yes
Manganese, dissolved Petroleum Hydrocarbons	0.17			2	0.50	na	па	1.5	0.15	Yes
Diesel Range Organics (DRO) Residual Range Organics (RRO)	1.4 2.8	0.28 2.8	4 3	1	0.33	na	na	1.1	0.11	Yes

Notes:

na - Not available.

NA - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/L - Milligram per liter.

**COPC** - Chemical of Potential Concern

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup

Rules - Technical Memorandum 01-007. December 18.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft.

18 AAC 75. December 14.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria

<sup>d</sup> This analyte is excluded as a COPC due to status as an essential nutrient

## Ta Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 27

Northeast Ca	pe, St. Lawrence	Island, Alaska
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			Soil Gravel Data							Regulatory	COPC Screening					
		Soil Tundra Da Maximum Minimum Ni			Number of Detection		Maximum	Minimum	Number of		Detection	BUTL (mg/kg)		Criteria*	Benchmark <sup>b</sup>	COPC?
Constituent		Maximum Detect (mg/kg)	Detect (mg/kg)	Samples Detects			Detect (mg/kg)		Samples	Detects	Frequency	Soil Tundra Soil Gravel		(mg/kg)	(mg/kg)	(Yes/No)
Inorganics																
-							5.7	2.5	4	4	1.0	7.8	11	2	0.2	No
Arsenic		17	17	1	1	1.0	23.7	3.7	10	10	1.0	48	50	26	2.6	No
Chromium		.,	.,				16	16	1	1	1.0	107	44	4,060	406	No
Copper		13	13	1	1	1.0	87	3.53	27	27	1.0	106	112	400 <sup>d</sup>	40	No
ead		15	15				17	17	1	1	1.0	59	30	87	8.7	No
Vickel							0.36	0.36	1	1	1.0	1.6	0.56	na	na	No
hallium		44	44	1	1	1.0	110	17	10	10	1.0	615	157	9,100	910	No
Zinc		**	44	·	·											
VOCs								0.0024	20	10	0.34	nc	nc	0.02	0.002	Yes
Benzene		0.12	0.12	1	1	1.0	0.798	0.0034	29	10	0.62	nc	nc	5.5	0.55	Yes
Ethylbenzene		1.3	1.3	1	1	1.0	8.09	0.011	29	18	0.62		nc	na	na	Yes
n,p-Xylene		5.1	5.1	. 1	1	1.0	25.3	0.0678	24	20		nc	nc	na	na	Yes
o-Xylene		2.7	2.7	1	1	1.0	16.3	0.010	24	20	0.83	nc		5.4	0.54	Yes
Toluene		3.2	3.2	1	1	1.0	7.55	0.036	29	10	0.34	nc	nc	78	7.8	No
Cylenes							4	0.0050	5	4	0.80	nc	nc	78	7.0	
CBs							0.035	0.035	9	1	0.11	nc	nc	10	1	No
CB-1260 (Aroclor 1260)							0.055	0.055								
PAHs				1027			2.00	0.00028	24	15	0.63	nc	nc	210	21	No
cenaphthene		0.18	0.18	1	1	1.0	3.09		24	2	0.08	nc	nc	210	21	No
cenaphthylene							0.0727	0.0011		13	0.54	nc	nc	4,300	430	No
Anthracene		0.012	0.012	1	1	1.0	0.90	0.00076	. 24	8	0.33	nc	nc	6	0.6	No
Benzo(a)anthracene							0.081	0.00027	24		0.08		nc	1	0.1	No
Benzo(a)pyrene							0.0774	0.0032	24	2		nc	nc		1.1	No
Benzo(b)fluoranthene		0.0052	0.0052	1	1	1.0	0.114	0.00027	24	10	0.42	nc		1500	150	No
Benzo(g,h,i)perylene							0.0427	0.00020	24	7	0.29	nc	nc	110	1.14	No
Benzo(k)fluoranthene							0.0909	0.0033	24	2	0.08	nc	nc	620	62	No
Chrysene							0.148	0.00067	24	13	0.54	nc	nc		0.1	No
Dibenzo(a,h)anthracene							0.0151	0.0151	24	1	0.04	nc	nc	1	210	No
		0.0029	0.0029	1	1	1.0	0.331	0.00019	24	15	0.6	nc	nc	2,100		No
luoranthene		0.33	0.33	1	1	1.0	7.44	0.00051	24	20	0.8	nc	nc	270	27	No
luorene		0.55	0.55				0.0505	0.0018	24	2	0.1	nc	nc	. 11	1.1	
ndeno(1,2,3-cd)pyrene		12	12	1	1	1.0	191	0.0011	24	22	0.9	nc	nc	43	4.3	Yes
Naphthalene		12	0.21	1	1	1.0	5.5	0.00084	24	22	0.9	nc	nc	4,300	430	No
Phenanthrene		0.21			1	1.0	0.391	0.00017	24	18	<b>0.8</b>	nc	пс	1,500	150	No
Pyrene		0.0059	0.0059	1		1.0	0.571	0100011	2							
Petroleum Hydrocarbons							<b>E1 000</b>		34	34	1.0	nc	nc	250	25	Yes
Diesel Range Organics (DRO)	•	13,000	13,000	1	1	1.0	51,000	11		22	0.76	nc	nc	300	30	Yes
Gasoline Range Organics (GRO)		70	70	1	1	1.0	491	2.3	29			nc	nc	10,000	1,000	Yes
Residual Range Organics (RRO)		5,100	5,100	1	1	1.0	9,100	16	24	22	0.9	ne	inc.		10 · • • • • • • • • • • • • •	
Table E-26

 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 27

Northeast Cape, St. Lawrence Island, Alaska

		Soil Tu	ndra Data				Soil Gr	avel Data					Regulatory	COPC Screening	
	Maximum	Minimum	Numb		Detection	Maximum	Minimum		ber of	Detection		(mg/kg)	Criteria*	Benchmark	COPC?
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	a Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
TRPH						66,400	170	10	10	1.0	nc	nc	NA °	NA	No
otes:		<u></u>							E.						
a - Not available.															
A - Not applicable.															
c - Not calculated.															
UTL - Background upper tolerance limit.															
g/kg - Milligram per kilogram.															
OPC - Chemical of Potential Concern															
AH - Polynuclear Aromatic Hydrocarbon	S														
CB - Polychlorinated Biphenyls															
RPH - Total Residual Petroleum Hydroca	arbons														
OC - Volatile Organic Compounds															
Please refer to Technical Memorandum-	Background Dete	ermination for Ris	k Assessme	nt, Derivat	ion of										
Ambient Concentrations for Abiotic Media	Associated with	the Northeast Ca	ne. St. Law	rence Islan	d, Alaska										
	Associated with	The Profilicust of													
MWH, 2003). Regulatory Criteria is equal to the minim	ADEC Soil C	leanun I evel nro	nosed by the	e following	hierarchy:										
. Minimum of 3 pathways listed in Table	ulli ADEC Soli C	den 40 inch anno	ADEC 200	1 18	C 75 Oil and	Hazardous									
	s BI and B2, Un	der 40 inch zone:	ADEC, 200	. 10 AA	C 75 On and	Tazardous									
Substances Pollution Control. January 30.			ADEC 200	2 Oil and	Other Hazar	doue Substances									
2. Minimum of 3 pathways listed in Table	s BI and B2, Un	der 40 inch zone:	ADEC, 200	Z. On and	Ouler mazar	dous Substances									
Pollution Control. Public Comment Draft.	18 AAC /5. De	ecember 14.	ADEC 200	2 Cumul	ative Dick Gu	idance									
3. Minimum of 3 pathways listed in Table	s B1 and B2, Un	der 40 inch zone:	ADEC, 200	Z. Cumun	auve Risk Ou	idance.	*)								
November 7.			ADEC 200	1 Calcula	ted Cleanup	Levels for									
4. Minimum of 3 pathways listed in Table	s B1 and B2, Un	der 40 inch zone:	ADEC, 200	007 Dec	ember 18	Levels for									
Compounds without Tabular Values in Site			orandum or	-007. Dec	childer 10.										
Benchmark Criteria is equal to 1/10 the i															
Screening Criteria for lead is based on re	sidential cleanup	value calculated	according to	o Risk Ass	essment										
Procedures Manual guidance (18 AAC 75.															
TRPH is excluded as a COPC due to out		ethods.													
IRFH is excluded as a COI C due to out	duced unity sis in	eurous.													
														•	

### Taun 1---7

### Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water

Site 27

Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsur	face Water	Data				Regulatory	COPC Screening	
	Maximum	Maximum	Numl	per of	Detection	Subsurface Wate	r BUTL (mg/L)	Criteria	Benchmark <sup>b</sup>	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total								0.05	0.005	No
Arsenic	0.024	0.024	1	1	1.0	0.025	nc	0.05	0.003	No
Chromium	0.050	0.050	1	1	1.0	1.7	nc	0.1		No
Copper	0.065	0.065	1	1	1.0	0.087	nc	1.3	0.13	
Lead	0.19	0.19	1	1	1.0	0.013	nc	0.015 <sup>d</sup>	0.0015	Yes
Manganese	0.20	0.20	1	1	1.0	0.20	nc	na	na	Yes
Nickel	0.043	0.043	1	1	1.0	0.056	nc	0.1	0.01	No
Zinc	0.24	0.24	1	1	1.0	0.29	nc	11	1.1	No
Inorganics, Dissolved									0.0015	Yes
Lead, Dissolved	0.0020	0.0020	1	1	1.0	nc	nc	0.015	0.0015	165
VOCs										V
Benzene	0.030	0.0046	3	2	0.67	nc	nc	0.005	0.0005	Yes
Ethylbenzene	0.12	0.014	3	2	0.67	nc	nc	0.7	0.07	Yes
m,p-Xylene	0.084	0.084	1	1	1.0	nc	nc	10	1	No
o-Xylene	0.0073	0.0073	1	1	1.0	nc	nc	10	1	No
Toluene	0.12	0.0033	3	2	0.67	nc	nc	10	1	No
Xylenes	0.080	0.080	2	1	0.50	nc	nc	10	1	No
Petroleum Hydrocarbons	()	1.4	3	3	1.0	nc	nc	1.5	0.15	Yes
Diesel Range Organics (DRO)	64		3	2	0.67	nc	nc	1.3	0.13	Yes
Gasoline Range Organics (GRO)	1.7	1.2	5	1	1.0	nc	nc	1.1	0.11	Yes
Residual Range Organics (RRO)	1.6	1.6	1					NA	NA	No
TRPH	2.4	2.4	1	1	1.0	nc	nc	110		

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

TRPH - Total Residual Petroleum Hydrocarbons

VOC - Volatile Organic Compounds

### Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water

Site 27

Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsurf	ace Water	Data				Regulatory	COPC Screening	
Constituent  Please refer to Technical Memorandum-	Maximum Detect (mg/L) Background Deter	Maximum Detect (mg/L) mination for Risk	Assessmen	Detects t, Derivati	Detection Frequency on of	Subsurface Wat Shallow	ter BUTL (mg/L) Deep	_ Criteria <sup>a</sup> (mg/L)	Benchmark <sup>b</sup> (mg/L)	COPC? (Yes/No)
Ambient Concentrations for Abiotic Media (MWH, 2003). <sup>b</sup> Regulatory Criteria is equal to the minim recent guidance documents, below.	a Associated with	the Northeast Cap	e, St. Lawr	ence Island	i, Alaska					
ADEC Groundwater Cleanup Levels Tabl ADEC, 2001. Calculated Cleanup Le Technical Memorandum 01-007. Dec	vels for Compoun cember 18.	ds without Tabula	r Values in	Site Clean	up Rules -					
ADEC Groundwater Cleanup Levels Tabl ADEC, 2002. Oil and Other Hazardo December 14.	us Substances Pol		blic Comm	ent Draft.	18 AAC 75.					
<ul> <li><sup>c</sup> Benchmark Criteria is equal to 1/10 the</li> <li><sup>d</sup> Screening Criteria for lead is based on reprocedures Manual guidance (18 AAC 75</li> <li><sup>e</sup> TRPH is excluded as a COPC due to out</li> </ul>	esidential cleanup .340).	value calculated a	ccording to	Risk Asso	essment					

### T\_\_\_\_\_3 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 28 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tu	ndra Data				Soil Gr	avel Data					Regulatory	COPC Screening	
	Maximum	Minimum	Numt	per of	Detection	Maximum	Minimum	Num		Detection		(mg/kg) *	Criteria <sup>b</sup>	Benchmark *	COPC?
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
norganics															
Beryllium	na	na	na	na	na	1.8	1.8	11	1	0.091	3.8	nc	42	4.2	Yes
Cadmium	na	na	па	na	па	2.6	2.4	11	2	0.18	1.4	3.1	5	0.5	No
Chromium	31	14	6	6	1.0	41	7.3	11	11	1.0	48	50	26	2.6	No
Copper	na	na	па	na	na	34	8.8	11	11	1.0	107	44	4,060	406	No
ead	42	24	6	6	1.0	100	7.1	11	11	1.0	106	112	400	40	No
lickel	na	na	na	na	na	25	7.8	11	8	0.73	59	30	87	8.7	No
hallium	na	na	па	na	na	0.26	0.26	11	1	0.091	1.6	0.56	na	na	Yes
linc	124	49	6	6	1.0	140	12	11	11	1.0	615	157	9,100	910	No
OCs													10	1	No
cetoné	na	na	па	na	na	0.19	0.032	5	3	0.60	nc	nc	10 5.5	0.55	Yes
thylbenzene	na ·	na	па	na	na	1.1	1.1	10	1	0.10	nc	nc		0.0015	Yes
fethylene chloride	na	na	na	na	na	0.16	0.0071	5	4	0.80	nc	nc	0.015	0.0015	Tes
CBs						1.5	0.24	10	3	0.30	nc	nc	10	1	Yes
CB-1254 (Aroclor 1254)	0.20	0.20	9	1	0.11	1.5	0.24	10	5	0.50					
AHs												nc	43	4.3	No
Methylnaphthalene	0.031	0.031	8	1	0.13	na	na	na	na	na	nc	nc	4,300	430	No
nthracene	1.9	0.016	8	2	0.25	na	na	па	па	na	nc	nc	6	0.6	Yes
enzo(a)anthracene	4.4	4.4	8	1	0.13	na	na	na	na	na	nc	nc	1	0.1	Yes
enzo(a)pyrene	2.3	2.3	8	1	0.13	na	na	па	na	na	nc	nc		1.1	Yes
enzo(b)fluoranthene	2.6	2.6	. 8	1	0.13	na	na	na	na	na	nc	nc	1,500	150	No
enzo(g,h,i)perylene	0.056	0.056	8	1	0.13	na	na	na	па	na	nc	nc	110	11	No
enzo(k)fluoranthene	2.7	2.7	8	1	0.13	na	na	na	na	na		nc	620	62	No
hrysene	5.5	5.5	8	1	0.13	na	na	na	na	na	nc	nc	2,100	210	No
luoranthene	9.3	0.035	8	2	0.25	na	na	па	na	na	nc		4,300	430	No
henanthrene	4.1	0.016	8	2	0.25	na	na	na	na	na	nc	nc	1,500	150	No
rene	7.5	0.025	8	2	0.25	na	na	na	na	na	nc	nc	1,500	150	1.0
etroleum Hydrocarbons						92,650	7.9	11	10	0.91	nc	nc	250	25	Yes
iesel Range Organics (DRO)	83,000	95	10	10	1.0					na	nc	nc	100	10	Yes
iesel Range Organics_Aromatic	59	59	2	1	0.50	na	na	na	na	na	nc	пс	7,200	720	No
iesel Range Organics_Aliphatic	490	50	2	2	1.0	na	na	na	na 4	na 0.40	nc	пс	300	30	Yes
asoline Range Organics (GRO)	na	na	па	па	na	120	3.7	10			nc	nc	10,000	1,000	Yes
esidual Range Organics (RRO)	2,200	1,200	6	6	1.0	na	na	na	na	na	nc	nc	3,000	300	Yes
esidual Range Organics_Aromatic	360	230	2	2	1.0	na	na	na	na	na		nc	NA °	NA	No
TRPH	110,000	47,000	2	2	1.0	104,000	12	10	10	1.0	nc	nc			

Notes:

na - Not available. NA- Not applicable.

# Table E-28 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 28 Northeast Cape, St. Lawrence Island, Alaska

Number of Detection Maximum Minimum Humber of Detection			Soil Tur	dra Data		e e	Soil Gr	avel Data			-	Regulatory Criteria	COPC Screening Benchmark	COPC?
he - Not calculated. BUTL - Background upper tolerance limit. mg/kg - Miligram per Kilogram. COPC - Chemical of Potential Concern PAH - Polynuclear Aromatic Hydrocarbons PCB - Polychiorinated Biphenyls TRPH - Total Residual Petroleum Hydrocarbons VOC - Volatile Organic Compounds * Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003). * Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy: 1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. 11 and Cher Hizardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14. 3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Coll and Determiner Ricidance Rici			Minimum	Number of		Maximum Detect (mg/kg)	Minimum Detect (mg/kg)							(Yes/No)
BUTL - Background upper tolerance limit.         mg/kg - Milligram per kilogram.         COPC - Chemical of Potential Concern         PAH - Polynuclear Aromatic Hydrocarbons         PCB - Polychlorinated Biphenyls         TRPH - Total Residual Pertolenum Hydrocarbons         VOC - Volatile Organic Compounds         * Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of         Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska         (MWH, 2003).         * Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:         1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. IB AAC 75 Oil and Hazardous Substances Pollution Control. January 30.         2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.         4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.         4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.         4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.         4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.         4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 200	Constitution	Detect (mg/kg)	Detect (mg/kg)	Samples Detect	s riequency	Detter (ing/ing/	Dettett							
mg/kg - Milligram per kilogram. COPC - Chemical of Potential Concern PAH - Polynuclear Aromatic Hydrocarbons PCB - Polychlorinated Biphenyls TRPH - Total Residual Petroleum Hydrocarbons VOC - Volatile Organic Compounds * Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003). * Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy: 1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30. 2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. January 30. 2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. January 30. 3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Outualitive Risk Guidance. November 7. 4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7. 4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7. 4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7. 4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7. 4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7. 4. Minimum of 10-007. December 18. * Benchmark Criteria is equal to 1/10 the indicated regulatory criteria. * Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment														
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<ul> <li>PAH - Polynuclear Aromatic Hydrocarbons</li> <li>PCB - Polychlorinated Biphenyls</li> <li>TRPH - Total Residual Petroleum Hydrocarbons</li> <li>VOC - Volatile Organic Compounds</li> <li>* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska</li> <li>(MWH, 2003).</li> <li>* Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:</li> <li>1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. January 30.</li> <li>2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li>3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.</li> <li>4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical</li> <li>* Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li>* Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>														
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<ul> <li>TRPH - Total Residual Petroleum Hydrocarbons</li> <li>VOC - Volatile Organic Compounds</li> <li>Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).</li> <li>Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. 0il and Hazardous Substances Pollution Control. January 30.</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. 0il and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical</li> <li>Memorandum 10-07. December 18.</li> <li>Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li>Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>		is												
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<ul> <li>(MWH, 2003).</li> <li><sup>6</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:</li> <li>1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.</li> <li>2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li>3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.</li> <li>4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical</li> <li>Memorandum 01-007. December 18.</li> <li><sup>6</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li><sup>4</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	Ambient Concentrations for Abiotic Media	Associated with	the Northeast Ca	pe, St. Lawrence Is	and, Alaska									
<ul> <li><sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:</li> <li>1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.</li> <li>2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.</li> <li>3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.</li> <li>4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical</li> <li>Memorandum 01-007. December 18.</li> <li><sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li><sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>														
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<ol> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Folution Control. Public Columnet Dath. To ARC 10. December 19.</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.</li> <li><sup>4</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li><sup>4</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ol>	Regulatory effective is equal to the minimum			•										
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<ol> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.</li> <li>Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical</li> <li>Memorandum 01-007. December 18.</li> <li>Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li>Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ol>	1. Minimum of 3 pathways listed in Tables B1	and B2, Under 40	) inch zone: ADEC.	2002. Oil and Other	lazardous Subst	ances Pollution Con	trol. Public Comm	ent Draft. 18	AAC 75. I	December 14.				
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Memorandum 01-007. December 18. <sup>6</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria. <sup>4</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment	A Minimum of 3 pathways listed in Tables B1	and B2. Under 40	) inch zone: ADEC.	2001. Calculated Cle	anup Levels for	Compounds without	t Tabular Values in	Site Cleanup	Rules - Tec	chnical				
<ul> <li>Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.</li> <li>Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment</li> </ul>	Memorandum 01-007. December 18.													
<sup>d</sup> Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment		indicated regulate	ory criteria.											
				according to Risk A	ssessment									
			y value calculated	according to thisk r										

<sup>e</sup> TRPH is excluded as a COPC due to outdated analysis methods.

### Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Freshwater Sediment

Site 28

Northeast Cape, St. Lawrence Island, Alaska

	Sediment Conce		Numt			BUTL (mg/kg) <sup>2</sup>	Regulatory Criteria <sup>b</sup> (mg/kg)	COPC Screening Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Sediment	(mg/kg)	(ing/kg)	(100100)
Inorganics									
Chromium	649	4.4	68	67	0.99	34	26	2.6	Yes
Copper	20	16	3	3	1.0	40	4,060	406	No
Lead	4,590	4.0	68	55	0.81	78	400 <sup>d</sup>	40	Yes
Nickel	13	13	3	1	0.33	126	87	8.7	No
Zinc	4,810	12	68	68	1.0	148	9,100	910	Yes
VOCs					0.12		0.02	0.002	Yes
Benzene	0.050	0.050	8	1	0.13	na	5.5	0.55	Yes
Ethylbenzene	1.8	0.027	8	2	0.25	na	5.4	0.54	No
Toluene	0.37	0.0038	8	3	0.38	na		7.8	No
Xylenes	0.78	0.048	8	3	0.38	na	78	7.8	
PCBs	0.12	0.12	79	1	0.013	na	10 <sup>e</sup>	1	No
PCB-1242 (Aroclor 1242)		0.038	79	14	0.18	na	10 <sup>e</sup>	1	Yes
PCB-1254 (Aroclor 1254)	2.8	0.063	79	27	0.34	na	10 <sup>e</sup>	. 1	Yes
PCB-1260 (Aroclor 1260)	5.4	0.005		-					
Pesticides					0.46	na	35	3.5	No
4,4'-DDD	1.2	0.0072	13	6	0.46	6	0.009	0.0009	Yes
beta-BHC	0.012	0.0036	10	2	0.20	na	7 <sup>f</sup>	0.7	No
Endosulfan sulfate	0.0086	0.0086	10	1	0.10	na		0.0003	Yes
gamma-BHC (Lindane)	0.0065	0.0029	13	2	0.15	na	0.003	0.0005	No
Heptachlor	0.0046	0.0044	13	2	0.15	na	0.8	0.08	NO
Dioxins & Furans			68	26	0.38	na	na <sup>g</sup>	na	Yes
Dibenzofuran	5.6	0.026	68	20	0.58				
PAHs							12	4.3	Yes
2-Methylnaphthalene	500	0.022	71	58	0.82	na	43	4.5	103

### Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Freshwater Sediment

Site 28

### Northeast Cape, St. Lawrence Island, Alaska

	Sediment Conce	ntration (mg/kg)	Numb	er of	Detection	BUTL (mg/kg) <sup>a</sup>	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Sediment	(mg/kg)	(mg/kg)	(Yes/No)
Acenaphthene	14	0.016	70	40	0.57	na	210	21	No
Acenaphthylene	0.047	0.047	71	1	0.014	na	210	21	No
Anthracene	1.8	0.0092	71	7	0.10	na	4,300	430	No
Benzo(a)anthracene	1.9	0.10	71	5	0.070	na	6	0.6	Yes
Benzo(a)pyrene	1.4	0.13	71	4	0.056	na	1	0.1	Yes
Benzo(b)fluoranthene	1.6	0.10	71	5	0.070	na	11	1.1	Yes
Benzo(g,h,i)perylene	0.91	0.037	71	2	0.028	na	1,500	150	No
Benzo(k)fluoranthene	1.9	0.19	71	4	0.056	na	110	11	No
Chrysene	2.6	0.031	71	7	0.10	na	620	62	No
Dibenzo(a,h)anthracene	0.015	0.015	71	1	0.014	na	1	0.1	No
Fluoranthene	14	0.0084	71	12	0.17	na	2,100	210	No
Fluorene	20	0.011	71	47	0.66	na	270	27	No
Indeno(1,2,3-cd)pyrene	1.2	0.046	71	3	0.042	na	11	1.1	Yes
Naphthalene	220	0.024	71	55	0.77	na	21	2.1	Yes
Phenanthrene	21	0.015	71	42	0.59	na	4,300	430	No
Pyrene	9.5	0.010	71	11	0.15	na	1,500	150	No
Petroleum Hydrocarbons									
Diesel Range Organics (DRO)	150,000	22	83	83	1.0	na	250	25	Yes
Diesel Range Organics_ Aromatic	60	60	3	1	0.33	na	100	10	Yes
Diesel Range Organics_Aliphatic	150,000	26	5	5	1.0	na	7,200	720	Yes
Gasoline Range Organics (GRO)	220	4.0	5	2	0.40	na	300	30	Yes
Residual Range Organics (RRO)	14,000	69	69	66	0.96	na	10,000	1,000	Yes
Residual Range Organics_ Aliphatic	11,000	58	5	4	0.80	na	20,000	2,000	Yes
Residual Range Organics_Aromatic	500	. 64	5	5	1.0	na	3,000	300	Yes
TRPH	127,000	21,500	5	5	1.0	na	NA <sup>h</sup>	NA	No

Notes:

na - Not available.

NA - Not applicable.

Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Freshwater Sediment

Site 28

### Northeast Cape, St. Lawrence Island, Alaska

	Sediment Conce	ntration (mg/kg)	Numl			BUTL (mg/kg) <sup>2</sup>	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Sediment	(mg/kg)	(mg/kg)	(Yes/No)
BUTL - Background upper tolerance li	mit.								
mg/kg - milligrams per kilogram.									
COPC - Chemical of Potential Concern	n.								
PAH - Polynuclear Aromatic Hydrocar	rbons								
PCB - Polychlorinated Hydrocarbons					d.				
TRPH - Total Residual Petroleum Hyd	rocarbons								
VOC - Volatile Organic Compounds									
Please refer to Technical Memorand									
Ambient Concentrations for Abiotic M	edia Associated with the	Northeast Cape, St. Lav	wrence Islan	d, Alaska					
(MWH, 2003).									
<sup>b</sup> Regulatory Criteria is equal to the mi	nimum ADEC Soil Clean	up Level proposed by t	he following	hierarchy:	1 Hannadawa	Substances Pollutio	-		
1. Minimum of 3 pathways listed in T	ables B1 and B2, Under 4	40 inch zone: ADEC, 20	03. 18 AAG	2 /3 Oil an	d Hazardous	Substances Fonutio	M1		
Control. January 30.		A inchange ADEC 20	02 Oil and	Other Haz	ardoue Subet	ances Pollution Con	atrol		
2. Minimum of 3 pathways listed in T		10 Inch zone: ADEC, 20	02. Oli allu	Other Haz	aluous Suosi	ances i onution con	iii on		
Public Comment Draft. 18 AAC 75. 1 3. Minimum of 3 pathways listed in T	bles P1 and P2 Under	10 inch zone: ADEC 20	02 Cumula	tive Risk (	Juidance. No	ovember 7.			
<ol> <li>Minimum of 3 pathways listed in T</li> <li>Minimum of 3 pathways listed in T</li> </ol>	ables B1 and B2, Under 4	10 inch zone: ADEC, 20	01. Calcula	ted Cleanu	n Levels for	Compounds withou	t		
Tabular Values in Site Cleanup Rules	Technical Memorandum	01-007. December 18			r				
<sup>6</sup> COPC Screening Benchmark is equal									
			to Dick						
<sup>d</sup> Screening Criteria for lead is based of		le calculated according	IO KISK						
Assessment Procedures Manual guidar	ICE (18 AAC 73.340).								
<sup>e</sup> Total PCBs used as a surrogate.									
f Endosulfan used as a surrogate.	10 N N N N								
<sup>8</sup> Screening criteria is currently not av	ailable for dioxins and fur	rans. These analytes are	e therefore						
carried through as COPCs.									
TRPH is excluded as a COPC due to	outdated analysis method	ds.							

### Table E-30 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Surface Water Site 28 Northeast Cape, St. Lawrence Island, Alaska

		Fresh Surfac	e Water Da	ita		BUTL	(mg/L) <sup>a</sup>	Regulatory	COPC Screening	
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)	Numb Samples		Detection Frequency	Fresh Surface Water	Ephemeral Surface Water	Criteria <sup>b</sup> (mg/L)	Benchmark <sup>c</sup> (mg/L)	COPC? (Yes/No)
Inorganics, Total								0.1	0.01	Yes
Chromium	0.015	0.015	3	1	0.33	nc	nc			Yes
Copper	0.040	0.040	. 3	1	0.33	nc	0.083	0.0031	0.00031	
Lead	0.086	0.086	3	1	0.33	nc	0.014	0.0081 <sup>d</sup>	0.00081	Yes
Zinc	0.62	0.62	3	1	0.33	nc	0.90	0.081	0.0081	Yes
Inorganics, Dissolved										
Lead, Dissolved	0.011	0.011	3	1	0.33	nc	nc	0.015	0.0015	Yes
Zinc, Dissolved	0.23	0.23	3	1	0.33	nc	0.093	11	1.1	Yes
VOCs										
Ethylbenzene	0.0016	0.0016	5	1	0.20	na	na	0.7	0.07	No
PCBs									0.0000014	Yes
PCB-1260 (Aroclor 1260)	0.0019	0.0015	15	2	0.13	na	na	1.4E-05 °	0.0000014	105
Petroleum Hydrocarbons								1.5	0.15	Yes
Diesel Range Organics (DRO)	326	0.39	17			na	na		0.13	Yes
Gasoline Range Organics (GRO)	0.57	0.57	5	; 1	0.20	na	na	1.3		No
TRPH	19	2.3	5	; 2	0.40	na	na	NA	NA	140

Notes:

BUTL - Background upper tolerance limit.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

# Table E-30 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Surface Water Site 28 Northeast Cape, St. Lawrence Island, Alaska

		Fresh Surfac	e Water D	ata		BUTL	(mg/L) <sup>a</sup>	Regulatory	COPC Screening	e ,
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)	Num		Detection Frequency	Fresh Surface Water	Ephemeral Surface Water	Criteria <sup>b</sup> (mg/L)	Benchmark <sup>c</sup> (mg/L)	COPC? (Yes/No)
constituent	Detect (ing/L)	Detect (Ing/L)	Samples	Dettetts	Trequency	Water	Surface Water	(ing b)	(	(10011.0)
<sup>9</sup> Benchmark Criteria is equal to the recent guidance documents, below.	minimum ADEC Grou	ndwater Cleanup	Level prop	osed by the	e two most					
ADEC Groundwater Cleanup Levels ADEC, 2001. Calculated Cleanu		nds without Tabul	lar Values i	n Site Clea	nup Rules -					
Technical Memorandum 01-007.	December 18.									
ADEC Groundwater Cleanup Levels ADEC, 2002. Oil and Other Haz 75. December 14.		llution Control. P	Public Com	ment Draft.	. 18 AAC					
Benchmark Criteria is equal to 1/10	) the indicated regulate	ory criteria.								
Screening Criteria for lead is based Procedures Manual guidance (18 AA	on residential cleanur	•	according t	o Risk Ass	essment					
Total PCBs used as a surrogate.										
		ath a da								
TRPH is excluded as a COPC due t	o outdated analysis me	ethods.								

### Table E-31 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Subsurface Water Site 28 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsurf	face Water	Data				Regulatory	COPC Screening	
	Maximum	Maximum	Numb	er of	Detection	Subsurface Wate	er BUTL (mg/L) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total										
Arsenic	0.039	0.039	1	1	1.0	0.025	nc	0.05	0.005	Yes
Chromium	0.25	0.25	2	1	0.50	1.7	nc	0.1	0.01	No
Copper	0.18	0.18	2	1	0.50	0.087	nc	1.3	0.13	Yes
Lead	0.20	0.0080	2	2	1.0	0.013	nc	0.015	0.0015	Yes
Nickel	0.16	0.16	2	1	0.50	0.056	nc	0.1	0.01	Yes
Zinc	0.59	0.59	2	1	0.50	0.29	nc	11	1.1	No
Petroleum Hydrocarbons Diesel Range Organics (DRO)	3.2	0.49	2	2	1.0	na	na	1.5	0.15	Yes

### Notes:

BUTL - Background upper tolerance limit.

COPC - Chemcial of Potential Concern.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.

### ADEC Groundwater Cleanup Levels Table C.

ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

ADEC Groundwater Cleanup Levels Table C.

ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

# Table E-32 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Plant Tissue Site 28 Northeast Cape, St. Lawrence Island, Alaska

	Plant Tigger Course	entration (mg/kg)	Numb	or of	Detection	BUTL (mg/kg) <sup>a</sup>	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect	Minimum Result			Frequency	Plant Tissue	(mg/kg)	(mg/kg)	(Yes/No)
				4		_			
Inorganics	0.0030	0.0030	1	1	1.0	nc	na	na	Yes
Antimony Arsenic	0.0050	<0.06	5	1	0.20	nc	na	na	Yes
Barium	40	0.45	5	5	1.0	nc	na	na	Yes
Cadmium	1.1	0.0020	5	5	1.0	nc	na	na	Yes
Chromium	10	<0.06	5	4	0.80	nc	na	na	Yes
	3.4	0.58	5	5	1.0	nc	na	na	Yes
Copper	5.0	0.065	5	5	1.0	nc	na	na	Yes
	0.027	<0.003	5	4	0.80	nc	na	na	Yes
Mercury	3.7	0.060	5	5	1.0	nc	na	na	Yes
Nickel	0.050	<0.025	5	1	0.20	nc	na	na	Yes
Selenium	0.023	<0.025	5	2	0.20	nc	na	na	Yes
Silver			5	5	1.0	nc	na	na	Yes
Vanadium	3.1	0.016	5	5	1.0	nc	na	na	Yes
Zinc	76	1.3	5	3	1.0	ne	na	na	100
PAHs									Yes
2-Methylnaphthalene	0.014	< 0.005	5	3	0.60	nc	na	na	Yes
Acenaphthene	0.052	0.0038	5	4	0.80	nc	na	na	Yes
Anthracene	0.016	< 0.005	5	4	0.80	nč	na	na	
Benzo(a)anthracene	0.11	0.0045	5	4	0.80	nc	na	na	Yes
Benzo(a)pyrene	0.17	< 0.005	5	2	0.40	nc	na	na	Yes
Benzo(b)fluoranthene	0.15	0.0037	5	4	0.80	nc	na	na	Yes
Benzo(g,h,i)perylene	0.099	0.0031	5	3	0.60	nc	na	na	Yes
Benzo(k)fluoranthene	0.16	< 0.005	5	2	0.40	nc	na	na	Yes
Chrysene	0.21	0.005	5	4	0.80	nc	na	na	Yes
Dibenz(a,h)anthracene	0.033	0.0035	5	3	0.60	nc	na	na	Yes
Iuoranthene	0.50	< 0.005	5	4	0.80	nc	na	na	Yes
Juorene	0.041	< 0.005	5	4	0.80	nc	na	na	Yes
ndeno(1,2,3-cd)pyrene	0.19	0.0027	5	4	0.80	nc	na	na	Yes
Naphthalene	0.022	0.0043	5	4	0.80	nc	na	na	Yes
Phenanthrene	0.56	0.0027	5	5	1.0	nc	na	na	Yes
Pyrene	0.48	<0.005	5	4	0.80	nc	na	na	Yes
B									
PCBs	0.22	0.0040	5	5	1.0	nc	na	na	Yes
PCB-1254 (Aroclor 1254)	0.22	0.0049	5	5	1.00	nc	na	na	Yes
PCB-1260 (Aroclor 1260)	0.099	0.0049	5	3	1.00	ne	114		

### Table E-32 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Plant Tissue Site 28 Northeast Cape, St. Lawrence Island, Alaska

							Regulatory	<b>COPC Screening</b>	
	Plant Tissue Conco	entration (mg/kg)	Numb	er of	Detection	BUTL (mg/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Plant Tissue	(mg/kg)	(mg/kg)	(Yes/No)

Notes:

BUTL - Background upper tolerance limit.

COPC - Chemical of Potential Concern.

mg/kg - Milligrams per kilogram.

NA - Not applicable.

na - Not available.

nc - Not calculated.

PAH - Polynuclear Aromatic Hydrocarbons

PCB - Polychlorinated Biphenyls

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Benchmark Criterion is not currently available for this media.

## Table E-33 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Freshwater Sediment Site 29

Northeast Cape, St. Lawrence Island, Alaska

Constituent	Sediment Conce	ntration (mg/kg) Minimum Result	Numb		Detection Frequency	BUTL (mg/kg) * Sediment	Regulatory Criteria <sup>b</sup> (mg/kg)	COPC Screening Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
	Maximum Detect								
Inorganics Aluminum	15,900	4,820	4	4	1.0	nc	na	па	Yes
	5.7	2.8	4	4	1.0	nc	2	0.2	Yes
Arsenic	115	40	4	4	1.0	nc	1,100	110	Yes
Barium	1.3	0.20	5	4	0.8	9.8	42	4.2	No
Beryllium Calcium	3,270	1,580	4	4	1.0	nc	NA d	NA	No
	27	2.6	17	17	1.0	34	26	2.6	No
Chromium Cobalt	7.0	2.0	4	4	1.0	nc	na	na	Yes
Copper	11	1.8	5	5	1.0	40	4,060	406	No
	14,900	8,720	4	4	1.0	nc	NA <sup>d</sup>	NA	No
Iron	24	3.2	17	17	1.0	78	400 <sup>e</sup>	40	No
Lead	3,770	2,030	4	4	1.0	nc	NA <sup>d</sup>	NA	No
Magnesium		80	4	4	1.0	nc	na	na	Yes
Manganese	114	0.050	4	1	0.3	nc	1.4	0.14	Yes
Mercury	0.050	5.0	5	4	0.8	126	87	8.7	No
Nickel	14	930	4	4	1.0	nc	NA <sup>d</sup>	NA	No
Potassium	1,360		4	4	1.0	nc	NA <sup>d</sup>	NA	No
Sodium	713	416	4	4	1.0	nc	710	71	Yes
Vanadium	35	17	17	17	1.0	148	9,100	910	No
Zinc	69	14	17	17	1.0				
VOCs									
	0.0032	0.0032	4	1	0.25	na	na	na	Yes
m,p-Xylene Toluene	0.0097	0.0047	9	4	0.44	na	5.4	0.54	No
louene	0.0077								
Dioxins & Furans							,		
Dibenzofuran	0.0086	0.0086	16	1	0.063	na	na <sup>f</sup>	na	Yes
PAHs					4		42	4.3	No
2-Methylnaphthalene	0.23	0.012	21	4	0.19	na	43		No
Acenaphthene	0.014	0.014	21	1	0.048	na	210	21	
	0.010	0.010	21	1	0.048	na	210	21	No

### Table E-33 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Freshwater Sediment Site 29 Northeast Cape, St. Lawrence Island, Alaska

	Sediment Conce	ntration (mg/kg)	Numb	er of	Detection	BUTL (mg/kg) *	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Sediment	(mg/kg)	(mg/kg)	(Yes/No)
Anthracene	0.023	0.023	21	1	0.048	na	4,300	430	No
Benzo(b)fluoranthene	0.0042	0.0042	21	1	0.048	na	11	1.1	No
Benzo(k)fluoranthene	0.0042	0.0042	21	1	0.048	na	110	11	No
Chrysene	0.0048	0.0048	21	1	0.048	na	620	62	No
Fluoranthene	0.022	0.010	21	3	0.14	na	2,100	210	No
	0.022	0.013	21	3	0.14	na	270	27	No
Fluorene	0.11	0.0098	21	3	0.14	na	21	2.1	No
Naphthalene		0.010	21	4	0.19	na	4,300	430	No
Phenanthrene Pyrene	0.037	0.0106	21	2	0.10	na	1,500	150	No
Petroleum Hydrocarbons							250	25	Yes
Diesel Range Organics (DRO)	25,000	9.3	26	24	0.92	na		1,000	No
Residual Range Organics (RRO)	1,000	10	18	17	0.94	na	10,000		No
Residual Range Organics_Aromatic	137	53	6	6	1.0	na	3,000	300	
TRPH	67	67	1	1	1.0	na	NA <sup>g</sup>	NA	No

Notes:

Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic

Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.

2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

<sup>b</sup> COPC Screening Benchmark is equal to 1/10 the applicable regulatory critieria.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

<sup>d</sup> This analyte is excluded as a COPC due to status as an essential nutrient.

\* Screening Criteria for lead is based on residential cleanup value calculated according to Risk Assessment Procedures Manual guidance (18 AAC 75.340).

Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Freshwater Sediment

Site 29

Northeast Cape, St. Lawrence Island, Alaska

	Sediment Concer	ntration (mg/kg)	Numb		Detection	BUTL (mg/kg) <sup>a</sup>	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>e</sup>	COPC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Sediment	(mg/kg)	(mg/kg)	(Yes/No)
<sup>1</sup> Screening criteria is currently not available carried through as COPCs.	ble for dioxins and fura	ns. These analytes are	therefore						
<sup>8</sup> TRPH is excluded as a COPC due to out	dated analysis method	s.							
NA - Not applicable.									
na - Not available.									
nc - Not calculated.									
BUTL - Background upper tolerance limit									
mg/kg - milligrams per kilogram.									
COPC - Chemical of Potential Concern.									

### Table E-34 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Surface Water Site 29 Northeast Cape, St. Lawrence Island, Alaska

		Fresh Surfac	e Water Da	ata		BUTL	(mg/L) <sup>a</sup>	Regulatory	COPC Screening	conce
	Maximum	Maximum	Numb		Detection	Fresh Surface		Criteria <sup>b</sup>	Benchmark <sup>c</sup> (mg/L)	COPC? (Yes/No
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Water	Surface Water	(mg/L)	(112/12)	(10)110
Inorganics, Total			· · ·							
Aluminum	0.040	0.040	4	4	1.0	nc	2.2	0.087	0.0087	Yes
Barium	0.0050	0.0050	4	4	1.0	nc	0.034	2	0.2	Yes
Calcium	7.6	6.9	4	4	1.0	nc	nc	NA <sup>d</sup>	NA	No
Iron	0.38	0.31	4	4	1.0	nc	nc	NA <sup>d</sup>	NA	No
	2.6	2.0	4	4	1.0	nc	nc	NA <sup>d</sup>	NA	No
Magnesium	0.027	0.017	4	4	1.0	nc	0.12	na	na	Yes
Manganese	1.0	0.68	4	3	0.75	nc	nc	NA <sup>d</sup>	NA	No
Potassium		. 14	4	4	1.0	nc	nc	NA <sup>d</sup>	NA	No
Sodium	29	0.0080	5	1	0.20	nc	0.90	11	1.1	Yes
Zinc	0.0080	0.0080	5	1	0.20					
Inorganics, Dissolved								0.18	0.018	Yes
Silver, Dissolved	0.020	0.020	1	1	1.0	nc	nc	0.10		
Petroleum Hydrocarbons								1.5	0.15	Yes
Diesel Range Organics (DRO)	0.33	0.33	13	1	0.077	nc	nc	1.5	0.01	Yes
Diesel Range Organics_ Aliphatic	0.33	0.33	1	1	1.0	nc	nc	0.1		Yes
Gasoline Range Organics (GRO)	0.41	0.33	11	2	0.18	nc	nc	1.3	0.13	1 08

Notes:

BUTL - Background upper tolerance limit.

mg/L - Milligrams per liter.

NA - Not applicable.

na - Not available.

nc - Not calculated.

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Benchmark Criteria is equal to the minimum ADEC Groundwater Cleanup Level proposed by the two most recent guidance documents, below.

ADEC Groundwater Cleanup Levels Table C.

### Tal 4

Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Surface Water

Site 29

Northeast Cape, St. Lawrence Island, Alaska

		Fresh Surfac	e Water Da	ata		BUTL	(mg/L) <sup>a</sup>	Regulatory	COPC Screening	
	Maximum	Maximum	Numb	per of	Detection	Fresh Surface	Ephemeral	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/L)		Samples	Detects	Frequency		Surface Water	(mg/L)	(mg/L)	(Yes/No)
				<b>C</b> '. <b>C</b>	Dulas					

ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules -

Technical Memorandum 01-007. December 18.

ADEC Groundwater Cleanup Levels Table C. ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC

75. December 14.

<sup>e</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

<sup>d</sup> This analyte is excluded as a COPC due to status as an essential nutrient.

### Table E-35 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Fish Tissue Site 29 Northeast Cape, St. Lawrence Island, Alaska

	Fish Tissue Conc	entration (mg/kg)	Numb	er of	Detection	BUTL (mg/kg) *	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Fish Tissue	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics									
Arsenic	0.78	0.50	8	8	1.0	nc	na	na	Yes
Barium	0.049	0.015	8	8	1.0	nc	na	na	Yes
Cadmium	0.009	0.0060	8	4	0.50	nc	na	na	Yes
	0.98	0.55	8	8	1.0	nc	na	na	Yes
Copper	0.012	0.0030	8	5	0.63	nc	na	na	Yes
ead	0.022	0.014	8	8	1.0	nc	na	na	Yes
Aercury		0.030	8	3	0.38	nc	na	na	Yes
lickel	0.10 0.17	0.12	8	8	1.0	nc	na	na	Yes
selenium		0.017	8	8	1.0	nc	na	na	Yes
/anadium	0.060	5.6	8	8	1.0	nc	na	na	Yes
Zinc	7.1	5.0	0	0	110				
PAHs					0.13	nc	na	na	Yes
-Methylnaphthalene	0.0065	<0.005	8	1	0.15	nc	na	na	Yes
cenaphthene	0.0067	0.0013	8	2	0.25	nc	na	na	Yes
Anthracene	0.0072	0.0017	8	2	0.25	nc	na	na	Yes
Benzo(a)anthracene	0.0082	0.0014	8	2	0.25	nc	na	na	Yes
Benzo(a)pyrene	0.0059	0.0021	8	2			na	na	Yes
Benzo(b)fluoranthene	0.004	0.0012	8	2	0.25	nc	na	na	Yes
Benzo(g,h,i)perylene	0.0064	0.0034	8	3	0.38	nc		na	Yes
Benzo(k)fluoranthene	0.012	0.0024	8	3	0.38	nc	na	na	Yes
Chrysene	0.0084	0.0025	8	2	0.25	nc	na	na	Yes
Dibenz(a,h)anthracene	0.0041	0.0041	8	1	0.13	nc	na	na	Yes
Fluoranthene	0.0093	0.0017	8	3	0.38	nc	na	na	Yes
Juorene	0.0076	0.0012	8	3	0.38	nc	na		Yes
ndeno(1,2,3-cd)pyrene	0.0027	0.00074	8	3	0.38	nc	na	na	Yes
	0.0047	0.0018	8	3	0.38	nc	na	na	Yes
Naphthalene	0.0086	0.0015	8	4	0.50	nc	na	na	Yes
Phenanthrene Pyrene	0.010	0.0026	8	3	0.38	nc	na	na	105
- -									
PCBs	0.016	0.0061	8	8	1.0	nc	na	na	Yes
PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260)	0.0045	<0.002	8	1	0.13	nc	na	na	Yes

Notes:

# Tal5Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Fish Tissue<br/>Site 29<br/>Northeast Cape, St. Lawrence Island, Alaska

	Fish Tissue Conce	ntration (mg/kg)	Numb	er of	Detection	BUTL (mg/kg) <sup>a</sup>	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>c</sup>	COPC?
Constituent –	Maximum Detect	Minimum Result			Frequency	Fish Tissue	(mg/kg)	(mg/kg)	(Yes/No)
BUTL - Background upper tolerance limit.	Maximum Detect	Minimum Result	Gampica	Dettets	Trequency		(		
COPC - Chemical of Potential Concern.									
mg/kg - Milligrams per kilogram.									
NA - Not applicable.									
na - Not available.									
nc - Not calculated.									
PAH - Polynuclear Aromatic Hydrocarbons									
PCB - Polychlorinated Biphenyls									
<sup>a</sup> Please refer to Technical Memorandum-B	ackground Determina	ation for Risk Assessm	ent, Derivatio	on of					
Ambient Concentrations for Abiotic Media (MWH, 2003).									

<sup>b</sup> Regulatory Benchmark Criterion is not currently available for this media.

## Table E-36 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Fish Tissue (Fillet Data Only) Site 30

Northeast Cape, St. Lawrence Island, Alaska

	Fish Tissue Conc	entration (mg/kg)	Numb	er of	Detection	BUTL (mg/kg) *	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Fish Tissue	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics			5	5	1.0	nc	na	na	Yes
Arsenic	0.94	0.33	5	5	1.0	nc	na	na	Yes
Barium	0.061	0.024	5	3	0.60	nc	na	na	Yes
Cadmium	0.0080	0.0070	5	5	1.0	nc	na	na	Yes
Copper	1.2	0.59	5	5	1.0	nc	na	na	Yes
Lead	0.0040	0.0020	5	5	1.0	nc	na	na	Yes
Mercury	0.034	0.030	5	4	0.80	nc	na	na	Yes
Nickel	0.050	0.13	5	5	1.0	nc	na	na	Yes
Selenium	0.19 0.080	0.046	5	5	1.0	nc	na	na	Yes
Vanadium	14	5.9	5	5	1.0	nc	na	na	Yes
Zinc	14	5.9	U						
PAHs Fluoranthene	0.0015	0.0015	5	1	0.200	nc	na	na	Yes
PCBs PCB-1254 (Aroclor 1254)	0.011	0.0062	5	5	1.00	nc	na	na	Yes

### Notes:

BUTL - Background upper tolerance limit.

COPC - Chemical of Potential Concern.

- mg/kg Milligrams per kilogram.
- NA Not applicable.

na - Not available.

nc - Not calculated.

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Benchmark Criterion is not currently available for this media.

### Table 2-7 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Plant Tissue Site 30 Northeast Cape, St. Lawrence Island, Alaska

							Regulatory	COPC Screening	CODO
	Plant Tissue Cond	entration (mg/kg)	Numb	per of	Detection	BUTL (mg/kg) *	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Maximum Detect	<b>Minimum Result</b>	Samples	Detects	Frequency	Plant Tissue	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics									
Arsenic	0.56	<0.21	2	1	0.50	nc	na	na	Yes
Barium	21	12	2	2	1.0	nc	na	na	Yes
Cadmium	0.88	0.18	2	2	1.0	nc	na	na	Yes
Chromium	9.0	1.0	2	2	1.0	nc	na	na	Yes
Copper	2.8	2.2	2	2	1.0	nc	na	na	Yes
Lead	3.5	0.68	2	2	1.0	nc	na	na	Yes
Mercury	0.021	0.0080	2	2	1.0	nc	na	na	Yes
Nickel	4.2	1.1	2	2	1.0	nc	na	na	Yes
Selenium	0.050	0.050	2	1	0.50	nc	na	na	Yes
Silver	0.019	0.011	2	2	1.0	nc	na	na	Yes
Vanadium	3.6	0.36	2	2	1.0	nc	na	na	Yes
Zinc	57	28	2	2	1.0	nc	na	na	Yes
Zinc	51	20							
PAHs									Yes
2-Methylnaphthalene	0.0076	< 0.005	2	1	0.50	nc	na	na	Yes
Acenaphthene	0.013	0.0037	2	2	1.0	nc	na	na	Yes
Anthracene	0.049	< 0.005	2	1	0.50	nc	na	na	Yes
Benzo(a)anthracene	0.075	0.0025	2	2	1.00	nc	na	na	Yes
Benzo(a)pyrene	0.021	0.0027	2	2	1.00	nc	na	na	Yes
Benzo(b)fluoranthene	0.053	0.0045	2	2	1.0	nc	na	na	
Benzo(g,h,i)perylene	0.013	0.0019	2	2	1.00	nc	na	na	Yes
Benzo(k)fluoranthene	0.046	0.0045	2	2	1.0	nc	na	na	Yes
Chrysene	0.087	0.0037	· 2	2	1.0	nc	na	na	Yes
Dibenz(a,h)anthracene	0.013	0.0019	2	2	1.00	nc	na	na	Yes
Fluoranthene	0.38	0.0083	2	2	1.0	nc	na	na	Yes
	0.022	0.0025	2	2	1.0	nc	na	na	Yes
Fluorene	0.022	0.0041	2	2	1.00	nc	na	na	Yes
Indeno(1,2,3-cd)pyrene	0.0078	0.0019	2	2	1.0	nc	na	na	Yes
Naphthalene	0.29	0.013	2	2	1.0	nc	na	na	Yes
Phenanthrene	0.29	0.0073	2	2	1.0	nc	na	na	Yes
Pyrene	0.28	0.0075	2	2	1.0				
PCBs									Yes
PCB-1254 (Aroclor 1254)	0.011	0.0097	2	2	1.0	nc	na	na	Yes
PCB-1260 (Aroclor 1260)	0.0095	0.0050	2	2	1.0	nc	na	na	105

 Table E-37

 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Plant Tissue

 Site 30

### Northeast Cape, St. Lawrence Island, Alaska

	Plant Tissue Cond	centration (mg/kg)	Numb	er of	Detection	BUTL (mg/kg) <sup>a</sup>	Regulatory Criteria <sup>b</sup>	COPC Screening Benchmark <sup>c</sup>	COPC?
Constituent	<b>Maximum Detect</b>	Minimum Result	Samples	Detects	Frequency	Plant Tissue	(mg/kg)	(mg/kg)	(Yes/No)
Notes:									
BUTL - Background upper tolerance limit.									
COPC - Chemical of Potential Concern.									
mg/kg - Milligrams per kilogram.									
na - Not available.									
nc - Not calculated.									
Ambient Concentrations for Abiotic Media (MWH, 2003). <sup>b</sup> Regulatory Benchmark Criterion is not co <sup>c</sup> Benchmark Criteria is equal to 1/10 the i	urrently available for	this media.		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					

### Taure 2-38 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 31 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data					Regulatory	<b>COPC Screening</b>	
	Maximum	Minimum	Number of		Detection	BUTL (mg/kg) <sup>a</sup>		Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
VOCs										
m,p-Xylene	0.017	0.0066	4	2	0.50	nc	nc	na	na	Yes
o-Xylene	0.0053	0.0053	4	1	0.25	nc	nc	na	na	Yes
Toluene	0.024	0.0073	4	3	0.75	nc	nc	5.4	0.54	No
PCBs										
PCB-1260 (Aroclor 1260)	22	0.36	8	6	0.75	nc	nc	10	1	Yes
Petroleum Hydrocarbons										
Diesel Range Organics (DRO)	11,000	11	24	24	1.0	nc	nc	250	25	Yes
Residual Range Organics (RRO)	9,600	12	24	12	0.50	nc	nc	10,000	1,000	Yes

### Notes:

na - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PCB - Polychlorinated Biphenyls

VOC - Volatile Organic Compounds

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:
1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.

2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

4. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

### Table E-38 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 31 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tur	dra Data				Regulatory	COPC Screening	CODC?
			Numb	er of	Detection	BUTL (mg/kg) <sup>a</sup>	Criteria "	Benchmark <sup>c</sup>	COPC?
	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)		Detects	Frequency	Soil Tundra Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Constituent	Detect (Ing/kg)	Detect (ing/kg/	Cumpies						

### Tab Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 32

Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data			-		Regulatory	COPC Screening	
	Maximum	Minimum	Numb	per of	Detection	BUTL (	(mg/kg) <sup>a</sup>	Criteria <sup>b</sup>	Benchmark <sup>c</sup>	COPC?
Constituent	Detect (mg/kg)		Samples	Detects	Frequency	Soil Tundra	a Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No
PCBs										
PCB-1260 (Aroclor 1260)	0.89	0.16	3	2	0.67	nc	nc	10	1	No
Petroleum Hydrocarbons								250	25	Yes
Diesel Range Organics (DRO)	13,000	230	5	5	1.0	nc	nc	10,000	1,000	Yes
Residual Range Organics (RRO)	3,600	1,100	5	3	0.60	nc	nc	10,000	1,000	
Notes:										
a - Not applicable.										
c - Not calculated.	· ·									
BUTL - Background upper tolerance limit	ι.									
ng/kg - Milligram per kilogram. COPC - Chemical of Potential Concern										
PCB - Polychlorinated Biphenyls										
•										
Please refer to Technical Memorandum-	-Background Det	ermination for Ris	sk 							
Assessment, Derivation of Ambient Conc	entrations for Abi	iotic Media Assoc	lated with							
the Northeast Cape, St. Lawrence Island,	Alaska (MWH, 2	003).		- fallowin	a hierarchy.					
<sup>b</sup> Regulatory Criteria is equal to the minim	num ADEC Soil (	Cleanup Level pro	posed by th	le lollowin	ig merateny.					
1. Minimum of 3 pathways listed in Tables B	1 and B2, Under 40	) inch zone: ADEC,	2003. 18 A	AC 75 Oil a	and Hazardous	Substances				
2. Minimum of 3 pathways listed in Tables B	1 and B2, Under 40	) inch zone: ADEC,	2002. Oil a	nd Other H	azardous Subst	ances Pollution				
Control. Public Comment Draft. 18 AAC 75. 3. Minimum of 3 pathways listed in Tables B 4. Minimum of 3 pathways listed in Tables B	1 and B2, Under 40	D inch zone: ADEC	2002. Cum 2001. Calc	ulated Clean	nup Levels for	Compounds				
4. Minimum of 3 pathways listed in Tables B	Tand B2, Under 40	mandum 01-007 D	ecember 18.		1990 • 19992					

without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

## Table E-40 Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 33

Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	avel Data		2			Regulatory	COPC Screening	•
Genetituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb Samples		Detection Frequency	BUTL (n Soil Tundra		Criteria <sup>b</sup> (mg/kg)	Benchmark <sup>c</sup> (mg/kg)	COPC? (Yes/No)
Constituent	Detteet (ing/ing/		•							
Petroleum Hydrocarbons Diesel Range Organics (DRO)	660	150	3	3	1.0	na	na	250	25	Yes
Residual Range Organics (RRO)	2,100	270	3	3	1.0	na	na	10,000	1,000	Yes

Notes:

na - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.

 Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

 Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

### Tab Selection of Chemicals of Potential Concern for the Tier I Human Health Screening - Soil Site 34 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data					Regulatory	COPC Screening	
	Maximum	Minimum	Numb		Detection Frequency		(mg/kg) Soil Gravel	Criteria <sup>a</sup> (mg/kg)	Benchmark <sup>b</sup> (mg/kg)	COPC? (Yes/No)
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Trequency	bon rundru				
PCBs										
PCB-1254 (Aroclor 1254)	0.59	0.050	8	5	0.63	nc	nc	10	1	No
PCB-1260 (Aroclor 1260)	0.47	0.063	8	4	0.50	nc	nc	10	1	No
Petroleum Hydrocarbons										
Diesel Range Organics (DRO)	1,100	13	9	9	1.0	nc	nc	250	25	Yes
Residual Range Organics (RRO)	1,200	58	9	8	0.89	nc	nc	10,000	1,000	Yes

### Notes:

na - Not applicable.

nc - Not calculated.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

COPC - Chemical of Potential Concern

PCB - Polychlorinated Biphenyls

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Regulatory Criteria is equal to the minimum ADEC Soil Cleanup Level proposed by the following hierarchy:

1. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2003. 18 AAC 75 Oil and Hazardous Substances Pollution Control. January 30.

2. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Oil and Other Hazardous Substances Pollution Control. Public Comment Draft. 18 AAC 75. December 14.

3. Minimum of 3 pathways listed in Tables B1 and B2, Under 40 inch zone: ADEC, 2002. Cumulative Risk Guidance. November 7.

 Minimum of 3 pathways listed in Tables D1 and B2, Under 40 inch zone: ADEC, 2001. Calculated Cleanup Levels for Compounds without Tabular Values in Site Cleanup Rules - Technical Memorandum 01-007. December 18.

### APPENDIX F

Human Health Tier 2 Baseline Risk Calculations



### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 3 - Fuel Line Corridor and Pumphouse - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Soil Concentration <sup>a</sup> (mg/kg)	Soil Ingestion Dose (mg/kg-d)	Soil Dermal Dose (mg/kg-d)	Dust Inhalation Dose (mg/kg-d)		lope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil	Specific Car Dermal	ncer Risk Dust Inhalation	Chemical- Specific Risk
VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.0093	3.7E-09	0.0E+00	2.7E-13	7.5E-03	7.5E-03	1.6E-03	2.8E-11	0.0E+00	4.5E-16	2.8E-11 3E-11
<ul> <li>betes:</li> <li>Based on the maximum or 95 percent upper confidence of the providence of the</li></ul>	c chemicals with available ence limit (95% UCL) on c chemicals with available	the mean control to the toxicity value of toxicity	ues. ncentration d ues.	etected at the	site.			ILCR Inc mg/kg mg/kg-d	Incomple	tal lifetime can te pathway. 15 per kilogram 15 per kilogram	<b>.</b>

of a medium

Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

Page 1 of 1

### TABLE F-2

### CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 3 - Fule Line Corridor and Pumphouse - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil Concentration <sup>a</sup> (mg/kg)	Soil Ingestion Dose (mg/kg-d)	Soil Dermal Dose (mg/kg-d)	Dust Inhalation Dose (mg/kg-d)	Cancer Slo	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil		ancer Risk Dust Inhalation	Chemical- Specific Risk
Constituent VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.0093	1.1E-08	0.0E+00	8.2E-13	7.5E-03	7.5E-03	1.6E-03	8.4E-11	0.0E+00	1.4E-15 ILCR	8.4E-11 8E-11
Notes: Based on the maximum or 95 percent upper co and soil gravel at the site. Doses and cancer risks shown only for carcino Absorbed doses were calculated for dermal co of a medium.	ogenic chemicals with ntact with the medium	available toxi	city values. were calculate					ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	l lifetime cancer pathway. per kilogram. per kilogram pe	

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

### TABL

### CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 3 - Fuel Line Corridor and Pumphouse - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose	Dose	Cancer Sl Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
VOCs Methylene chloride	0.0093	9.1E-11	0.0E+00	2.8E-14	7.5E-03	7.5E-03	1.6E-03	6.8E-13	0.0E+00	4.6E-17	6.8E-13
							0 	20		ILCR	7E-13
otes: Based on the maximum or 95 percent upp ) Doses and cancer risks shown only for ca ) Absorbed doses were calculated for derm	rcinogenic chemicals with a	vailable toxic	city values.			on		ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	l lifetime cance pathway. per kilogram. per kilogram p	
of a medium ) Cancer risks are unitless values which rep effect. They are calculated using the following the follo	present the probability of inc owing formula: Cancer Ris	urring an adv k = Exposure	verse health Dose x Cano	cer Slope Fact	or.						

### **TABLE F-4**

### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 3 - Fuel Line Corridor - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	<b>c</b> "	Soil	Dermal	Dust Inhalation				Pathw	ay-Specific	Hazard	Chemical
	Soil	Ingestion Dose	Dose	Dose	Refere	nce Dose (m	ig/kg-d)	Soil		Dust	Specific
Constituent	Concentration <sup>®</sup> (mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal		Ingestion	Dermal	Inhalation	HQ
											3
INORGANICS	119	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead	119	na									
VOLATILE ORGANIC COMPOUNDS					6.0E-02	6.0E-02	8.6E-01	5.6E-07	0.0E+00	2.0E-12	0.000000
Methylene chloride	0.0093	3.4E-08	0.0E+00	1.7E-12	6.0E-02	0.0E-02	8.0L-01	5.01 01	0.02		
POLYNUCLEAR AROMATIC HYDROCARBONS								0.05.03	3.8E-03	1.1E-05	0.013
Naphthalene	51	1.8E-04	7.6E-05	9.2E-09	2.0E-02	2.0E-02	8.6E-04	9.2E-03	3.86-03	1.112-05	0.010
· · · · · · · · · · · · · · · · · · ·										HI	0.013
PETROLEUM HYDROCARBONS	2,587	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	nad
Diesel Range Organics	2,070	7.5E-03	Inc	3.7E-07	1.0E-01	na	2.9E-01	7.5E-02	Inc	1.3E-06	0.08
Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic	1,035	3.8E-03	Inc	1.9E-07	4.0E-02	na	5.7E-01	9.4E-02	Inc	3.3E-07	0.1
Dieser Kange Organica, Aronado										ні	0.17
			15						,		
otes: Based on the maximum or 95 percent upper confidence I	imit (95% LICL)	n the mean						HI	Hazard inc	lex.	
								HQ	Hazard qu	otient.	
concentration detected at the site.	aumulative UI esti	mate						Inc	Incomplete	e pathway.	
<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the <sup>c</sup> Risks associated with indicator compounds are included	in cumulative risk	and hazard						mg/kg	•	s per kilogram	
estimates for each site. However, the health hazards asso	ociated with netrol	eum mixtures						mg/kd-d	Milligram	s per kilogram	per day.
	ociated with perso							na	not availab	ole	
will be evaluated and reported separately. <sup>d</sup> Exposure dose and noncancer hazards were calculated for	or petroleum hydro	carbons meas	ured as DRO	(method 8100)							
Exposure dose and noncancer nazards were calculated in by segregating total DRO concentrations into aliphatic a	and aromatic fracti	ons, assuming	80% aliphatic	c							
by segregating total DKO concentrations into aliphatic a	2000-1	0.12, 2254.1.19									
hydrocarbons and 40% aromatic hydrocarbons (ADEC,	2000c).	with available	toxicity values	s.							
1) Doses and noncancer hazards shown only for noncarcing	ogenic chemicals v	with available	toxicity values	S.	lation						

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose. effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

### TAB

### NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 3 - Fuel Line Corridor and Pumphouse - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Concentration* (mg/kg-d)Dose (mg/kg-d)Dose (mg/kg-d)Dose (mg/kg-d)Dose (mg/kg-d)Dose (mg/kg-d)Reference Dose (mg/kg-d) (mg/kg-d)Soil InpastionDust DustSpecific HQINORGANICS Lead119na*<		Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	y-Specific		Chemical
Lead       119       na <sup>b</sup> na	Constituent	Concentration <sup>®</sup>								Dermal		•
Methylene chloride       0.0093       1.0E-07       0.0E+00       5.0E+12       6.0E+02       6.0E+02       6.0E+01       1.1E-02       3.2E-05       0.039         PAHs Naphthalene       51       5.6E-04       2.3E-04       2.8E-08       2.0E+02       2.0E+02       8.6E-04       2.8E-02       1.1E-02       3.2E-05       0.039         PETROLEUM HYDROCARBONS <sup>e</sup> Diesel Range Organics       2,587       na <sup>d</sup>	INORGANICS Lead	119	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Naphthalene       51       5.6E-04       2.3E-04       2.8E-08       2.0E-02       2.0E-02       8.0E-04       2.8E-02       1.1E-02       1.0E-01       na <sup>d</sup>	VOCs Methylene chloride	0.0093	1.0E-07	0.0E+00	5.0E-12	6.0E-02	6.0E-02	8.6E-01	1.7E-06	0.0E+00	5.9E-12	0.000001
PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics 2,587 na <sup>d</sup>	PAHs Naphthalene	51	5.6E-04	2.3E-04	2.8E-08	2.0E-02	2.0E-02	8.6E-04	2.8E-02	1.1E-02		
tes:       HI       Hazard index.         Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean       HQ       Hazard quotient.         concentration detected at the site.       Inc       Incomplete pathway.         Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.       mg/kg       Milligrams per kilogram.         Risks associated with indicator compounds are included in cumulative risk and hazard       mg/kd-d       Milligrams per kilogram per day.         estimates for each site. However, the health hazards associated with petroleum mixtures       na       not available	PETROLEUM HYDROCARBONS <sup>e</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic	2,070	2.3E-02	Inc	1.1E-06	1.0E-01	na	2.9E-01	2.3E-01	Inc	3.9E-06 9.8E-07	0.2 0.3
	Based on the maximum or 95 percent upper confide concentration detected at the site. Consistent with EPA policy, lead is not evaluated in Risks associated with indicator compounds are incl	n the cumulative HI uded in cumulative	estimate. risk and haza	rd					HQ Inc mg/kg	Hazard qu Incomple Milligran Milligran	dex. notient. te pathway. ns per kilogram ns per kilogram	n.

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

### **TABLE F-6**

### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 3 - Fuel Line Corridor and Pumphouse - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil	Dermal	Dust Inhalation				Pathy	vay-Specific I	lazard	Chemical-
Constituent	Soil Concentration <sup>®</sup> (mg/kg)	Ingestion Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral	nce Dose (n Dermal	ng/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ
INORGANICS Lead	119	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.0093	2.7E-10	0.0E+00	8.2E-14	6.0E-02	6.0E-02	8.6E-01	4.4E-09	0.0E+00	9.5E-14	0.00000004
POLYNUCLEAR AROMATIC HYDROCAR Naphthalene	BONS 51	1.5E-06	2.5E-06	4.5E-10	2.0E-02	2.0E-02	8.6E-04	7.3E-05	1.2E-04	5.2E-07	0.0002 0.00020
PETROLEUM HYDROCARBONS <sup>e</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic	2,587 2,070 1,035	na <sup>d</sup> 5.9E-05 3.0E-05	na <sup>d</sup> Inc Inc	na <sup>d</sup> 1.8E-08 9.1E-09	na <sup>d</sup> 1.0E-01 4.0E-02	na <sup>d</sup> na na	na <sup>d</sup> 2.9E-01 5.7E-01	na <sup>d</sup> 5.9E-04 7.4E-04	na <sup>d</sup> Inc Inc	na <sup>d</sup> 6.3E-08 1.6E-08 HI	na <sup>d</sup> 0.0006 0.0007 <b>0.0013</b>
<ul> <li>botes:</li> <li>Based on the maximum or 95 percent upper confict concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evaluate</li> <li>Risks associated with indicator compounds are in estimates for each site. However, the health haz will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were calc by segregating total DRO concentrations into all other sectors.</li> </ul>	d in the cumulative I ncluded in cumulative ards associated with ulated for petroleum	I estimate. ve risk and hat petroleum mi hydrocarbons	zard xtures s measured as	s DRO (metho aliphatic	d 8100)			HI HQ Inc mg/kg mg/kd-d na	0	ient. pathway. per kilogram. per kilogram pe	er day.

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

### TA -7

### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 3 - Fuel Line Corridor and Pumphouse - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathw	vay-Specific		Chemica
	<b>Concentration</b> <sup>a</sup>	Dose	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere	nce Dose ( Dermal	mg/kg-d) Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-u)	(Ing/kg-u)	Ulai	Dermar	Innunution				
PETROLEUM HYDROCARBONS									4	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	14	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na 2.2E-01	na 1.2
Diesel Range Organics, Aliphatic	11	9.5E-02	Inc	6.3E-02	1.0E-01	na	2.9E-01	9.5E-01	Inc	5.5E-02	1.2
Diesel Range Organics, Aromatic	5.6	4.7E-02	Inc	3.2E-02	4.0E-02	na	5.7E-01	1.2E+00	Inc		na
Residual Range Organics	8.1	na®	na°	na°	na®	na	na	na®	na°	na	na 0.031
Residual Range Organics, Aliphatic	7.3	6.2E-02	Inc	4.3E-05	2.0E+00	na	na	3.1E-02	Inc	Inc	0.031
Residual Range Organics, Aromatic	2.4	2.1E-02	Inc	1.4E-05	3.0E-02	na	na	6.8E-01	Inc	Inc	0.08
										HI	3.1
										m	UIL
Based on the maximum or 95 percent upper concentration detected at the site.	aluated in the cumulat	ive HI estima	nte.					HI HQ Inc mg/L	Hazard inde Hazard quo Incomplete Milligrams	ient. pathway.	
<sup>2</sup> Consistent with EPA policy, lead is not evaluate Risks associated with indicator compounds estimates for each site. However, the healt will be evaluated and reported separately.	aluated in the cumulat are included in cumu h hazards associated	ive HI estima lative risk an with petroleu	ate. Id hazard m mixtures		nathod 810	201		HQ Inc mg/L mg/kd-d na	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j e	
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evaluates for each site. However, the health will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards wer</li> </ul>	aluated in the cumulat s are included in cumu h hazards associated e calculated for petrol	ive HI estima ilative risk an with petroleur eum hydroca	ite. d hazard m mixtures rbons measur	red as DRO (r	method 810	00)		HQ Inc mg/L mg/kd-d	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j	
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not ever Risks associated with indicator compounds estimates for each site. However, the healt will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were by segregating total DRO concentrations in the set of t</li></ul>	aluated in the cumulat s are included in cumu h hazards associated e calculated for petrol nto aliphatic and aron	ive HI estima ilative risk an with petroleur eum hydroca	ite. d hazard m mixtures rbons measur	red as DRO (r 80% aliphatic	nethod 810	)0)		HQ Inc mg/L mg/kd-d na	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j e	
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not everence in the second secon</li></ul>	aluated in the cumulat s are included in cumu h hazards associated y e calculated for petrol nto aliphatic and aron pons (ADEC, 2000c).	ive HI estima ulative risk an with petroleur eum hydroca natic fraction	ate. d hazard m mixtures rbons measur s, assuming 8	30% aliphatic		00)		HQ Inc mg/L mg/kd-d na	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j e	
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evaluates for each site. However, the health will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards wer by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocards.</li> </ul>	aluated in the cumulat s are included in cumu h hazards associated e calculated for petrol nto aliphatic and aron pons (ADEC, 2000c). e calculated for petrol	ive HI estima ilative risk an with petroleur eum hydroca natic fraction eum hydroca	nte. d hazard m mixtures rbons measur s, assuming 8 rbons measur	o% aliphatic red as RRO (r	method)	00)		HQ Inc mg/L mg/kd-d na	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j e	
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evaluates for each site. However, the health will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards wer by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocards.</li> </ul>	aluated in the cumulat s are included in cumu h hazards associated e calculated for petrol nto aliphatic and aron pons (ADEC, 2000c). e calculated for petrol	ive HI estima ilative risk an with petroleur eum hydroca natic fraction eum hydroca	nte. d hazard m mixtures rbons measur s, assuming 8 rbons measur	o% aliphatic red as RRO (r	method)	00)		HQ Inc mg/L mg/kd-d na	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j e	
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not ever Risks associated with indicator compounds estimates for each site. However, the head will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocards were by segregating total RRO concentrations in the sequence of the sequence</li></ul>	aluated in the cumulat s are included in cumu h hazards associated y e calculated for petrol nto aliphatic and aron pons (ADEC, 2000c). e calculated for petrol nto aliphatic and aron	ive HI estima ilative risk an with petroleur eum hydroca natic fraction eum hydroca	nte. d hazard m mixtures rbons measur s, assuming 8 rbons measur	o% aliphatic red as RRO (r	method)	)0)		HQ Inc mg/L mg/kd-d na	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j e	
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evaluated at the indicator compounds estimates for each site. However, the head will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocards were by segregating total RRO concentrations in hydrocarbons and 30% aromatic hydrocarbons and seven and</li></ul>	aluated in the cumulat s are included in cumu h hazards associated y e calculated for petrol nto aliphatic and aron pons (ADEC, 2000c). e calculated for petrol nto aliphatic and aron pons (ADEC, 2000c). for poncarcinogenic c	ive HI estima ulative risk an with petroleur eum hydroca natic fractions eum hydroca natic fractions hemicals with	ate. d hazard m mixtures rbons measur s, assuming 8 rbons measur s, assuming 9 h available to	30% aliphatic red as RRO (r 90% aliphatic xicity values.	method)			HQ Inc mg/L mg/kd-d na	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j e	
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not ever Risks associated with indicator compounds estimates for each site. However, the head will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocards were by segregating total RRO concentrations in the sequence of the sequence</li></ul>	aluated in the cumulat s are included in cumu h hazards associated y e calculated for petrol nto aliphatic and aron pons (ADEC, 2000c). e calculated for petrol nto aliphatic and aron pons (ADEC, 2000c). for poncarcinogenic c	ive HI estima ulative risk an with petroleur eum hydroca natic fractions eum hydroca natic fractions hemicals with	ate. d hazard m mixtures rbons measur s, assuming 8 rbons measur s, assuming 9 h available to	30% aliphatic red as RRO (r 90% aliphatic xicity values.	method)			HQ Inc mg/L mg/kd-d na	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j e	
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not ever Risks associated with indicator compounds estimates for each site. However, the head will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocards were by segregating total RRO concentrations in hydrocarbons and 30% aromatic hydrocarbons and seven and</li></ul>	aluated in the cumulat s are included in cumu h hazards associated w e calculated for petrol nto aliphatic and aron oons (ADEC, 2000c). e calculated for petrol nto aliphatic and aron oons (ADEC, 2000c). for noncarcinogenic c l contact with the med	ive HI estima ilative risk an with petroleur eum hydrocan natic fractions eum hydrocan natic fractions hemicals with dium, and inta	ate. d hazard m mixtures rbons measur s, assuming 8 rbons measur s, assuming 9 h available to akes were cal	30% aliphatic red as RRO (r 10% aliphatic xicity values. culated for in	method)			HQ Inc mg/L mg/kd-d na	Hazard quot Incomplete Milligrams Milligrams not availabl	ient. pathway. per liter. per kilogram j e	
# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 3 - Fuel Line Corridor and Pumphouse - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Confere Weter	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific	Hazard	Chemica
Constituent	Surface Water Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Referer Oral		mg/kg-d) Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ
Constituent	(										
PETROLEUM HYDROCARBONS <sup>e</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic	14 11 5.6 8.1 7.3	na <sup>d</sup> 3.7E-01 1.8E-01 na <sup>e</sup> 2.4E-01	na <sup>d</sup> Inc Inc na <sup>e</sup> Inc	na <sup>d</sup> 2.5E-01 1.2E-01 na <sup>°</sup> 1.7E-04	na <sup>d</sup> 1.0E-01 4.0E-02 na <sup>e</sup> 2.0E+00	na <sup>d</sup> na na <sup>e</sup> na	na <sup>d</sup> 2.9E-01 5.7E-01 na <sup>e</sup> na	na <sup>d</sup> 3.7E+00 4.6E+00 na <sup>e</sup> 1.2E-01	na <sup>d</sup> Inc Inc Inc	na <sup>d</sup> 8.5E-01 2.2E-01 na <sup>e</sup> na	na <sup>d</sup> 4.5 4.8 na <sup>e</sup> 0.12 2.7
Residual Range Organics, Aromatic	2.4	8.0E-02	Inc	5.5E-05	3.0E-02	na	na	2.7E+00	Inc	na HI	12
<ul> <li>Risks associated with indicator compound estimates for each site. However, the hea will be evaluated and reported separately.</li> <li><sup>d</sup> Exposure dose and noncancer hazards we</li> </ul>	Ith hazards associated	l with petrole	carbons meas	ured as DRO	(method 81	00)		mg/kd-d na VOC	not availabl	per kilogram e ganic compour	
<ul> <li>by segregating total DRO concentrations hydrocarbons and 40% aromatic hydroca</li> <li>Exposure dose and noncancer hazards we by segregating total RRO concentrations hydrocarbons and 30% aromatic hydroca</li> </ul>	into aliphatic and arc rbons (ADEC, 2000c) ere calculated for petro into aliphatic and arc rbons (ADEC, 2000c)	omatic fractio ). oleum hydroc omatic fractio ).	ons, assuming carbons meas ons, assuming	80% aliphati ured as RRO 90% aliphati	c (method) c						
<ul> <li>) Doses and noncancer hazards shown only</li> <li>?) Absorbed doses were calculated for derm of a medium</li> <li>?) Noncancer hazards are unitless values wh effect. They are calculated using the foll</li> </ul>	of for noncarcinogenic for noncarcinogenic al contact with the m	chemicals w edium, and in bability of in	curring an ad	verse health		inhalation	n				

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 3 - Fuel Line Corridor and Pumphouse - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathw	ay-Specific	Hazard	Chemica
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral	nce Dose ( Dermal	mg/kg-d) Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ
PETROLEUM HYDROCARBONS <sup>e</sup>			· ·								d
	14	na <sup>d</sup>	na <sup>d</sup>	nad	nad	nad	nad	nad	na <sup>d</sup>	na <sup>d</sup>	nad
Diesel Range Organics Diesel Range Organics, Aliphatic	11.2	1.3E-02	Inc	3.1E-03	1.0E-01	na	2.9E-01	1.3E-01	Inc	1.1E-02	0.14
Diesel Range Organics, Anomatic	5.6	6.4E-03	Inc	1.5E-03	4.0E-02	na	5.7E-01	1.6E-01	Inc	2.7E-03	
	8.1	na	na°	na	na®	na®	na <sup>e</sup>	na®	na	na	na
Residual Range Organics Residual Range Organics, Aliphatic	7.3	8.3E-03	Inc	2.1E-06	2.0E+00	na	na	4.2E-03	Inc	Inc	0.0042
Residual Range Organics, Anomatic	2.4	2.8E-03	Inc	6.9E-07	3.0E-02	na	na	9.2E-02	Inc	Inc	0.092
Kesiduai Kange Organics, Aromatic										HI	0.40
otes:									Hazard inde	v	
<sup>a</sup> Based on the maximum or 95 percent upp	er confidence limit (95	% UCL) on t	he mean					HI HQ	Hazard quo		
concentration detected at the site.									Incomplete		
<sup>b</sup> Consistent with EPA policy, lead is not ev	valuated in the cumulat	ive HI estima	te.					Inc	•	-	
<ul> <li>Risks associated with indicator compound</li> </ul>	is are included in cumu	lative risk an	d hazard					mg/L	Milligrams		day
estimates for each site. However, the hea	Ith hazards associated	with petroleur	m mixtures					mg/kd-d		per kilogram	per day.
								na	not availabl	e	
will be evaluated and reported separately. <sup>d</sup> Exposure dose and noncancer hazards we	a loulated for notrol	aum hydroca	rhons measur	ed as DRO (n	nethod 810	0)		VOC	Volatile org	ganic compour	nd.
<sup>d</sup> Exposure dose and noncancer hazards we	re calculated for perior	cull fraction	accuming 8	0% alinhatic							
by segregating total DRO concentrations	into aliphatic and aror	natic fractions	s, assuming o	070 anphatic							
hydrocarbons and 40% aromatic hydrocar	bons (ADEC, 2000c).				4 - 1 >						
<ul> <li>Exposure dose and noncancer hazards we</li> </ul>	re calculated for petrol	eum hydroca	rbons measur	ed as RRO (n	nethod)						
by segregating total RRO concentrations	into aliphatic and aron	natic fractions	s, assuming 9	0% aliphatic							
hydrocarbons and 30% aromatic hydrocar	rbons (ADEC, 2000c).										
the strength of the strength o	for popercipogenic c	hemicals with	available to	xicity values.							
<ol> <li>Doses and noncancer hazards shown only</li> <li>Absorbed doses were calculated for derm</li> </ol>	al contact with the me	dium, and inta	akes were cal	culated for ing	gestion or i	nhalation					
of a madium											
<ul><li>3) Noncancer hazards are unitless values whether the effect. They are calculated using the following the f</li></ul>	ich represent the proba	ability of incu	rring an adve	rse health							
			nocure Dose	Reference do	se.						

# NONCANCER HAZARD CALCULATIONS FOR A CURRENT SEASONAL RESIDENT SITE 4 - Subsistence Fish and Hunting Camp - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

SoilIngestionDefinitiaImmutoinReference Dose (mg/kg-d)SoilDustSpeciConstituent(mg/kg)(mg/kg-d)(mg/kg-d)(mg/kg-d)OralDermalInhalationIngestionDermalInhalationHQINORGANICSLead160na <sup>b</sup> na <sup>b</sup>			Soil Ingestion Dermal In	Dust Inhalation				Pathwa	ay-Specific	Hazard	Chemica	
Constituent       Dase       Dase <th></th> <th>Soil</th> <th></th> <th></th> <th></th> <th>Defere</th> <th>nce Dose (m</th> <th>g/kg-d)</th> <th></th> <th></th> <th></th> <th>Specifi</th>		Soil				Defere	nce Dose (m	g/kg-d)				Specifi
ContractionNORGANICSLead160 $n^a$ <										Dermal	Inhalation	HQ
Lead       160       na <sup>a</sup> na	Constituent	(ing/kg)	(ing/kg u)	(								
Lead       160       na <sup>n</sup> na	INORGANICS						h	Þ	b	na <sup>b</sup>	nab	na <sup>b</sup>
PETROLEUM HYDROCARBONS <sup>6</sup> Diesel Range Organics 5,300 na <sup>4</sup>		160	na <sup>b</sup>	na <sup>b</sup>	na <sup>®</sup>	na"	na°	na	na	Ild	na	
Diesel Range Organics $5.300$ $na^4$ $na^4$ $na^3$ $na^4$ $na$											HI	0
Diesel Range Organics $5.300$ $na^4$ $na^4$ $na^3$ $na^4$ $na$	THE AND AND A CARDONE											4
Diesel Range Organics, Aliphatic       4,240       1.5E-02       Inc       7.7E-07       1.0E-01       na       2.9E-01       1.5E-01       Inc       2.6E-06       0.1.         Diesel Range Organics, Aromatic       2,120       7.7E-03       Inc       3.8E-07       4.0E-02       na       5.7E-01       1.9E-01       Inc       6.7E-07       0.1.         Diesel Range Organics, Aromatic       3,420       na*		5 200	nad	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>		
Diesel Range Organics, Airphaite       1,220       7,72-03       Inc       3,8E-07       4,0E-02       na       5,7E-01       1,9E-01       Inc       6,7E-07       0,11         Residual Range Organics, Airphaite       3,420       na*						1.0E-01	na	2.9E-01		Inc		
Diesel Range Organics, Aromatic       2.12.0       International mathematical and the						4.0E-02	na	5.7E-01	1.9E-01	Inc		
Residual Range Organics       3,420       ina       ina <t< td=""><td>Diesel Range Organics, Aromatic</td><td>and the second second</td><td></td><td></td><td></td><td></td><td>nae</td><td>nae</td><td>na®</td><td>na</td><td>nae</td><td>na</td></t<>	Diesel Range Organics, Aromatic	and the second second					nae	nae	na®	na	nae	na
Residual Range Organics, Aliphatic       3,078       1.1E-02       Inc       JAD-60       2.00100       ma       na       1.2E-01       Inc       Inc       0.1         Residual Range Organics, Aromatic       1,026       3.7E-03       Inc       1.9E-07       3.0E-02       na       na       1.2E-01       Inc       Inc       0.1         Ites:       Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.       HI       Hazard quotient.       HQ       Hazard quotient.       HQ       Hazard quotient.       Inc       Inc onplete pathway.       mg/kg       Milligrams per kilogram.       mg/kg       Milligrams per kilogram.       mg/kg       Milligrams per kilogram.       mg/kg       Milligrams per kilogram.       na       not available       na	Residual Range Organics							na	5.6E-03	Inc	Inc	0.00
Residual Range Organics, Aromatic       1,026       3,7E-03       internet 1,9E-07       5,6E-02       internet 1,9E-07	Residual Range Organics, Aliphatic				-				1.2E-01	Inc	Inc	0.12
Ites:       HI       Hazard index.         Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean       HQ       Hazard quotient.         concentration detected at the site.       Inc       Incomplete pathway.         ? Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.       Inc       Incomplete pathway.         ? Risk associated with indicator compounds are included in cumulative risk and hazard       mg/kg       Milligrams per kilogram.         estimates for each site. However, the health hazards associated with petroleum mixtures       mg/kd-d       Milligrams per kilogram.         will be evaluated and reported separately.       Percentations into aliphatic and aromatic fractions, assuming 80% aliphatic       hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).         Pospoure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method 1)       by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic       hydrocarbons (ADEC, 2000c).         Pospoure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method 1)       by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic         hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).       Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.         Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated fo	Residual Range Organics, Aromatic	1,026	3.7E-03	Inc	1.9E-07	3.01-02	na					
Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean       H1       Hazard unitex.         Concentration detected at the site.       HQ       Hazard quotient.         Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.       Inc       Incomplete pathway.         Risks associated with indicator compounds are included in cumulative risk and hazard       mg/kg       Milligrams per kilogram.         will be evaluated and reported separately.       mg/kd-d       Milligrams per kilogram per day.         Pexposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)       ma       not available         by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic       hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).       High and the medium, and intakes were calculated for ingestion or inhalation       High and the medium, and intakes were calculated for ingestion or inhalation         O bases and noncancer hazards hydro carbons (ADEC, 2000c).       Doese and noncancer hazards hydrocarbons (ADEC, 2000c).       High and the medium, and intakes were calculated for ingestion or inhalation       High and the medium, and intakes were calculated for ingestion or inhalation         O bases and noncancer hazards hydro carbons (ADEC, 2000c).       High and the medium, and intakes were calculated for ingestion or inhalation       High and the medium, and intakes were calculated for ingestion or inhalation         O baserbed doses were calcu											HI	0.48
<ul> <li>by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic</li> <li>hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).</li> <li>Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method)</li> <li>by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic</li> <li>hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).</li> <li>Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.</li> <li>Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation</li> <li>of a medium.</li> </ul>	Based on the maximum or 95 percent upper co	onfidence limit (95% UC	L) on the mea	an					110	Hererd and	otient	
Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method ) by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c). Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values. Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.	concentration detected at the site. Consistent with EPA policy, lead is not evalua Risks associated with indicator compounds are estimates for each site. However, the health h will be evaluated and reported separately.	ated in the cumulative H e included in cumulative azards associated with p	estimate. risk and haza etroleum mix	tures	RO (method 81	00)		2	Inc mg/kg mg/kd-d	Incomplete Milligrams Milligrams	e pathway. s per kilogram. s per kilogram	
Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method ) by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c). Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values. Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.	concentration detected at the site. Consistent with EPA policy, lead is not evalua Risks associated with indicator compounds are estimates for each site. However, the health h will be evaluated and reported separately. Exposure dose and noncancer hazards were can by segregating total DRO concentrations into	ated in the cumulative Hi e included in cumulative azards associated with p alculated for petroleum h aliphatic and aromatic f	estimate. risk and haza etroleum mix ydrocarbons i	urd tures measured as D	RO (method 81	00)			Inc mg/kg mg/kd-d	Incomplete Milligrams Milligrams	e pathway. s per kilogram. s per kilogram	
<ul> <li>hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).</li> <li>Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.</li> <li>Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.</li> </ul>	concentration detected at the site. <sup>2</sup> Consistent with EPA policy, lead is not evaluate Risks associated with indicator compounds are estimates for each site. However, the health h will be evaluated and reported separately. <sup>3</sup> Exposure dose and noncancer hazards were can by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbons	ated in the cumulative Hi e included in cumulative azards associated with p alculated for petroleum h aliphatic and aromatic f s (ADEC, 2000c).	estimate. risk and haza etroleum mix ydrocarbons r ractions, assu	urd tures measured as D ming 80% alig	ohatic	00)			Inc mg/kg mg/kd-d	Incomplete Milligrams Milligrams	e pathway. s per kilogram. s per kilogram	
Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values. Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.	concentration detected at the site. Consistent with EPA policy, lead is not evalua Risks associated with indicator compounds are estimates for each site. However, the health h will be evaluated and reported separately. Exposure dose and noncancer hazards were can by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbons	ated in the cumulative Hi e included in cumulative azards associated with p alculated for petroleum h aliphatic and aromatic f s (ADEC, 2000c). alculated for petroleum h	estimate. risk and haza etroleum mix ydrocarbons i ractions, assu ydrocarbons	rd tures measured as D ming 80% alig measured as R	RO (method)	00)			Inc mg/kg mg/kd-d	Incomplete Milligrams Milligrams	e pathway. s per kilogram. s per kilogram	
Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion of induction of a medium.	concentration detected at the site. Consistent with EPA policy, lead is not evaluate Risks associated with indicator compounds are estimates for each site. However, the health he will be evaluated and reported separately. Exposure dose and noncancer hazards were can by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbons Exposure dose and noncancer hazards were can by segregating total RRO concentrations into	ated in the cumulative Hi e included in cumulative azards associated with p alculated for petroleum h a aliphatic and aromatic f s (ADEC, 2000c). alculated for petroleum h a aliphatic and aromatic f	estimate. risk and haza etroleum mix ydrocarbons i ractions, assu ydrocarbons	rd tures measured as D ming 80% alig measured as R	RO (method)	00)			Inc mg/kg mg/kd-d	Incomplete Milligrams Milligrams	e pathway. s per kilogram. s per kilogram	
Non-service are unitless values which represent the probability of incurring an adverse health	concentration detected at the site. Consistent with EPA policy, lead is not evaluate Risks associated with indicator compounds are estimates for each site. However, the health h will be evaluated and reported separately. Exposure dose and noncancer hazards were can by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbons Exposure dose and noncancer hazards were can by segregating total RRO concentrations into hydrocarbons and 30% aromatic hydrocarbons	ated in the cumulative Hi e included in cumulative azards associated with p alculated for petroleum h e aliphatic and aromatic f s (ADEC, 2000c). alculated for petroleum h e aliphatic and aromatic f s (ADEC, 2000c).	estimate. risk and haza etroleum mix ydrocarbons i ractions, assu ydrocarbons a sations, assu	rd tures measured as E ming 80% alin measured as R ming 90% alin able toxicity v	RO (method ) phatic values.				Inc mg/kg mg/kd-d	Incomplete Milligrams Milligrams	e pathway. s per kilogram. s per kilogram	
effect They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.	<ul> <li>concentration detected at the site.</li> <li><sup>9</sup> Consistent with EPA policy, lead is not evaluate Risks associated with indicator compounds are estimates for each site. However, the health h will be evaluated and reported separately.</li> <li><sup>4</sup> Exposure dose and noncancer hazards were car by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbons.</li> <li><sup>6</sup> Exposure dose and noncancer hazards were car by segregating total RRO concentrations into hydrocarbons and 30% aromatic hydrocarbons.</li> <li><sup>6</sup> Doses and noncancer hazards shown only for Absorbed doses were calculated for dermal components.</li> </ul>	ated in the cumulative Hi e included in cumulative azards associated with p alculated for petroleum h e aliphatic and aromatic f s (ADEC, 2000c). alculated for petroleum h e aliphatic and aromatic f s (ADEC, 2000c).	estimate. risk and haza etroleum mix ydrocarbons i ractions, assu ydrocarbons a sations, assu	rd tures measured as E ming 80% alin measured as R ming 90% alin able toxicity v	RO (method ) phatic values.				Inc mg/kg mg/kd-d	Incomplete Milligrams Milligrams	e pathway. s per kilogram. s per kilogram	
	concentration detected at the site. Consistent with EPA policy, lead is not evaluate Risks associated with indicator compounds are estimates for each site. However, the health h will be evaluated and reported separately. Exposure dose and noncancer hazards were can by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbons Exposure dose and noncancer hazards were can by segregating total RRO concentrations into hydrocarbons and 30% aromatic hydrocarbons Doses and noncancer hazards shown only for Absorbed doses were calculated for dermal co of a medium.	ated in the cumulative Hi e included in cumulative azards associated with p alculated for petroleum h aliphatic and aromatic f s (ADEC, 2000c). alculated for petroleum h aliphatic and aromatic f s (ADEC, 2000c). noncarcinogenic chemic ontact with the medium,	estimate. risk and haza etroleum mixi ydrocarbons i ractions, assu ydrocarbons i ractions, assu als with avail and intakes w of incurring a	rd tures measured as E ming 80% alig measured as R ming 90% alig able toxicity v ere calculated an adverse hea	RO (method ) ohatic alues. for ingestion of lth				Inc mg/kg mg/kd-d	Incomplete Milligrams Milligrams	e pathway. s per kilogram. s per kilogram	

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 4 - Subsistence Fish and Hunting Camp - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	6.1	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific	Hazard	Chemical
	Soil	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	Concentration <sup>®</sup> (mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS										b	na <sup>b</sup>
Lead	160	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na
										HI	0
PETROLEUM HYDROCARBONS									4	đ	na <sup>d</sup>
Diesel Range Organics	5,300	nad	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup> 2.6E-06	na 0.15
Diesel Range Organics, Aliphatic	4,240	1.5E-02	Inc	7.7E-07	1.0E-01	na	2.9E-01	1.5E-01	Inc	6.7E-07	0.19
Diesel Range Organics, Aromatic	2,120	7.7E-03	Inc	3.8E-07	4.0E-02	na	5.7E-01	1.9E-01	Inc	0.7E-07	na
Residual Range Organics	3,420	na	na	na°	na®	na	na°	na°	na		na 0.0056
Residual Range Organics, Aliphatic	3,078	1.1E-02	Inc	5.6E-07	2.0E+00	na	na	5.6E-03	Inc	Inc	0.0030
Residual Range Organics, Aromatic	1,026	3.7E-03	Inc	1.9E-07	3.0E-02	na	na	1.2E-01	Inc	Inc	0.12
										HI	0.48
<ul> <li>Based on the maximum or 95 percent upper conconcentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evaluat</li> <li>Risks associated with indicator compounds are estimates for each site. However, the health ha will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were call</li> </ul>	ted in the cumulative HI included in cumulative azards associated with pu- lculated for petroleum h	estimate. risk and haza etroleum mix ydrocarbons r	rd tures neasured as D	RO (method 81	00)			HQ Inc mg/kg mg/kd-d na		e pathway. s per kilogram. s per kilogram	
by segregating total DRO concentrations into a hydrocarbons and 40% aromatic hydrocarbons	(ADEC, 2000c).										
• Exposure dose and noncancer hazards were cal	lculated for petroleum h	ydrocarbons	measured as R	RO (method)							
by segregating total RRO concentrations into a hydrocarbons and 30% aromatic hydrocarbons	aliphatic and aromatic fi	ractions, assu	ming 90% alip	hatic							
1) Doses and noncancer hazards shown only for n	(ADEC, 2000c).	ale with avail	able toxicity y	alues.							
<ol> <li>Doses and noncancer hazards shown only for h</li> <li>Absorbed doses were calculated for dermal cor</li> </ol>	ntact with the medium, a	and intakes w	ere calculated	for ingestion or	inhalation						
of a medium.											

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 4 - Subsistence Fishing and Hunting Camp - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil Ingestion	Dermal	Dust Inhalation				Pathwa	y-Specific	Hazard	Chemical
	Soil Concentration*	Dose	Dose	Dose	Refere	nce Dose	(mg/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Lead	160	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
										HI	0
PETROLEUM HYDROCARBONS											4
Diesel Range Organics	5,300	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad
Diesel Range Organics, Aliphatic	4,240	4.6E-02	Inc	2.3E-06	1.0E-01	na	2.9E-01	4.6E-01	Inc	7.9E-06	0.5
Diesel Range Organics, Aromatic	2,120	2.3E-02	Inc	1.1E-06	4.0E-02	na	5.7E-01	5.8E-01	Inc	2.0E-06	na <sup>e</sup>
Residual Range Organics	3,420	na	na	na	na	na®	na	na	na	na	na 0.017
Residual Range Organics, Aliphatic	3,078	3.4E-02	Inc	1.7E-06	2.0E+00		na	1.7E-02 3.7E-01	Inc	Inc	0.37
Residual Range Organics, Aromatic	1,026	1.1E-02	Inc	5.6E-07	3.0E-02	na	na	3.7E-01	me	me	0.01
										HI	1.4
Based on the maximum or 95 percent upper co concentration detected at the site.								HQ Inc	Hazard qu	te pathway.	
Consistent with EPA policy, lead is not evalua Risks associated with indicator compounds are	included in cumulative	risk and haza	rd					mg/kg		ns per kilogram	
estimates for each site. However, the health ha	azards associated with pe	etroleum mixt	ures					mg/kd-d	not availa	•	in per day.
will be evaluated and reported separately.								na	not availa	DIC	
Exposure dose and noncancer hazards were ca	lculated for petroleum hy	ydrocarbons r	neasured as D	ORO (method	8100)						
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbons	aliphatic and aromatic fr	ractions, assur	ning 80% ali	phatic							
Exposure dose and noncancer hazards were ca	lculated for petroleum hy	ydrocarbons r	neasured as R	RO (method	)						
by segregating total RRO concentrations into	aliphatic and aromatic fr	actions, assur	ming 90% alig	phatic							
hydrocarbons and 30% aromatic hydrocarbons	(ADEC, 2000c).										
Design and manager bagards shown only for i	noncarcinogenic chemica	als with availa	able toxicity v	values.							
Absorbed doses were calculated for dermal co	ntact with the medium, a	ind intakes we	ere calculated	tor ingestion	or inhalati	ion					
Noncancer hazards are unitless values which r effect. They are calculated using the following	epresent the probability	of incurring a	n adverse hea	lth							
an my total and a the following	a formula: Noncancer	H = HYDOSUIFE	· LOSE/KEIEIE	THE UDSC.							

## TAB 3

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 4 - Subsistence Fishing and Hunting Camp - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation			-	Pathy	way-Specific 1		Chemical
	Concentration <sup>®</sup>	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
NORGANICS									b	na <sup>b</sup>	na <sup>b</sup>
Lead	160	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na	na
										НІ	0
PETROLEUM HYDROCARBONS								4	4	na <sup>d</sup>	nad
Diesel Range Organics	5,300	nad	na <sup>d</sup>	nad	nad	nad	na <sup>d</sup>	nad	nad	na 1.3E-07	0.0012
Diesel Range Organics, Aliphatic	4,240	1.2E-04	Inc	3.7E-08	1.0E-01	na	2.9E-01	1.2E-03 1.5E-03	Inc Inc	3.3E-08	0.0012
Diesel Range Organics, Aromatic	2,120	6.1E-05	Inc	1.9E-08	4.0E-02	na	5.7E-01		na®	na®	na
Residual Range Organics	3,420	na°	na	na°	na®	na	na®	na° 4.4E-05	na Inc	Inc	4.4E-05
Residual Range Organics, Aliphatic	3,078	8.8E-05	Inc	2.7E-08	2.0E+00	na	na	4.4E-03 9.8E-04	Inc	Inc	0.00098
Residual Range Organics, Aromatic	1,026	2.9E-05	Inc	9.0E-09	3.0E-02	na	na	9.06-04	Inc	inc	
·										HI	0.0037
Based on the maximum or 95 percent upper of concentration detected at the site. Consistent with EPA policy, lead is not evalu	ated in the cumulative H	II estimate.			¥			HQ Inc mg/kg	Hazard quot Incomplete Milligrams		
Risks associated with indicator compounds an	re included in cumulativ	e risk and na	vtures					mg/kd-d		per kilogram pe	r day.
estimates for each site. However, the health l	hazards associated with	peu oleum mi	Atures					na	not available		
will be evaluated and reported separately.			manuradar	DPO (metho	8100)			114			
Exposure dose and noncancer hazards were c	calculated for petroleum	nydrocardons	measured as	linhatio							
by segregating total DRO concentrations into	o aliphatic and aromatic	fractions, ass	uming 80% a	inphatic							
hydrocarbons and 40% aromatic hydrocarbor	ns (ADEC, 2000c).			<b>nn</b> 0 (	N						
Exposure dose and noncancer hazards were c	calculated for petroleum	hydrocarbons	s measured as	s RRO (method	1)						
by segregating total RRO concentrations into	o aliphatic and aromatic	fractions, ass	uming 90% a	aliphatic							
hydrocarbons and 30% aromatic hydrocarbor	ns (ADEC, 2000c).		2								
Deere and noncensor bazards shown only for	noncarcinogenic chemi	cals with ava	ilable toxicity	y values.							
Absorbed doses were calculated for dermal c	contact with the medium,	and intakes	were calculat	ed for ingestio	n or inhalation	on					
of a medium											
Noncancer hazards are unitless values which effect. They are calculated using the followi	represent the probability	y of incurring	an adverse h	icalth							

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 4 - Subsistence Fishing and Hunting Camp - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific I		Chemica
	Concentration <sup>2</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent			5								
PETROLEUM HYDROCARBONS <sup>e</sup>								4	na <sup>d</sup>	nad	na <sup>d</sup>
Diesel Range Organics	3.7	nad	nad	nad	nad	na <sup>d</sup>	na <sup>d</sup>	nad		5.8E-02	0.31
Diesel Range Organics, Aliphatic	3.0	2.5E-02	Inc	1.7E-02	1.0E-01	na	2.9E-01	2.5E-01	Inc	1.5E-02	0.33
Diesel Range Organics, Aromatic	1.5	1.3E-02	Inc	8.3E-03	4.0E-02	na	5.7E-01	3.1E-01	Inc		na
	6.5	na®	na	na	na	na	na	na°	na	na"	na 0.025
Residual Range Organics Residual Range Organics, Aliphatic	5.9	4.9E-02	Inc	3.4E-05	2.0E+00	na	na	2.5E-02	Inc	na	0.025
Residual Range Organics, Aromatic	2.0	1.6E-02	Inc	1.1E-05	3.0E-02	na	na	5.5E-01	Inc	na	0.55
Residual Range Organics, Atomatic										н	1.2
										m	1.2
Based on the maximum or 95 percent upper											
concentration detected at the site.	aluated in the cumulati	ve HI estimat	e. I hazard					HQ Inc mg/L	Hazard quot Incomplete Milligrams	pathway. per liter.	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal	aluated in the cumulati s are included in cumul	ve HI estimat lative risk and	i hazard					Inc	Incomplete Milligrams	pathway. per liter. per kilogram p	ber day.
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately.	aluated in the cumulati s are included in cumul th hazards associated w	ve HI estimat lative risk and vith petroleun	n mixtures	d as DRO (m	ethod 8100	)		Inc mg/L mg/kd-d	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately. Exposure dose and noncancer hazards wer	aluated in the cumulati s are included in cumul th hazards associated w re calculated for petrole	ve HI estimat lative risk and vith petroleun cum hydrocar	n mixtures bons measure	d as DRO (m 0% aliphatic	ethod 8100	)		Inc mg/L mg/kd-d na	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p e	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately. Exposure dose and noncancer hazards wer by segregating total DRO concentrations	aluated in the cumulati s are included in cumul th hazards associated w re calculated for petrole into aliphatic and arom	ve HI estimat lative risk and vith petroleun cum hydrocar	n mixtures bons measure	d as DRO (m )% aliphatic	ethod 8100	)		Inc mg/L mg/kd-d na	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p e	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately. Exposure dose and noncancer hazards wer by segregating total DRO concentrations hydrocarbons and 40% aromatic hydrocar	aluated in the cumulati s are included in cumul th hazards associated w re calculated for petrole into aliphatic and arom bons (ADEC, 2000c).	ve HI estimat lative risk and vith petroleun eum hydrocarl atic fractions.	h hazard n mixtures bons measure , assuming 80	)% aliphatic		)		Inc mg/L mg/kd-d na	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p e	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately. Exposure dose and noncancer hazards wer by segregating total DRO concentrations hydrocarbons and 40% aromatic hydrocard Exposure dose and noncancer hazards wer	aluated in the cumulati s are included in cumul th hazards associated w re calculated for petrole into aliphatic and arom bons (ADEC, 2000c). re calculated for petrole	ve HI estimat lative risk and vith petroleun eum hydrocarl atic fractions	n mixtures bons measure , assuming 80 bons measure	o% aliphatic		)		Inc mg/L mg/kd-d na	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p e	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately. Exposure dose and noncancer hazards wer by segregating total DRO concentrations hydrocarbons and 40% aromatic hydrocard Exposure dose and noncancer hazards wer	aluated in the cumulati s are included in cumul th hazards associated w re calculated for petrole into aliphatic and arom bons (ADEC, 2000c). re calculated for petrole	ve HI estimat lative risk and vith petroleun eum hydrocarl atic fractions	n mixtures bons measure , assuming 80 bons measure	o% aliphatic		)		Inc mg/L mg/kd-d na	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p e	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately. Exposure dose and noncancer hazards wer by segregating total DRO concentrations hydrocarbons and 40% aromatic hydrocar Exposure dose and noncancer hazards wer by segregating total RRO concentrations	aluated in the cumulati s are included in cumul th hazards associated w re calculated for petrole into aliphatic and arom bons (ADEC, 2000c). re calculated for petrole into aliphatic and arom	ve HI estimat lative risk and vith petroleun eum hydrocarl atic fractions	n mixtures bons measure , assuming 80 bons measure	o% aliphatic		)		Inc mg/L mg/kd-d na	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p e	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately. Exposure dose and noncancer hazards wer by segregating total DRO concentrations hydrocarbons and 40% aromatic hydrocar Exposure dose and noncancer hazards wer by segregating total RRO concentrations hydrocarbons and 30% aromatic hydrocar	aluated in the cumulati s are included in cumulati th hazards associated w re calculated for petrole into aliphatic and arom bons (ADEC, 2000c). re calculated for petrole into aliphatic and arom bons (ADEC, 2000c).	ve HI estimat lative risk and with petroleun aum hydrocarl atic fractions atic fractions atic fractions	n mixtures bons measure , assuming 80 bons measure , assuming 90 available tox	9% aliphatic ed as RRO (m 9% aliphatic icity values.	ethod)			Inc mg/L mg/kd-d na	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p e	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately. Exposure dose and noncancer hazards wer by segregating total DRO concentrations hydrocarbons and 40% aromatic hydrocar Exposure dose and noncancer hazards wer by segregating total RRO concentrations hydrocarbons and 30% aromatic hydrocar Doses and noncancer hazards shown only Absorbed doses were calculated for derma	aluated in the cumulati s are included in cumulati th hazards associated w re calculated for petrole into aliphatic and arom bons (ADEC, 2000c). re calculated for petrole into aliphatic and arom bons (ADEC, 2000c). for noncarcinogenic ch al contact with the med	ve HI estimat lative risk and vith petroleum aum hydrocarl atic fractions, eum hydrocarl atic fractions, thermicals with ium, and intal	h nazard n mixtures bons measure assuming 80 bons measure assuming 90 available tox kes were calc	9% aliphatic ed as RRO (m 9% aliphatic icity values. ulated for ing	ethod)			Inc mg/L mg/kd-d na	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p e	
concentration detected at the site. Consistent with EPA policy, lead is not ev Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately. Exposure dose and noncancer hazards wer by segregating total DRO concentrations hydrocarbons and 40% aromatic hydrocar Exposure dose and noncancer hazards wer by segregating total RRO concentrations hydrocarbons and 30% aromatic hydrocar	aluated in the cumulati s are included in cumulati th hazards associated w re calculated for petrole into aliphatic and arom bons (ADEC, 2000c). re calculated for petrole into aliphatic and arom bons (ADEC, 2000c). for noncarcinogenic ch al contact with the med ich represent the probal	ve HI estimat lative risk and vith petroleum aum hydrocarl atic fractions, eum hydrocarl atic fractions, emicals with ium, and intal bility of incur	h nazard n mixtures bons measure , assuming 80 bons measure , assuming 90 available tox kes were calc ring an adver	% aliphatic d as RRO (m % aliphatic icity values. ulated for ing se health	ethod ) estion or in			Inc mg/L mg/kd-d na	Incomplete Milligrams Milligrams not availabl	pathway. per liter. per kilogram p e	

# TAE 5

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 4 - Subsistence Fish and Hunting Camp - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	way-Specific I		Chemica
	Concentration <sup>*</sup>	Dose	Dose	Dose		nce Dose (		Turantian	Dormal	VOC Inhalation	Specifie HQ
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	IIIIaiation	nų
DETROITED AND DOCA BRONE											
PETROLEUM HYDROCARBONS <sup>e</sup>	3.7	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	naď	na <sup>d</sup>	nad	naď
Diesel Range Organics	3.7	9.7E-02	Inc	6.5E-02	1.0E-01	na	2.9E-01	9.7E-01	Inc	2.2E-01	1.2
Diesel Range Organics, Aliphatic	1.5	4.9E-02	Inc	3.2E-02	4.0E-02	na	5.7E-01	1.2E+00	Inc	5.7E-02	1.3
Diesel Range Organics, Aromatic		na <sup>°</sup>	na®	na	na®	na®	na	na®	na	na®	na
Residual Range Organics	6.5 4.6	1.5E-01	Inc	1.0E-04	5.0E+00	na	na	3.0E-02	Inc	na	0.030
Residual Range Organics, Aliphatic	3.3	1.1E-01	Inc	7.4E-05	2.0E-01	na	na	5.3E-01	Inc	na	0.53
Residual Range Organics, Aromatic	5.5	1.112 01								ні	3.0
										ш	5.0
otes:			40 - 1 - A1					HI .	Hazard inde	κ.	
Based on the maximum or 95 percent upp	per confidence limit (95	5% UCL) on 1	the mean						Hazard quot		
concentration detected at the site.								HQ			
Consistent with EPA policy, lead is not e	valuated in the cumula	tive HI estimation	ate.					Inc	Incomplete p		
e Risks associated with indicator compound	ds are included in cum	ulative risk ar	d hazard					mg/L	Milligrams p	ber liter.	
estimates for each site. However, the hea	alth hazards associated	with petroleu	m mixtures					mg/kd-d	Milligrams p	er kilogram p	er day.
will be evaluated and reported separately								na	not available		
<sup>d</sup> Exposure dose and noncancer hazards we	ere calculated for netro	leum hydroca	rbons measur	ed as DRO (r	nethod 8100	))		VOC	Volatile orga	anic compoun	d.
Exposure dose and noncancer nazards we	in calculated for period	notio fraction	c accuming 8	0% alinhatic							
			s, assuming o	io io unpinacio							
by segregating total DRO concentrations	whone (ADEC 2000c)										
hydrocarbons and 40% aromatic hydroca	100115 (ADEC, 2000C).										
hydrocarbons and 40% aromatic hydroca • Exposure dose and noncancer hazards we	ere calculated for petro	leum hydroca	rbons measur	red as RRO (n	nethod )						
hydrocarbons and 40% aromatic hydroca • Exposure dose and noncancer hazards we	ere calculated for petro	leum hydroca	rbons measur s, assuming 9	o% aliphatic	neurou )						
<ul> <li>hydrocarbons and 40% aromatic hydroca</li> <li>Exposure dose and noncancer hazards we by segregating total RRO concentrations</li> </ul>	ere calculated for petro s into aliphatic and aror	leum hydroca natic fraction	rbons measur s, assuming 9	ed as RRO (n 0% aliphatic	nethod )						
<ul> <li>hydrocarbons and 40% aromatic hydroca</li> <li>Exposure dose and noncancer hazards we by segregating total RRO concentrations hydrocarbons and 30% aromatic hydroca</li> </ul>	ere calculated for petro s into aliphatic and aror arbons (ADEC, 2000c).	leum hydroca natic fraction chemicals wit	s, assuming 9 h available to	0% aliphatic xicity values.							
<ul> <li>hydrocarbons and 40% aromatic hydroca</li> <li>Exposure dose and noncancer hazards we by segregating total RRO concentrations hydrocarbons and 30% aromatic hydroca</li> </ul>	ere calculated for petro s into aliphatic and aror arbons (ADEC, 2000c).	leum hydroca natic fraction chemicals wit	s, assuming 9 h available to	0% aliphatic xicity values.		halation					
<ul> <li>hydrocarbons and 40% aromatic hydroca</li> <li>Exposure dose and noncancer hazards we by segregating total RRO concentrations hydrocarbons and 30% aromatic hydroca</li> <li>Doses and noncancer hazards shown only</li> <li>Absorbed doses were calculated for derre of a medium</li> </ul>	ere calculated for petro s into aliphatic and aron arbons (ADEC, 2000c). y for noncarcinogenic c nal contact with the me	leum hydroca natic fraction chemicals wit dium, and int	s, assuming 9 h available to akes were cal	0% aliphatic xicity values. culated for in		nhalation					
<ul> <li>hydrocarbons and 40% aromatic hydroca</li> <li>Exposure dose and noncancer hazards we by segregating total RRO concentrations</li> </ul>	ere calculated for petro s into aliphatic and aron arbons (ADEC, 2000c). y for noncarcinogenic c nal contact with the me hich represent the prob	leum hydroca natic fraction chemicals wit dium, and int ability of incu	s, assuming 9 h available to akes were cal urring an adve	0% aliphatic xicity values. culated for in crse health	gestion or in	nhalation					

## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 6 - Cargo Beach Road Drumfield - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-S	Specific Ca	ncer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
INORGANICS Beryllium Cobalt	1.3 5.1	5.2E-07 2.1E-06	0.0E+00 0.0E+00	3.8E-11 1.5E-10	na na	na na	8.4E+00 9.8E+00	na na	na na	3.2E-10 1.5E-09	3.2E-10 1.5E-09
VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.0079	3.2E-09	0.0E+00	2.3E-13	7.5E-03	7.5E-03	1.6E-03	2.4E-11	0.0E+00	3.8E-16	2.4E-11 2E-09
betes: Based on the maximum or 95 percent upper confid Doses and cancer risks shown only for carcinogeni Desced on the maximum or 95 percent upper confid	c chemicals with availab	le toxicity va	lues.			0		ILCR Inc mg/kg	Incomple	tal lifetime can te pathway. 15 per kilogram	

2) Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site. Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

Milligrams per kilogram. Milligrams per kilogram per day. Not available.

mg/kg-d

na

3) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 6 - Cargo Beach Road Drumfield - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathwa	y-Specific C	ancer Risk	Chemical
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)		ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
· San given for the second											
INORGANICS											
Beryllium	1.3	1.6E-06	0.0E+00	1.1E-10	na	na	8.4E+00	na	na	9.6E-10	9.6E-10
Cobalt	5.1	6.2E-06	0.0E+00	4.5E-10	na	na	9.8E+00	na	na	4.4E-09	4.4E-09
VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.0079	9.5E-09	0.0E+00	7.0E-13	7.5E-03	7.5E-03	1.6E-03	7.2E-11	0.0E+00	1.1E-15	7.2E-11
									1	ILCR	5E-09

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected in soil tundra and soil gravel at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

ILCR Incremental lifetime cancer risk.

IncIncomplete pathway.mg/kgMilligrams per kilogram.mg/kg-dMilligrams per kilogram per day.

Not available.

na

## CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 6 - Cargo Beach Road Drumfield - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway	Specific Ca	ncer Risk	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer Sl	ope Factor	(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS Beryllium Cobalt	1.3 5.1	1.3E-08 5.0E-08	0.0E+00 0.0E+00	3.9E-12 1.5E-11	na na	na na	8.4E+00 9.8E+00	na na	na na	3.3E-11 1.5E-10	3.3E-11 1.5E-10
VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.0079	7.7E-11	0.0E+00	2.4E-14	7.5E-03	7.5E-03	1.6E-03	5.8E-13	0.0E+00	3.9E-17	5.8E-13
										ILCR	2E-10

Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

 Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor. ILCRIncremental lifetime cancer risk.IncIncomplete pathway.mg/kgMilligrams per kilogram.mg/kg-dMilligrams per kilogram per day.naNot available.

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 6 - Cargo Beach Drum Field - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific l	Hazard	Chemical-
	Concentration <sup>®</sup>	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS	0.950	3.6E-02	0.0E+00	1.8E-06	1.0E+00	1.0E+00	1.4E-03	3.6E-02	0.0E+00	1.3E-03	0.037
Aluminum	9,850	4.7E-06	0.0E+00	2.3E-10	2.0E-03	2.0E-03	5.7E-06	2.4E-03	0.0E+00	4.1E-05	0.0024
Beryllium	1.3 5.1	4.7E-00	0.0E+00	9.2E-10	2.0E-02	2.0E-02	5.7E-06	9.3E-04	0.0E+00	1.6E-04	0.0011
Cobalt	164	6.0E-04	0.0E+00	3.0E-08	1.4E-01	1.4E-01	1.4E-05	4.3E-03	0.0E+00	2.1E-03	0.0064
Manganese	164	0.0E-04	0.02+00	5.02-00	1.45 01	11.12.01					
VOLATILE ORGANIC COMPOUNDS						0.01	2.05.02	8 OF 07	0.0E+00	2.7E-10	0.000000
m,p-Xylene	0.044	1.6E-07	0.0E+00	7.9E-12	2.0E-01	2.0E-01	2.9E-02	8.0E-07	0.0E+00	1.7E-10	0.0000004
Methylene chloride	0.0079	2.9E-08	0.0E+00	1.4E-12	6.0E-02	6.0E-02	8.6E-01	4.8E-07		8.7E-11	0.0000002
o-Xylene	0.014	5.1E-08	0.0E+00	2.5E-12	2.0E-01	2.0E-01	2.9E-02	2.5E-07	0.0E+00	8.7E-11	0.000002
										HI	0.047
PETROLEUM HYDROCARBONS											4
Diesel Range Organics	102,000	na <sup>d</sup>	nad	nad	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na <sup>d</sup>	nad	nad
	81,600	3.0E-01	Inc	1.5E-05	1.0E-01	na	2.9E-01	3.0E+00	Inc	5.1E-05	3.0
Diesel Range Organics, Aliphatic	40,800	1.5E-01	Inc	7.4E-06	4.0E-02	na	5.7E-01	3.7E+00	Inc	1.3E-05	3.7
Diesel Range Organics, Aromatic			na®	na	na®	na®	nae	na®	nae	na	nae
Residual Range Organics	8,500	na		1.4E-06	2.0E+00	na	na	1.4E-02	Inc	Inc	0.014
Residual Range Organics, Aliphatic	7,650	2.8E-02	Inc Inc	4.6E-07	3.0E-02	na	na	3.1E-01	Inc	Inc	0.31
Residual Range Organics, Aromatic	2550	9.3E-03	inc	4.02-07	5.01-02	na					
										HI	7.0
tes: Based on the maximum or 95 percent upper of	confidence limit (95% UC	CL) on the mea	an	3				HI HQ	Hazard inde Hazard quo		
concentration detected at the site.								Inc	Incomplete		
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	uated in the cumulative H	estimate.						mg/kg	Milligrams	per kilogram.	
e Risks associated with indicator compounds a	re included in cumulative	risk and naza	IU					mg/kd-d	•	per kilogram	per day.
estimates for each site. However, the health	hazards associated with p	etroleum mix	lures					na	not availabl	le	
will be evaluated and reported separately. <sup>d</sup> Exposure dose and noncancer hazards were of	alculated for petroleum h	vdrocarbons t	neasured as D	RO (method 81	00)						
by segregating total DRO concentrations into	o aliphatic and aromatic f	ractions, assu	ming 80% alip	ohatic	- 4						
hydrocarbons and 40% aromatic hydrocarbon Exposure dose and noncancer hazards were of	ns (ADEC, 2000c).	vdrocarbons i	measured as R	RO (method)							
<ul> <li>Exposure dose and noncancer nazards were of by segregating total RRO concentrations inthe hydrocarbons and 30% aromatic hydrocarbon</li> </ul>	o aliphatic and aromatic f	ractions, assu	ming 90% alip	ohatic							
) Doses and noncancer hazards shown only for	r noncarcinogenic chemic	als with availa	able toxicity v	alues.							
Absorbed doses were calculated for dermal c	contact with the medium	and intakes w	ere calculated	for ingestion or	inhalation						
	onaet with the moulding			U							
of a medium. Noncancer hazards are unitless values which	represent the probability	of incurring a	n adverse hea	lth							
Noncancer nazarus are unitiess values which	represent the probability		D D . C								

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 6 - Cargo Beach Road Drumfield - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust				Dothwo	y-Specific	Hezard	Chemical-
	Soil	Ingestion	Dermal	Inhalation		-			y-specific	Dust	Specific
	Concentration <sup>*</sup>	Dose	Dose	Dose	Refere Oral		(mg/kg-d) Inhalation	Soil Ingestion	Dermal	Inhalation	HQ
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Orai	Dermai	milalation	Ingestion			
INORGANICS								1 15 01	0.0E+00	3.8E-03	0.11
Aluminum	9,850	1.1E-01	0.0E+00	5.3E-06		1.0E+00	1.4E-03	1.1E-01	0.0E+00	1.2E-04	0.0072
Beryllium	1.3	1.4E-05	0.0E+00	7.0E-10	2.0E-03		5.7E-06	7.1E-03	0.0E+00	4.8E-04	0.0033
Cobalt	5.1	5.6E-05	0.0E+00	2.8E-09		2.0E-02	5.7E-06	2.8E-03	0.0E+00	6.3E-04	0.019
Manganese	164	1.8E-03	0.0E+00	8.9E-08	1.4E-01	1.4E-01	1.4E-05	1.3E-02	0.06+00	0.52-05	0.017
VOLATILE ORGANIC COMPOUNDS					1		0.05.00	2 45 06	0.0E+00	8.2E-10	0.0000024
m,p-Xylene	0.044	4.8E-07	0.0E+00	2.4E-11	2.0E-01		2.9E-02	2.4E-06 1.4E-06	0.0E+00	5.0E-12	0.0000014
Methylene chloride	0.0079	8.6E-08	0.0E+00	4.3E-12	6.0E-02		8.6E-01	7.6E-07	0.0E+00	2.6E-10	0.00000076
o-Xylene	0.014	1.5E-07	0.0E+00	7.6E-12	2.0E-01	2.0E-01	2.9E-02	/.0E-0/	0.06+00	2.01-10	0.00000070
										HI	0.14
PETROLEUM HYDROCARBONS <sup>e</sup>						4	d	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	102,000	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	naď	na <sup>d</sup>	nad		Inc	1.5E-04	8.9
Diesel Range Organics, Aliphatic	81,600	8.9E-01	Inc	4.4E-05	1.0E-01	na	2.9E-01	8.9E+00	Inc	3.9E-05	11
Diesel Range Organics, Aromatic	40,800	4.5E-01	Inc	2.2E-05	4.0E-02	na	5.7E-01	1.1E+01		na°	na®
Residual Range Organics	8,500	na	na	na°	na®	na	na	na	na	na Inc	0.042
Residual Range Organics, Aliphatic	7,650	8.4E-02	Inc	4.1E-06	2.0E+00	na	na	4.2E-02	Inc	Inc	0.93
Residual Range Organics, Aromatic	2,550	2.8E-02	Inc	1.4E-06	3.0E-02	na	na	9.3E-01	Inc	inc	0.75
						S.	-	1		HI	21
Notes:								ні	Hazard in	dex.	
<ul> <li>Based on the maximum or 95 percent upper contract</li> </ul>	onfidence limit (95% UC	L) on the mea	in					HQ	Hazard qu	iotient.	
concentration detected at the site.								Inc		te pathway.	
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	ated in the cumulative HI	estimate.						mg/kg	Milligran	ns per kilogram	n.
e Risks associated with indicator compounds an	e included in cumulative	risk and haza	rd					mg/kd-d		ns per kilogran	
estimates for each site. However, the health h	azards associated with pe	etroleum mixt	ures					na	not availa		
it he eveluated and reported cenarately					0100)			inu -			
<sup>d</sup> Exposure dose and noncancer hazards were ca	alculated for petroleum h	ydrocarbons r	neasured as L	DRO (method	8100)						
by segregating total DRO concentrations into	aliphatic and aromatic f	ractions, assur	ming 80% alı	phatic							
hydrocarbons and 40% aromatic hydrocarbon	s (ADEC, 2000C).	vdrocarbons r	neasured as F	RRO (method	)						
• Exposure dose and noncancer hazards were ca	alculated for performation for	ractions assu	ming 90% ali	nhatic	·						
by segregating total RRO concentrations into	anphatic and aromatic in	acuons, assur	B yore un								
hydrocarbons and 30% aromatic hydrocarbon	s (ADEC, 2000c).	ale with avail	able toxicity	values.							
<ol> <li>Doses and noncancer hazards shown only for</li> <li>Absorbed doses were calculated for dermal co</li> </ol>	noncarcinogenic chemic	and intaker w	ere calculated	for ingestion	or inhalati	on					
2) Absorbed doses were calculated for dermal co	ontact with the medium, a	ind makes we	cic calculated	ion ingestion							

of a medium.

## TAB 1

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 6 - Cargo Beach Road Drumfield - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathwa	y-Specific H	lazard	Chemical-
Constituent	Concentration <sup>*</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 6 - Cargo Beach Road Drumfield - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust				Pathy	way-Specific I	Iazard	Chemical-
	Soil	Ingestion	Dermal	Inhalation	Deferou	nce Dose (m	a/ka-d)	Soil		Dust	Specific
	Concentration <sup>a</sup>	Dose	Dose	Dose (mg/kg d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Ulai	Dermai	Annuality				
INORGANICS						1 05 00	1.4E-03	2.8E-04	0.0E+00	6.2E-05	0.00034
Aluminum	9,850	2.8E-04	0.0E+00	8.6E-08	1.0E+00	1.0E+00	-	1.9E-05	0.0E+00	2.0E-06	0.000021
Beryllium	1.3	3.7E-08	0.0E+00	1.1E-11	2.0E-03	2.0E-03	5.7E-06	7.3E-06	0.0E+00	7.9E-06	0.000015
Cobalt	5.1	1.5E-07	0.0E+00	4.5E-11	2.0E-02	2.0E-02	5.7E-06	3.3E-05	0.0E+00	1.0E-04	0.00014
Manganese	164	4.7E-06	0.0E+00	1.4E-09	1.4E-01	1.4E-01	1.4E-05	3.5E-05	0.01100		
VOLATILE ORGANIC COMPOUNDS					0.05.01	2.05.01	2.9E-02	6.3E-09	0.0E+00	1.3E-11	0.000000063
m,p-Xylene	0.044	1.3E-09	0.0E+00	3.9E-13	2.0E-01	2.0E-01		3.8E-09	0.0E+00	8.1E-14	0.000000038
Methylene chloride	0.0079	2.3E-10	0.0E+00	6.9E-14	6.0E-02	6.0E-02	8.6E-01	2.0E-09	0.0E+00	4.2E-12	0.000000020
o-Xylene	0.014	4.0E-10	0.0E+00	1.2E-13	2.0E-01	2.0E-01	2.9E-02	2.06-09	0.02100		
0-Affond										Ш	0.00051
											4
PETROLEUM HYDROCARBONS	102.000	na <sup>d</sup>	nad	nad	nad	nad	nad	na <sup>d</sup>	nad	na <sup>d</sup>	nad
Diesel Range Organics	102,000		Inc	7.2E-07	1.0E-01	na	2.9E-01	2.3E-02	Inc	2.5E-06	0.023
Diesel Range Organics, Aliphatic	81,600	2.3E-03		3.6E-07	4.0E-02	na	5.7E-01	2.9E-02	Inc	6.3E-07	0.029
Diesel Range Organics, Aromatic	40,800	1.2E-03	Inc		na	na	na	na	na	na°	na
Residual Range Organics	8,500	na	na <sup>°</sup>	na"	2.0E+00	na	na	1.1E-04	Inc	Inc	0.00011
Residual Range Organics, Aliphatic	7,650	2.2E-04	Inc	6.7E-08	3.0E-02	na	na	2.4E-03	Inc	Inc	0.0024
Residual Range Organics, Aromatic	2,550	7.3E-05	Inc	2.2E-08	3.0E-02	na				Ш	0.055
										н	0.055
Notes:								HI	Hazard inde	x.	
<ul> <li>Based on the maximum or 95 percent upper</li> </ul>	confidence limit (95% C	CL) on the h	ican					HQ	Hazard quot	ient.	
concentration detected at the site.								Inc	Incomplete	pathway.	
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	uated in the cumulative	HI estimate.	nord					mg/kg		per kilogram.	
<ul> <li>Risks associated with indicator compounds a</li> </ul>	are included in cumulativ	ve risk and ha	Zaru					mg/kd-d	Milligrams	per kilogram p	er day.
estimates for each site. However, the health	hazards associated with	petroleum m	ixtures					na	not available	e	
ill be evaluated and reported separately				DDO ( sthe	1 0 1 0 0)						
d Exposure dose and noncancer hazards were	calculated for petroleum	hydrocarbon	s measured a	s DRO (metho	a 8100)						
by segregating total DRO concentrations inthe hydrocarbons and 40% aromatic hydrocarbo	to aliphatic and aromatic	fractions, as	suming 80%	aliphatic							
Exposure dose and noncancer hazards were	calculated for petroleum	hydrocarbon	s measured a	s RRO (metho	d)						
by segregating total RRO concentrations inthe hydrocarbons and 30% aromatic hydrocarbon	to aliphatic and aromatic ons (ADEC, 2000c).	ractions, as	summing 90 /0	amphano							
Down only for	r noncarcinogenic chem	icals with ava	ailable toxicit	y values.							
<ol> <li>Doses and noncancer hazards shown only to</li> <li>Absorbed doses were calculated for dermal of</li> </ol>	contact with the medium	n, and intakes	were calculat	ted for ingestic	on or inhalati	on					
of a medium 3) Noncancer hazards are unitless values which											
3) INONCANCEL NAZARUS ARE UNITIESS VALUES WHICH											

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 6 - Cargo Beach Road Drumfield - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	6-11	Soil Ingestion	Dermal	Dust Inhalation			Pathw	ay-Specific H	lazard	Chemical-
	Soil Concentration <sup>®</sup>	Dose	Dose	Dose	Reference Dose (r	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 7 - Cargo Beach Road Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-S	pecific Car	ncer Risk	Chemica
	Concentration"	Dose	Dose	Dose	Cancer Sl	ope Factor (	mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
NORGANICS								0.15.06	1.1E-06	6.6E-09	1.0E-05
Arsenic	15	6.0E-06	7.1E-07	4.4E-10	1.5E+00	1.5E+00	1.5E+01	9.1E-06		6.3E-10	6.3E-10
Cadmium	3.4	1.4E-06	5.4E-09	1.0E-10	na	na	6.3E+00	na	na na	5.5E-09	5.5E-09
Cobalt	19	7.6E-06	0.0E+00	5.6E-10	na	na	9.8E+00	na	na	5.56-07	0.012 0.
OLATILE ORGANIC COMPOUNDS					2 05 02	2.9E-03	2.9E-03	2.1E-10	0.0E+00	1.5E-14	2.1E-10
Bromoethane	0.18	7.2E-08	0.0E+00	5.3E-12	2.9E-03	2.9E-03 7.5E-03	1.6E-03	3.9E-10	0.0E+00	6.3E-15	3.9E-1
Aethylene chloride	0.13	5.2E-08	0.0E+00	3.8E-12	7.5E-03	7.56-05	1.02-05	5.72 10			
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	1.6	6.4E-07	3.6E-07	4.7E-11	2.0E+00	2.0E+00	2.0E+00	1.3E-06	7.1E-07	9.4E-11	2.0E-00
DIOXINS/FURANS 2,3,7,8-Tetrachlorodibenzo-p-dioxins TCDD) Toxicity Equivalents (TEQ)	0.000043	1.7E-11	2.0E-12	1.3E-15	1.5E+05	1.5E+05	1.5E+05	2.6E-06	3.1E-07	1.9E-10	2.9E-0
TCDD) Toxicity Equivalence (TDQ)										ILCR	2E-05

<ul> <li>Notes:</li> <li><sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.</li> <li>1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.</li> <li>2) Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site. Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.</li> <li>3) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation</li> </ul>	Inc mg/kg	Incremental lifetime cancer risk. Incomplete pathway. Milligrams per kilogram. Milligrams per kilogram per day. Not available.
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of a medium

Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

#### TAB ..... \_4

## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 7 - Cargo Beach Road Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil			10 100 1				Pathwa	y-Specific C	ancer Risk	Chemica
	Concentration <sup>®</sup>	Dose	Dose	Dose				Soil	D	Dust	Specific Risk
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermai	Innalation	Risk
	15	1.8E-05	2.1E-06	1.3E-09	1.5E+00	1.5E+00	1.5E+01	2.7E-05	3.2E-06	2.0E-08	3.0E-05
				3.0E-10	na	na	6.3E+00	na	na	1.9E-09	1.9E-09
					па	na	9.8E+00	na	na	1.6E-08	1.6E-08
	17	2.50 05	0.02.00								
ATED BIPHENYLS									215.04	2.85 10	6.0E-06
or 1260)	1.6	1.9E-06	1.1E-06	1.4E-10	2.0E+00	2.0E+00	2.0E+00	3.9E-06	2.1E-06	2.8E-10	0.012-00
GANIC COMPOUNDS								< 15 10	0.07.00	4 75 14	6.4E-10
	0.18	2.2E-07	0.0E+00	1.6E-11							1.2E-09
c	0.13	1.6E-07	0.0E+00	1.1E-11	7.5E-03	7.5E-03	1.6E-03	1.2E-09	0.0E+00	1.8E-14	1.26-0
NS										6 75 10	0 7E 0
	0.000043	5.2E-11	6.1E-12	3.8E-15	1.5E+05	1.5E+05	1.5E+05	7.8E-06	9.2E-07	5.7E-10	8.7E-00
nts (TEQ)											
										ILCR	5E-05
	ATED BIPHENYLS or 1260) GANIC COMPOUNDS e NS odibenzo-p-dioxins (TCDD)	Constituent(mg/kg)153.419ATED BIPHENYLSor 1260)1.6GANIC COMPOUNDSe0.18e0.13NS0.000043	Constituent         Concentration* (mg/kg)         Dose (mg/kg-d)           15         1.8E-05           3.4         4.1E-06           19         2.3E-05           ATED BIPHENYLS or 1260)         1.6         1.9E-06           GANIC COMPOUNDS         0.18         2.2E-07           e         0.13         1.6E-07           NS odibenzo-p-dioxins (TCDD)         0.000043         5.2E-11	Soil         Ingestion         Dermal           Constituent         Dose (mg/kg)         Dose (mg/kg-d)         Dose (mg/kg-d)           15         1.8E-05         2.1E-06           3.4         4.1E-06         1.6E-08           19         2.3E-05         0.0E+00           ATED BIPHENYLS or 1260)         1.6         1.9E-06         1.1E-06           GANIC COMPOUNDS e         0.18         2.2E-07         0.0E+00           NS odibenzo-p-dioxins (TCDD)         0.000043         5.2E-11         6.1E-12	Soil         Ingestion         Dermal         Inhalation           Constituent         Concentration <sup>a</sup> Dose         Dose         Dose         Dose           15         1.8E-05         2.1E-06         1.3E-09         3.0E-10         3.44         4.1E-06         1.6E-08         3.0E-10           19         2.3E-05         0.0E+00         1.7E-09         1.7E-09           ATED BIPHENYLS         1.6         1.9E-06         1.1E-06         1.4E-10           GANIC COMPOUNDS         0.18         2.2E-07         0.0E+00         1.6E-11           NS         0.13         1.6E-07         0.0E+00         1.1E-11           NS         0.000043         5.2E-11         6.1E-12         3.8E-15	Soil         Ingestion         Dermal         Inhalation           Constituent         Concentration* (mg/kg)         Dose (mg/kg-d)         Dose (mg/kg-d)         Dose (mg/kg-d)         Cancer Ske Oral           15         1.8E-05         2.1E-06         1.3E-09         1.5E+00           3.4         4.1E-06         1.6E-08         3.0E-10         na           19         2.3E-05         0.0E+00         1.7E-09         na           ATED BIPHENYLS         1.6         1.9E-06         1.1E-06         1.4E-10         2.0E+00           GANIC COMPOUNDS         0.18         2.2E-07         0.0E+00         1.6E-11         2.9E-03           e         0.13         1.6E-07         0.0E+00         1.1E-11         7.5E-03           NS         0.000043         5.2E-11         6.1E-12         3.8E-15         1.5E+05	Soil         Ingestion         Dermal         Inhalation           Constituent         Concentration*         Dose         Dose         Dose         Dose         Cancer Slope Factor (mg/kg-d)           15         1.8E-05         2.1E-06         1.3E-09         1.5E+00         1.5E+00         1.5E+00           3.4         4.1E-06         1.6E-08         3.0E-10         na         na           19         2.3E-05         0.0E+00         1.7E-09         na         na           ATED BIPHENYLS         1.6         1.9E-06         1.1E-06         1.4E-10         2.0E+00         2.0E+00           GANIC COMPOUNDS         0.18         2.2E-07         0.0E+00         1.6E-11         2.9E-03         2.9E-03           e         0.13         1.6E-07         0.0E+00         1.1E-11         7.5E-03         7.5E-03           NS         0.000043         5.2E-11         6.1E-12         3.8E-15         1.5E+05         1.5E+05	Soil         Ingestion         Dermal         Inhalation           Constituent         Concentration* (mg/kg)         Dose (mg/kg-d)         Dose (mg/kg-d)         Dose (mg/kg-d)         Cancer Slope Factor (mg/kg-d) <sup>-1</sup> Oral         Dermal         Inhalation           15         1.8E-05         2.1E-06         1.3E-09         1.5E+00         1.5E+00         1.5E+01           3.4         4.1E-06         1.6E-08         3.0E-10         na         na         6.3E+00           19         2.3E-05         0.0E+00         1.7E-09         na         na         9.8E+00           ATED BIPHENYLS or 1260)         1.6         1.9E-06         1.1E-06         1.4E-10         2.0E+00         2.0E+00         2.0E+00           ATED BIPHENYLS or 1260)         0.18         2.2E-07         0.0E+00         1.6E-11         2.9E-03         2.9E-03         2.9E-03           Constituent         0.18         2.2E-07         0.0E+00         1.6E-11         2.9E-03         2.9E-03         1.6E-03           NS         0.13         1.6E-07         0.0E+00         1.1E-11         7.5E-03         1.5E+05         1.5E+05	Soil         Ingestion         Dermal Inhalation         Cancer Slope Factor (mg/kg-d) <sup>-1</sup> Pathwa           Constituent         Concentration <sup>a</sup> Dose (mg/kg)         Dose (mg/kg-d)         Dose (mg/kg-d)         Dose (mg/kg-d)         Cancer Slope Factor (mg/kg-d) <sup>-1</sup> Pathwa           15         1.8E-05         2.1E-06         1.3E-09         1.5E+00         1.5E+00         1.5E+01         2.7E-05           3.4         4.1E-06         1.6E-08         3.0E-10         na         na         6.3E+00         na           19         2.3E-05         0.0E+00         1.7E-09         na         na         9.8E+00         na           ATED BIPHENYLS         1.6         1.9E-06         1.1E-06         1.4E-10         2.0E+00         2.0E+00         3.9E-06           GANIC COMPOUNDS         0.18         2.2E-07         0.0E+00         1.6E-11         2.9E-03         2.9E-03         2.9E-03         1.6E-03         1.2E-09           NS         0.13         1.6E-07         0.0E+00         1.1E-11         7.5E-03         1.5E+05         1.5E+05         7.8E-06	Soil         Ingestion         Dermal         Inhalation         Pathway-Specific C           Constituent         Concentration <sup>a</sup> (mg/kg)         Dose (mg/kg-d)         Dose (mg/kg-d)         Dose (mg/kg-d)         Dose (mg/kg-d)         Dose (mg/kg-d)         Dose (mg/kg-d)         Pathway-Specific C           15         1.8E-05         2.1E-06         1.3E-09         1.5E+00         1.5E+01         2.7E-05         3.2E-06           3.4         4.1E-06         1.6E-08         3.0E-10         na         na         6.3E+00         na         na           19         2.3E-05         0.0E+00         1.7E-09         na         na         9.8E+00         na         na           ATED BIPHENYLS         1.6         1.9E-06         1.1E-06         1.4E-10         2.0E+00         2.0E+00         3.9E-06         2.1E-06           GANIC COMPOUNDS         0.18         2.2E-07         0.0E+00         1.6E-11         2.9E-03         2.9E-03         2.9E-03         6.4E-10         0.0E+00           e         0.13         1.6E-07         0.0E+00         1.1E-11         7.5E-03         1.5E+05         1.5E+05         1.2E-09         0.0E+00	SoilIngestion (mg/kg)Dermal DoseInhalationPathway-Specific Cancer RiskConstituentConcentration* (mg/kg)Dose (mg/kg-d)Dose (mg/kg-d)Dose (mg/kg-d)Dose (mg/kg-d)Dose (mg/kg-d)Dose (mg/kg-d)Pathway-Specific Cancer Risk15 $1.8E-05$ $2.1E-06$ $1.3E-09$ $1.5E+00$ $1.5E+00$ $1.5E+01$ $2.7E-05$ $3.2E-06$ $2.0E-08$ 3.4 $4.1E-06$ $1.6E-08$ $3.0E-10$ nanana6.3E+00nanana19 $2.3E-05$ $0.0E+00$ $1.7E-09$ nana $9.8E+00$ nanana1.6E-08ATED BIPHENYLS or 1260) $1.6$ $1.9E-06$ $1.1E-06$ $1.4E-10$ $2.0E+00$ $2.0E+00$ $3.9E-06$ $2.1E-06$ $2.8E-10$ CANIC COMPOUNDS e $0.18$ $2.2E-07$ $0.0E+00$ $1.6E-11$ $2.9E-03$ $2.9E-03$ $2.9E-03$ $6.4E-10$ $0.0E+00$ $4.7E-14$ e $0.13$ $1.6E-07$ $0.0E+00$ $1.1E-11$ $7.5E-03$ $7.5E-03$ $1.6E-03$ $0.2E-00$ $4.7E-14$ NS odibenzo-p-dixins (TCDD) $0.000043$ $5.2E-11$ $6.1E-12$ $3.8E-15$ $1.5E+05$ $1.5E+05$ $7.8E-06$ $9.2E-07$ $5.7E-10$

Milligrams per kilogram.

Not available.

Milligrams per kilogram per day.

mg/kg

na

mg/kg-d

Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.
 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation

of a medium. 3) Cancer risks are unitless values which represent the probability of incurring an adverse health

and soil gravel at the site.

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 7 - Cargo Beach Road Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-	Specific Ca	ncer Risk	Chemical-
	Concentration*	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
Constituent	(mg/kg)	(ing/kg-u)	(ing/kg-u)	(ing/ing d)	0.11						
INORGANICS			5.05.00	4 617 11	1.5E+00	1.5E+00	1.5E+01	2.2E-07	8.7E-08	6.8E-10	3.1E-07
Arsenic	15	1.5E-07	5.8E-08	4.5E-11			6.3E+00	па	na	6.4E-11	6.4E-11
Cadmium	3.4	3.3E-08	4.4E-10	1.0E-11	na	na	9.8E+00	na	na	5.6E-10	5.6E-10
Cobalt	19	1.9E-07	0.0E+00	5.7E-11	na	na	9.8E+00	па	na	5.02-10	
VOLATILE ORGANIC COMPOUNDS Bromoethane	0.18	1.8E-09	0.0E+00 0.0E+00	5.4E-13 3.9E-13	2.9E-03 7.5E-03	2.9E-03 7.5E-03	2.9E-03 1.6E-03	5.1E-12 9.5E-12	0.0E+00 0.0E+00	1.6E-15 6.4E-16	5.1E-12 9.5E-12
Methylene chloride	0.13	1.3E-09	0.06+00	5.96-15	1.52 05	100 00					
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	1.6	1.6E-08	2.9E-08	4.8E-12	2.0E+00	2.0E+00	2.0E+00	3.1E-08	5.8E-08	9.6E-12	8.9E-08
DIOXINS/FURANS 2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD)	0.000043	4.2E-13	1.7E-13	1.3E-16	1.5E+05	1.5E+05	1.5E+05	6.3E-08	2.5E-08	1.9E-11	8.8E-08
Toxicity Equivalents (TEQ)										ILCR	5E-07

<ul> <li>Notes:</li> <li><sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.</li> <li>1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.</li> <li>2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium</li> <li>3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.</li> </ul>	ILCR Inc mg/kg mg/kg-d na	Incremental lifetime cancer risk. Incomplete pathway. Milligrams per kilogram. Milligrams per kilogram per day. Not available.	
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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 7 - Cargo Beach Road Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal					Pathw	ay-Specific l	Hazard	_ Chemical- Specific
	Concentration	Dose	Dose	Dose	Refere	nce Dose (m	g/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Aluminum	12,000	4.4E-02	0.0E+00	2.2E-06	1.0E+00	1.0E+00	1.4E-03	4.4E-02	0.0E+00	1.5E-03	0.045
Arsenic	15	5.3E-05	5.1E-06	2.7E-09	3.0E-04	3.0E-04	3.0E-04	1.8E-01	1.7E-02	8.8E-06	0.19
Cadmium	3.4	1.2E-05	3.9E-08	6.1E-10	5.0E-04	5.0E-04	5.0E-04	2.5E-02	7.8E-05	1.2E-06	0.025
Chromium	43	1.6E-04	0.0E+00	7.8E-09	1.5E+00	1.5E+00	1.5E+00	1.0E-04	0.0E+00	5.2E-09	0.00010
Cobalt	19	6.9E-05	0.0E+00	3.4E-09	2.0E-02	2.0E-02	5.7E-06	3.5E-03	0.0E+00	6.0E-04	0.0041
	196	nab	na <sup>b</sup>								
Lead	662	2.4E-03	0.0E+00	1.2E-07	1.4E-01	1.4E-01	1.4E-05	1.7E-02	0.0E+00	8.5E-03	0.026
Manganese	0.31	1.1E-06	0.0E+00	5.6E-11	3.0E-04	3.0E-04	3.0E-04	3.8E-03	0.0E+00	1.9E-07	0.0038
Mercury	50	1.8E-04	0.0E+00	9.0E-09	2.0E-02	2.0E-02	2.0E-02	9.0E-03	0.0E+00	4.5E-07	0.0090
Nickel	1.2	4.4E-06	0.0E+00	2.2E-10	7.0E-05	7.0E-05	7.0E-06	6.2E-02	0.0E+00	3.1E-05	0.062
Thallium	1.2	4.42-00	0.01+00	2.26 10	1101 00						
VOLATILE ORGANIC COMPOUNDS						2 05 01	( 25 01	3.6E-06	0.0E+00	8.0E-11	0.0000036
1,1,1-Trichloroethane	0.28	1.0E-06	0.0E+00	5.1E-11	2.8E-01	2.8E-01	6.3E-01	5.7E-06	0.0E+00	2.8E-10	0.0000057
Acetone	1.4	5.1E-06	0.0E+00	2.5E-10	9.0E-01	9.0E-01	9.0E-01		0.0E+00	1.1E-11	0.0000010
Bromoethane	0.18	6.6E-07	0.0E+00	3.3E-11	4.0E-01	4.0E-01	2.9E+00	1.6E-06	0.0E+00	4.1E-11	0.0000012
m,p-Xylene	0.066	2.4E-07	0.0E+00	1.2E-11	2.0E-01	2.0E-01	2.9E-01	1.2E-06	0.0E+00	2.7E-11	0.000008
Methylene chloride	0.13	4.7E-07	0.0E+00	2.3E-11	6.0E-02	6.0E-02	8.6E-01	7.9E-06	0.0E+00	2.70-11	0.00000
SEMIVOLATILE ORGANIC COMPOUNDS											
4-Methylphenol (p-Cresol)	4	1.4E-05	4.5E-06	7.0E-10	5.0E-03	5.0E-03	5.0E-03	2.8E-03	9.0E-04	1.4E-07	0.0037
POLYCHLORINATED BIPHENYLS										1 15 05	0.42
PCB-1260 (Aroclor 1260)	1.6	5.8E-06	2.6E-06	2.9E-10	2.0E-05	2.0E-05	2.0E-05	2.9E-01	1.3E-01	1.4E-05	0.42
										HI	0.79
PETROLEUM HYDROCARBONS							4	4	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	32,000	nad	nad	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	nad		1.6E-05	0.93
Diesel Range Organics, Aliphatic	25,600	9.3E-02	Inc	4.6E-06	1.0E-01	na	2.9E-01	9.3E-01	Inc		1.2
Diesel Range Organics, Aromatic	12,800	4.7E-02	Inc	2.3E-06	4.0E-02	na	5.7E-01	1.2E+00	Inc	4.1E-06	
	3.448	na®	na°	na	na	na®	na <sup>e</sup>	na®	na°	na	na®
Residual Range Organics	3,104	1.1E-02	Inc	5.6E-07	2.0E+00	na	na	5.6E-03	Inc	Inc	0.0056
Residual Range Organics, Aliphatic	1.035	3.8E-03	Inc	1.9E-07	3.0E-02	na	na	1.3E-01	Inc	Inc	0.13
Residual Range Organics, Aromatic	1,055	5.01-05								н	2.2
										<u> </u>	2.2
Notes:		W S an el a						HI	Hazard ind	ex.	
Based on the maximum or 95 percent upper confide concentration detected at the site.	ence limit (95% UC	L) on the me	an					HQ	Hazard que		
	- the menulation II	Lastimate						Inc	Incomplete	pathway.	
<sup>b</sup> Consistent with EPA policy, lead is not evaluated i <sup>c</sup> Risks associated with indicator compounds are incl	n the cumulative H	estimate.						mg/kg		per kilogram.	

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 7 - Cargo Beach Road Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific	Hazard	Chemical
		<b>Concentration</b>	Dose	Dose	Dose	Refere	ence Dose (n Dermal	ng/kg-d) Inhalation	Soil	Dermal	Dust Inhalation	Specific HQ
Constituent		(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Ula	Dernita	Annuality				
	However, the health haz	and associated with ne	troleum mixt	ires					mg/kd-d	Milligrams	per kilogram	per day.
		calus associated with pe							па	not availab	e	
will be evaluated and re	ported separately.				0.0 (	0						
Exposure dose and non	cancer hazards were cald	culated for petroleum hy	drocarbons n	heasured as D	RO (method 810	0)						
by segregating total DI	RO concentrations into a	liphatic and aromatic fr	actions, assur	ning 80% alip	hatic							
	aromatic hydrocarbons											
Exposure doce and non	cancer hazards were calo	rulated for petroleum hy	drocarbons n	neasured as R	RO (method)							
Exposure dose and non		linketic and acomptic fr	actions assur	ning 90% alin	hatic							
	O concentrations into a		actions, assur	ing your unp								
hydrocarbons and 30%	aromatic hydrocarbons	(ADEC, 2000c).										
Doses and noncancer h	azards shown only for n	oncarcinogenic chemica	ls with availa	ble toxicity v	alues.							
Absorbed doses were c	alculated for dermal con	tact with the medium, a	nd intakes we	re calculated	for ingestion or i	nhalation						
of a medium.												
Noncancer hazards are	unitless values which re	present the probability of	of incurring a	n adverse heal	th							
effect. They are calculated		Contra Management	II - Exposure	Dose/Referen	ace dose							

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 7 - Cargo Beach Road Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil	Demail	Dust Inhalation				Pathwa	y-Specific	Hazard	Chemical-
	Soil	Ingestion	Dermal		D.6	Dece	(ma/ka d)	Soil	jopeenie	Dust	Specific
	Concentration"	Dose	Dose (mg/kg-d)	Dose (mg/kg-d)	Oral		(mg/kg-d) Inhalation		Dermal	Inhalation	HQ
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-u)	(mg/kg-u)	Orai	Derman	malation	Ingestion	2000		
INORGANICS									0.05.00	1 (1 02	0.14
Aluminum	12,000	1.3E-01	0.0E+00	6.5E-06		1.0E+00	1.4E-03	1.3E-01	0.0E+00	4.6E-03	0.14 0.60
Arsenic	15	1.6E-04	1.6E-05	8.1E-09	3.0E-04		3.0E-04	5.5E-01	5.2E-02	2.7E-05	0.00
Cadmium	3.4	3.7E-05	1.2E-07	1.8E-09	5.0E-04		5.0E-04	7.4E-02	2.4E-04	3.7E-06	
Chromium	43	4.7E-04	0.0E+00	2.3E-08		1.5E+00	1.5E+00	3.1E-04	0.0E+00	1.6E-08	0.00031
Cobalt	19	2.1E-04	0.0E+00	1.0E-08	2.0E-02		5.7E-06	1.0E-02	0.0E+00	1.8E-03	0.012
Lead	196	nab	na <sup>b</sup>	nab	nab	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Manganese	662	7.2E-03	0.0E+00	3.6E-07	1.4E-01	1.4E-01	1.4E-05	5.2E-02	0.0E+00	2.6E-02	0.077
Mercury	0.31	3.4E-06	0.0E+00	1.7E-10	3.0E-04	3.0E-04	3.0E-04	1.1E-02	0.0E+00	5.6E-07	0.011
Nickel	50	5.5E-04	0.0E+00	2.7E-08	2.0E-02	2.0E-02	2.0E-02	2.7E-02	0.0E+00	1.4E-06	0.027
Thallium	1.2	1.3E-05	0.0E+00	6.5E-10	7.0E-05	7.0E-05	7.0E-05	1.9E-01	0.0E+00	9.3E-06	0.19
VOLATILE ORGANIC COMPOUNDS											
1,1,1-Trichloroethane	0.28	3.1E-06	0.0E+00	1.5E-10	2.8E-01	2.8E-01	6.3E-01	1.1E-05	0.0E+00	2.4E-10	0.000011
Acetone	1.4	1.5E-05	0.0E+00	7.6E-10	9.0E-01	9.0E-01	9.0E-01	1.7E-05	0.0E+00	8.4E-10	0.000017
Bromoethane	0.18	2.0E-06	0.0E+00	9.8E-11	4.0E-01	4.0E-01	2.9E+00	4.9E-06	0.0E+00	3.4E-11	0.000004
m,p-Xylene	0.066	7.2E-07	0.0E+00	3.6E-11	2.0E-01	2.0E-01	2.9E-02	3.6E-06	0.0E+00	1.2E-09	0.000003
Methylene chloride	0.13	1.4E-06	0.0E+00	7.0E-11	6.0E-02	6.0E-02	8.6E-01	2.4E-05	0.0E+00	8.2E-11	0.000024
SEMIVOLATILE ORGANIC COMPOUNDS	5										0.011
4-Methylphenol (p-Cresol)	3.9	4.3E-05	1.3E-05	2.1E-09	5.0E-03	5.0E-03	5.0E-03	8.5E-03	2.7E-03	4.2E-07	0.011
POLYCHLORINATED BIPHENYLS								0.75.01	3.9E-01	4.3E-05	1.3
PCB-1260 (Aroclor 1260)	1.6	1.7E-05	7.7E-06	8.7E-10	2.0E-05	2.0E-05	2.0E-05	8.7E-01	3.98-01	4.56-05	1.5
										HI	2.4
PETROLEUM HYDROCARBONS <sup>e</sup>								4	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	32,000	na <sup>d</sup>	nad	na <sup>d</sup>	nad	nad	na <sup>d</sup>	nad		na 4.8E-05	2.8
Diesel Range Organics, Aliphatic	25,600	2.8E-01	Inc	1.4E-05	1.0E-01	na	2.9E-01	2.8E+00	Inc	4.8E-05 1.2E-05	3.5
Diesel Range Organics, Aromatic	12,800	1.4E-01	Inc	6.9E-06	4.0E-02	na	5.7E-01	3.5E+00	Inc		
Residual Range Organics	3,448	nae	na®	na°	nae	na®	na®	na	na <sup>e</sup>	na®	na
Residual Range Organics, Aliphatic	3,103	3.4E-02	Inc	1.7E-06	2.0E+00	na	na	1.7E-02	Inc	Inc	0.017
Residual Range Organics, Amphatic Residual Range Organics, Aromatic	1,034	1.1E-02	Inc	5.6E-07	3.0E-02	na	na	3.8E-01	Inc	Inc	0.38
										HI	6.7

Notes:

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 7 - Cargo Beach Road Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Ingestion	Dermal	Inhalation	Defer	ance Doce	(mg/kg-d)	Pathwa Soil	y-Specific	Hazard Dust	Chemical- Specific
Constituent	Concentration <sup>*</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Oral		Inhalation		Dermal	Inhalation	HQ
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evalue</li> <li>Risks associated with indicator compounds ar estimates for each site. However, the health h will be evaluated and reported separately.</li> </ul>	ated in the cumulative I re included in cumulativ nazards associated with	H estimate. re risk and ha petroleum m	azard aixtures					HI HQ Inc mg/kg mg/kd-d na	Milligram	otient. e pathway. s per kilogram s per kilogram	
<sup>d</sup> Exposure dose and noncancer hazards were carby segregating total DRO concentrations into	alculated for petroleum aliphatic and aromatic	hydrocarbon fractions, as	s measured a suming 80%	s DRO (metho aliphatic	d 8100)						
hydrocarbons and 40% aromatic hydrocarbon • Exposure dose and noncancer hazards were c	alculated for petroleum	hydrocarbor	ns measured a	s RRO (metho	d )						
by segregating total RRO concentrations into hydrocarbons and 30% aromatic hydrocarbon	s (ADEC, 2000c).										
<ol> <li>Doses and noncancer hazards shown only for</li> <li>Absorbed doses were calculated for dermal co of a medium</li> </ol>	ontact with the medium	, and intakes	were calcula	ted for ingestic	on or inha	alation					
of a medium. 3) Noncancer hazards are unitless values which effect. They are calculated using the following	represent the probabilit	y of incurrin	g an adverse	health							

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# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 7 - Cargo Beach Road Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Path	way-Specific H	lazard	Chemical
	Concentration <sup>®</sup>	Dose	Dose	Dose	Refere	nce Dose (m	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Aluminum	12,000	3.4E-04	0.0E+00	1.1E-07	1.0E+00	1.0E+00	1.4E-03	3.4E-04	0.0E+00	7.5E-05	0.00042
Arsenic	15	4.3E-07	1.7E-07	1.3E-10	3.0E-04	3.0E-04	3.0E-04	1.4E-03	5.7E-04	4.4E-07	0.0020
Cadmium	3.4	9.7E-08	1.3E-09	3.0E-11	5.0E-04	5.0E-04	5.0E-04	1.9E-04	2.6E-06	6.0E-08	0.00020
Chromium	43	1.2E-06	0.0E+00	3.8E-10	1.5E+00	1.5E+00	1.5E+00	8.2E-07	0.0E+00	2.5E-10	0.0000008
Cobalt	19	5.4E-07	0.0E+00	1.7E-10	2.0E-02	2.0E-02	2.0E-02	2.7E-05	0.0E+00	8.3E-09	0.000027
Lead	196	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>
	662	1.9E-05	0.0E+00	5.8E-09	1.4E-01	1.4E-01	1.4E-05	1.3E-04	0.0E+00	4.2E-04	0.00055
Manganese	0.31	8.8E-09	0.0E+00	2.7E-12	3.0E-04	3.0E-04	3.0E-04	2.9E-05	0.0E+00	9.1E-09	0.000029
Mercury	50	1.4E-06	0.0E+00	4.4E-10	2.0E-02	2.0E-02	2.0E-02	7.1E-05	0.0E+00	2.2E-08	0.000071
Nickel		3.4E-08	0.0E+00	1.1E-11	7.0E-05	7.0E-05	7.0E-05	4.9E-04	0.0E+00	1.5E-07	0.00049
Thallium	1.2	3.4E-06	0.06+00	1.12-11	7.01-05	1.02-05	1.01-05				
VOLATILE ORGANIC COMPOUNDS							( 25 0)	2.05.09	0.0E+00	3.9E-12	0.0000000
1,1,1-Trichloroethane	0.28	8.0E-09	0.0E+00	2.5E-12	2.8E-01	2.8E-01	6.3E-01	2.9E-08		1.4E-11	0.0000000
Acetone	1.4	4.0E-08	0.0E+00	1.2E-11	9.0E-01	9.0E-01	9.0E-01	4.4E-08	0.0E+00		0.0000000
Bromoethane	0.18	5.1E-09	0.0E+00	1.6E-12	4.0E-01	4.0E-01	2.9E+00	1.3E-08	0.0E+00	5.5E-13	
m,p-Xylene	0.066	1.9E-09	0.0E+00	5.8E-13	2.0E-01	2.0E-01	2.9E-02	9.4E-09	0.0E+00	2.0E-11	0.00000000
Methylene chloride	0.13	3.7E-09	0.0E+00	1.1E-12	6.0E-02	6.0E-02	8.6E-01	6.2E-08	0.0E+00	1.3E-12	0.0000000
SEMIVOLATILE ORGANIC COMPOUNDS											
4-Methylphenol (p-Cresol)	3.9	1.1E-07	1.5E-07	3.4E-11	5.0E-03	5.0E-03	5.0E-03	2.2E-05	2.9E-05	6.8E-09	0.000052
POLYCHLORINATED BIPHENYLS											
PCB-1260 (Aroclor 1260)	1.6	4.6E-08	8.4E-08	1.4E-11	2.0E-05	2.0E-05	2.0E-05	2.3E-03	4.2E-03	7.0E-07	0.0065
										HI	0.010
PETROLEUM HYDROCARBONS											
	32,000	nad	nad	nad	nad	na <sup>d</sup>	na <sup>d</sup>	nad	nad	na <sup>d</sup>	nad
Diesel Range Organics		7.3E-04	Inc	2.2E-07	1.0E-01	na	2.9E-01	7.3E-03	Inc	7.8E-07	0.0073
Diesel Range Organics, Aliphatic	25,600	3.7E-04	Inc	1.1E-07	4.0E-02	na	5.7E-01	9.1E-03	Inc	2.0E-07	0.0091
Diesel Range Organics, Aromatic	12,800							na	na	na®	na®
Residual Range Organics	3,448	na	na®	na	na	na®	na®			Inc	0.000044
Residual Range Organics, Aliphatic	3,103	8.9E-05	Inc	2.7E-08	2.0E+00	na	na	4.4E-05	Inc		0.00098
Residual Range Organics, Aromatic	1,034	3.0E-05	Inc	9.1E-09	3.0E-02	na	na	9.8E-04	Inc	Inc	0.00098
										HI	0.017
tes:											
Based on the maximum or 95 percent upper confid	lence limit (95% U	CL) on the m	ean					HI	Hazard index		
			A Monapat					HQ	Hazard quoti	ent.	
concentration detected at the site.									Incomplete p		

<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.

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# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 7 - Cargo Beach Road Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathy	way-Specific H	lazard	Chemical-
Constituent	Concentration <sup>®</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose	Refer Oral	ence Dose (r Dermal	ng/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ
<ul> <li>Risks associated with indicator compounds are in estimates for each site. However, the health haz will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were calc by segregating total DRO concentrations into a hydrocarbons and 40% aromatic hydrocarbons (* Exposure dose and noncancer hazards were calc by segregating total RRO concentrations into a hydrocarbons and 30% aromatic hydrocarbons of the hydrocarbons of the hydrocarbons are and the hydrocarbons and 30% aromatic hydrocarbons of the hydrocarbons of the hydrocarbons and 30% aromatic hydrocarbons of the hydrocarbons of the hydrocarbons and 30% aromatic hydrocarbons of the hydrocarbons of the hydrocarbons are hydrocarbons and 30% aromatic hydrocarbons of the hydrocarbons of the hydrocarbons are hydrocarbo</li></ul>	ands associated with culated for petroleum liphatic and aromatic (ADEC, 2000c). culated for petroleum liphatic and aromatic (ADEC, 2000c).	petroleum mi hydrocarbons fractions, ass hydrocarbons fractions, ass	xtures measured as uming 80% a measured as uming 90% a	liphatic RRO (method liphatic				mg/kg mg/kd-đ na	Milligrams p Milligrams p not available	er kilogram per	r day.
<ol> <li>Doses and noncancer hazards shown only for ne</li> <li>Absorbed doses were calculated for dermal con of a medium</li> <li>Noncancer hazards are unitless values which re effect. They are calculated using the following</li> </ol>	tact with the medium,	y of incurring	an adverse h	ealth	n or inhalat	ion					

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## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 7 - Cargo Beach Road Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca	ncer Risk	
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer S	lope Factor	$(mg/kg-d)^{-1}$			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS											
Cobalt	0.064	2.4E-04	1.3E-06	Inc	na	na	9.8E+00	na	na	Inc	0.0E+00
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.0021	8.0E-06	2.3E-06	2.4E-05	5.5E-02	5.5E-02	2.7E-02	4.4E-07	1.3E-07	6.5E-07	1.2E-06
DIOXINS/FURANS											
2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD) Toxicity Equivalents (TEQ)	0.00000000023	8.8E-14	9.7E-13	Inc	1.5E+05	1.5E+05	1.5E+05	1.3E-08	1.5E-07	Inc	1.6E-07
			<i>x</i> <sup>*</sup>							ILCR	1E-06
otes:										11:6-1	on siels
Based on the maximum or 95 percent upper con	fidence limit (95%)	UCL) on the	mean					ILCR		l lifetime cano	cer fisk.
concentration detected at the site.								Inc	Incomplete		
Doses and cancer risks shown only for carcinog								mg/L	Milligrams	•	non dau
Absorbed doses were calculated for dermal con calculated for ingestion or inhalation of a mediu		n, and intakes	s were					mg/kg-d VOC	Volatile or	per kilogram ganic compou	
) Cancer risks are unitless values which represent effect. They are calculated using the following	the probability of in	ncurring an a isk = Exposu	dverse health re Dose x Ca	ncer Slope F	actor.			na	Not availab	ole.	

# CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 7 - Cargo Beach Road Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

			Demmal	VOC Inhalation				Pathway	y-Specific Ca	ncer Risk	Chemical
	Surface Water Concentration <sup>®</sup>	Ingestion Dose	Dermal Dose	Dose		ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	VOC Inhalation	Specific Risk
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermai	Innalation	Ingestion			
INORGANICS Cobalt	0.064	9.5E-04	2.7E-04	Inc	na	na	9.8E+00	na	na	Inc	0.0E+00
VOLATILE ORGANIC COMPOUNDS Benzene	0.0021	3.1E-05	8.8E-06	9.4E-05	5.5E-02	5.5E-02	2.7E-02	1.7E-06	4.9E-07	2.5E-06	4.7E-06
DIOXINS/FURANS 2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD)	0.00000000023	3.4E-13	3.8E-12	Inc	1.5E+05	1.5E+05	1.5E+05	5.1E-08	5.7E-07	Inc	6.2E-07
Toxicity Equivalents (TEQ)										ILCR	5E-06
otes:								ILCR	Incremental	lifetime cance	r risk.
<sup>a</sup> Based on the maximum or 95 percent upper con	fidence limit (95% U	JCL) on the r	mean					Inc	Incomplete		
concentration detected at the site.								mg/L	Milligrams		
) Doses and cancer risks shown only for carcinog	enic chemicals with	available tox	icity values.					mg/kg-d		per kilogram p	
<ul> <li>Absorbed doses were calculated for dermal cont calculated for ingestion or inhalation of a mediu</li> </ul>	ım.							VOC na	Volatile org Not availab	anic compound	1.
<ul> <li>Cancer risks are unitless values which represent effect. They are calculated using the following</li> </ul>	formula: Cancer Ri	isk = Exposu	re Dose x Ca	ancer Slope F	actor.						

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# CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 7 - Cargo Beach Road Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca		Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose			(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	VOC Inhalation	Specific Risk
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Innalation	ingestion	Derman		
INORGANICS Cobalt	0.064	2.5E-05	5.2E-06	Inc	na	na	9.8E+00	na	na	Inc	0.0E+00
VOLATILE ORGANIC COMPOUNDS Benzene	0.0021	8.2E-07	1.7E-07	9.4E-05	5.5E-02	5.5E-02	2.7E-02	4.5E-08	9.4E-09	2.5E-06	2.6E-06
DIOXINS/FURANS 2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD) Toxicity Equivalents (TEQ)	0.00000000023	9.0E-15	7.3E-14	Inc	1.5E+05	1.5E+05	1.5E+05	1.3E-09	1.1E-08	Inc	1.2E-08
										ILCR	3E-06
Notes:								H CD	Incremente	l lifetime cance	er risk
* Based on the maximum or 95 percent upper con	nfidence limit (95%	UCL) on the	mean					ILCR			A HOR
concentration detected at the site.								Inc mg/L	Incomplete Milligrams		
1) Doses and cancer risks shown only for carcinog	genic chemicals with	available to:	kicity values.					mg/L mg/kg-d	•	per kilogram p	er day.
2) Absorbed doses were calculated for dermal con		m, and intake	s were					VOC	U	ganic compoun	
calculated for ingestion or inhalation of a medi	um.		decesso boolth					na	Not availab	-	
3) Cancer risks are unitless values which represen	t the probability of i	incurring an a	averse health	ncer Slope F	actor				5		
effect. They are calculated using the following	formula: Cancer F	dsk = Expose	ne Dose x Ca	incer stope r	actor.						

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 7 - Cargo Beach Road Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathw	ay-Specific I	Hazard	Chemica
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specifi
G	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(ing/L)	(IIIg/Kg-U)	(ing/ing d)	(							
INORGANICS				1	1.0E+00	1.0E+00	1.4E-03	2.2E-01	1.0E-02	Inc	0.23
Aluminum	26	2.2E-01	1.0E-02	Inc	7.0E+00	7.0E-04	1.4E-03	1.6E+00	7.4E-02	Inc	1.6
Barium	0.13	1.1E-03	5.2E-05	Inc	2.0E-04	2.0E-04	5.7E-06	2.7E-02	5.1E-04	Inc	0.02
Cobalt	0.064	5.4E-04	1.0E-05	Inc			na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>	nab
Lead, Dissolved	0.040	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>		3.6E-02	1.7E-03	Inc	0.03
Manganese	0.59	5.0E-03	2.4E-04	Inc	1.4E-01	1.4E-01	1.4E-05	3.6E-02 1.5E+00	1.4E-02	Inc	1.5
Nickel	3.5	3.0E-02	2.8E-04	Inc	2.0E-02	2.0E-02	2.0E-02	7.0E-02	3.3E-03	Inc	0.074
Zinc	2.5	2.1E-02	1.0E-03	Inc	3.0E-01	3.0E-01	3.0E-01	7.0E-02	3.56-05	me	or or o
VOLATILE ORGANIC COMPOUNDS	0.0021	1.8E-05	1.7E-05	1.5E-04	4.0E-03	4.0E-03	8.6E-03	4.4E-03	4.3E-03	1.7E-02	0.02
Benzene	0.0021	102 00			• 2 *					HI	3.5
PETROLEUM HYDROCARBONS <sup>c</sup>											d
	0.66	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad
Diesel Range Organics	0.53	4.5E-03	Inc	3.0E-03	1.0E-01	na	2.9E-01	4.5E-02	Inc	1.0E-02	0.05
Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic	0.26	2.2E-03	Inc	1.5E-03	4.0E-02	na	5.7E-01	5.6E-02	Inc	2.6E-03	0.05
	2.7	na	na°	na°	na®	na	na	na®	na®	na	na
Residual Range Organics	2.4	2.1E-02	Inc	1.4E-05	2.0E+00	na	na	1.0E-02	Inc	Inc	0.01
Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	0.8	6.8E-03	Inc	4.8E-06	3.0E-02	na	na	2.3E-01	Inc	Inc	0.23
Kondun Kunge er Banar, in									-	HI	0.35
tes:								ні	Hazard inde	x.	
Based on the maximum or 95 percent upper of	confidence limit (95	5% UCL) on 1	he mean					HQ	Hazard quot		
concentration detected at the site.								Inc	Incomplete		
Consistent with EPA policy, lead is not evalu Risks associated with indicator compounds a	ated in the cumulater included in cum	tive HI estimative risk ar	ate. ad hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the health	hazards associated	with petroleu	m mixtures					mg/kd-d	1.77.1	per kilogram	per day.
will be evaluated and reported separately.								na	not availabl		
Exposure dose and noncancer hazards were of		Laura budenne	-hans massi	rad as DRO (	method 810	0)		VOC	Volatile org	anic compour	nd.

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 7 - Cargo Beach Road Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation		Pathw	ay-Specific I	lazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)		Reference Dose (mg/kg-d) Oral Dermal Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 9 - Housing and Operations Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-S	pecific Car	ncer Risk	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer Slo	ope Factor (	(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS	17	6.7E-06	7.9E-07	4.9E-10	1.5E+00	1.5E+00	1.5E+01	1.0E-05	1.2E-06	7.3E-09	1.1E-05
Arsenic	17	1.6E-06	6.5E-09	1.2E-10	na	na	6.3E+00	na	na	7.6E-10	7.6E-10
Cadmium	4.1 38	1.5E-05	0.0E+00	1.1E-09	na	na	9.8E+00	na	na	1.1E-08	1.1E-08
Cobalt	38	1.5E-05	0.011+00	1.12-07							
VOLATILE ORGANIC COMPOUNDS						0.55.01	7 75 01	3.4E-12	0.0E+00	2.3E-16	3.4E-12
1,2-Dibromoethane	0.000010	4.0E-12	0.0E+00	2.9E-16	8.5E-01	8.5E-01	7.7E-01 6.8E-02	2.7E-12	0.0E+00		2.7E-12
1,3-Dichloropropane	0.000097	3.9E-11	0.0E+00	2.9E-15	6.8E-02	6.8E-02	6.8E-02	2.7E-12 2.5E-14	0.0E+00		2.5E-14
2,2-Dichloropropane	0.0000092	3.7E-13	0.0E+00	2.7E-17	6.8E-02	6.8E-02	0.86-02	2.56-14	0.01100	11012 10	
DIOXINS/FURANS											
2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD) Toxicity Equivalents (TEQ)	0.0000085	3.4E-12	4.0E-13	2.5E-16	1.5E+05	1.5E+05	1.5E+05	5.1E-07	6.1E-08	3.7E-11	5.7E-07
										ILCR	1E-05

Notes:	ILCR	Incremental lifetime cancer risk.
<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.	Inc	Incomplete pathway.
1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.	mg/kg	Milligrams per kilogram.
<ol> <li>Doses and cancer risks shown only for calcingging energy of the calcingging energy of the calcing of the calcing</li></ol>	mg/kg-d	Milligrams per kilogram per day.
Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.		

3) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

### TALLE -J6

## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 9 - Housing and Operations Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil Concentration <sup>2</sup>	Soil Ingestion Dose	Soil Dermal Dose (mg/kg-d)	Dust Inhalation Dose (mg/kg-d)	Cancer Slo Oral	ope Factor ( Dermal		Soil	y-Specific C Dermal	ancer Risk Dust Inhalation	Chemical- Specific Risk
Constituent	(mg/kg)	(mg/kg-d)	(ing/kg-u)	(ing/kg-u)	orai	2 ct man					
INORGANICS Arsenic Cadmium Cobalt	17 4.1 38	2.0E-05 4.9E-06 4.6E-05	2.4E-06 1.9E-08 0.0E+00	1.5E-09 3.6E-10 3.4E-09	1.5E+00 na na	1.5E+00 na na	1.5E+01 6.3E+00 9.8E+00	3.0E-05 na na	3.6E-06 na na	2.2E-08 2.3E-09 3.3E-08	3.4E-05 2.3E-09 3.3E-08
VOLATILE ORGANIC COMPOUNDS 1,2-Dibromoethane 1,3-Dichloropropane 2,2-Dichloropropane	0.000010 0.00010 0.0000092	1.2E-11 1.2E-10 1.1E-12	0.0E+00 0.0E+00 0.0E+00	8.8E-16 8.6E-15 8.1E-17	8.5E-01 6.8E-02 6.8E-02	8.5E-01 6.8E-02 6.8E-02	7.7E-01 6.8E-02 6.8E-02	1.0E-11 8.0E-12 7.5E-14	0.0E+00 0.0E+00 0.0E+00	6.8E-16 5.8E-16 5.5E-18	1.0E-11 8.0E-12 7.5E-14
DIOXINS/FURANS 2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD) Toxicity Equivalents (TEQ)	0.000085	1.0E-11	1.2E-12	7.5E-16	1.5E+05	1.5E+05	1.5E+05	1.5E-06	1.8E-07	1.1E-10	1.7E-06

		ILCR	4E-05
Notes: Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected in soil tundra and soil gravel at the site.	ILCR Inc	Incremental lifetime cancer risk. Incomplete pathway.	
<ol> <li>Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.</li> <li>Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.</li> </ol>	mg/kg mg/kg-d	Milligrams per kilogram. Milligrams per kilogram per day.	

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 9 - Housing and Operations Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	6-11	Soil Ingestion	Dose	Dust Inhalation Dose (mg/kg-d)				Pathway-	Specific Ca	ncer Risk	Chemical-	
	Soil Concentration <sup>a</sup> (mg/kg)	Dose			Cancer Slope Factor (mg/kg-d) <sup>1</sup>			Soil	Dermal	Dust Inhalation	Specific Risk	
		(mg/kg-d)			Oral	Dermal	Inhalation	Ingestion	Dermai	Innatation		
INORGANICS							1 55.01	2.4E-07	9.6E-08	7.5E-10	3.4E-07	
Arsenic	17	1.6E-07	6.4E-08	5.0E-11	1.5E+00	1.5E+00	1.5E+01		na	7.7E-11	7.7E-11	
Cadmium	4.1	4.0E-08	5.3E-10	1.2E-11	na	na	6.3E+00	na	na	1.1E-09	1.1E-09	
Cobalt	38	3.7E-07	0.0E+00	1.1E-10	na	na	9.8E+00	na				
VOLATILE ORGANIC COMPOUNDS							7 75 01	8.3E-14	0.0E+00	2.3E-17	8.3E-14	
.2-Dibromoethane	0.000010	9.8E-14	0.0E+00	3.0E-17	8.5E-01	8.5E-01	7.7E-01	6.5E-14	0.0E+00	2.0E-17	6.5E-14	
.3-Dichloropropane	0.000097	9.5E-13	0.0E+00	2.9E-16	6.8E-02	6.8E-02	6.8E-02	6.1E-16	0.0E+00	1.9E-19	6.1E-16	
2,2-Dichloropropane	0.0000092	9.0E-15	0.0E+00	2.8E-18	6.8E-02	6.8E-02	6.8E-02	0.1E-10	0.02+00	1.76 .7		
NOVINSTUBANS												
DIOXINS/FURANS 2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD) Toxicity Equivalents (TEQ)	0.000085	0085 8.3E-14	3.3E-14	2.6E-17	1.5E+05	1.5E+05	1.5E+05	1.2E-08	4.9E-09	3.8E-12	1.7E-08	
Toxicity Equivalence (1-24)										ILCR	4E-07	

Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.
 Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.
 Inc Incomplete pathway.
 Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.
 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation
 Milligrams per kilogram per day.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 9 - Housing and Operations Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Sail	Soil Dust Soil Ingestion Dermal Inhalatior						Pathway-Specific Hazard			Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Referen	ce Dose (m	e/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
Constitution											
INORGANICS					1 05 00	1.05.00	1 45 02	1.3E-11	0.0E+00	4.6E-13	0.00000000014
Aluminum	0.0000036	1.3E-11	0.0E+00	6.5E-16	1.0E+00	1.0E+00	1.4E-03	1.3E-11 1.2E-01	0.0E+00	6.1E-06	0.12
Antimony	14	4.9E-05	0.0E+00	2.4E-09	4.0E-04	4.0E-04	4.0E-04	2.0E-01	1.9E-02	1.0E-05	0.22
Arsenic	17	6.0E-05	5.7E-06	3.0E-09	3.0E-04	3.0E-04	3.0E-04	3.0E-01	9.4E-02	1.5E-06	0.030
Cadmium	4.1	1.5E-05	4.7E-08	7.4E-10	5.0E-04	5.0E-04	5.0E-04	7.1E-05	0.0E+00	3.5E-09	0.000071
Chromium	29	1.1E-04	0.0E+00	5.3E-09	1.5E+00	1.5E+00	1.5E+00	6.9E-03	0.0E+00	1.2E-03	0.0081
Cobalt	38	1.4E-04	0.0E+00	6.9E-09	2.0E-02	2.0E-02	5.7E-06	9.7E-03	0.0E+00	4.8E-07	0.010
Copper	98	3.6E-04	0.0E+00	1.8E-08	3.7E-02	3.7E-02	3.7E-02		na <sup>b</sup>	nab	na <sup>b</sup>
Lead	276	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab			0.038
Manganese	970	3.5E-03	0.0E+00	1.8E-07	1.4E-01	1.4E-01	1.4E-05	2.5E-02	0.0E+00	1.3E-02	
Mercury	0.21	7.7E-07	0.0E+00	3.8E-11	3.0E-04	3.0E-04	3.0E-04	2.6E-03	0.0E+00	1.3E-07	0.0026
Nickel	27	9.9E-05	0.0E+00	4.9E-09	2.0E-02	2.0E-02	2.0E-02	4.9E-03	0.0E+00	2.4E-07	0.0049
Selenium	1.0	3.6E-06	0.0E+00	1.8E-10	5.0E-03	5.0E-03	5.0E-03	7.3E-04	0.0E+00	3.6E-08	0.00073 0.015
Thallium	0.28	1.0E-06	0.0E+00	5.1E-11	7.0E-05	7.0E-05	7.0E-05	1.5E-02	0.0E+00	7.2E-07	
Zinc	459	1.7E-03	0.0E+00	8.3E-08	3.0E-01	3.0E-01	3.0E-01	5.6E-03	0.0E+00	2.8E-07	0.0056
Zinc											
VOLATILE ORGANIC COMPOUNDS							6 3 5 01	1 05 06	0.0E+00	4.1E-11	0.0000019
1,1,1-Trichloroethane	0.14	5.2E-07	0.0E+00	2.6E-11	2.8E-01	2.8E-01	6.3E-01	1.9E-06	0.0E+00	3.2E-11	0.00000064
1,2-Dibromoethane	0.000010	3.6E-11	0.0E+00	1.8E-15	5.7E-05	5.7E-05	5.7E-05	6.4E-07	0.0E+00	1.2E-08	0.00025
1,3-Dichlorobenzene	0.062	2.3E-07	0.0E+00	1.1E-11	9.0E-04	9.0E-04	9.0E-04	2.5E-04 3.2E-07	0.0E+00	1.6E-11	0.0000032
1,3-Dichloropropane	0.000097	3.5E-10	0.0E+00	1.8E-14	1.1E-03	1.1E-03	1.1E-03		0.0E+00	1.5E-13	0.000000030
2,2-Dichloropropane	0.0000092	3.3E-12	0.0E+00	1.7E-16	1.1E-03	1.1E-03	1.1E-03	3.0E-09		4.1E-14	0.0000000082
2-Chlorotoluene	0.0000045	1.6E-11	0.0E+00	8.1E-16	2.0E-02	2.0E-02	2.0E-02	8.2E-10	0.0E+00		0.000000002
2-Chloroethyl vinyl ether	0.0000026	9.5E-12	0.0E+00	4.7E-16	na	na	na	na	na o or oo	na 6.8E-14	0.00000000040
2-Hexanone	0.000087	3.2E-11	0.0E+00	1.6E-15	8.0E-02	8.0E-02	2.3E-02	4.0E-10	0.0E+00		0.0000000000
4-Bromophenyl phenyl ether	0.0000024	8.7E-12	0.0E+00	4.3E-16	na	na	na	na	na	na	0
4-Chlorophenyl phenyl ether	0.0000029	1.1E-11	0.0E+00	5.2E-16	na	na	na	na	na	na	0.00000000017
4-Isopropyltoluene	0.0000047	1.7E-11	0.0E+00	8.5E-16	1.0E-01	1.0E-01	1.0E-01	1.7E-10	0.0E+00	8.5E-15	0.000000017
Bromomethane	0.36	1.3E-06	0.0E+00	6.5E-11	1.4E-03	1.4E-03	1.4E-03	9.4E-04	0.0E+00	4.6E-08	0.00094
Toluene	1.1	4.0E-06	0.0E+00	2.0E-10	2.0E-01	2.0E-01	1.1E-01	2.0E-05	0.0E+00	1.8E-09	0.000020
Toluene											
SEMIVOLATILE ORGANIC COMPOUNDS								2 45 07	7.6E-08	1.2E-11	0.0000031
3-Nitroaniline	0.0000019	6.9E-12	2.2E-12	3.4E-16	2.9E-05	2.9E-05	2.9E-05	2.4E-07		2.2E-10	0.0000059
4-Chlorotoluene	0.025	8.9E-08	2.8E-08	4.4E-12	2.0E-02	2.0E-02	2.0E-02	4.5E-06	1.4E-06		0.0000049
4-Nitroaniline	0.000030	1.1E-10	3.4E-11	5.4E-15	2.9E-05	2.9E-05	2.9E-05	3.7E-06	1.2E-06	1.9E-10	0.0000049
4-Nitrophenol	0.00013	4.8E-10	1.5E-10	2.4E-14	5.0E-04	5.0E-04	5.7E-04	9.7E-07	3.1E-07	4.2E-11	
	0.0000037	1.3E-11	4.3E-12	6.7E-16	5.0E-04	5.0E-04	5.7E-04	2.7E-08	8.5E-09	1.2E-12	0.00000035
2-Methyl-4,6-dinitrophenol	0.0000007										

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 9 - Housing and Operations Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion Dose (mg/kg-d)	Dermal Dose (mg/kg-d)	Dust Inhalation Dose (mg/kg-d)				Pathw	ay-Specific	Hazard	Chemical
	Concentration <sup>*</sup>				Reference Dose (mg/kg-d)			Soil		Dust	Specific
Constituent	(mg/kg)				Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
										HI	0.46
PETROLEUM HYDROCARBONS <sup>e</sup>									4	đ	na <sup>d</sup>
Diesel Range Organics	462	na <sup>d</sup>	nad	na	nad	na <sup>d</sup>	naď	nad	na <sup>d</sup>	na <sup>d</sup> 2.3E-07	na 0.013
Diesel Range Organics, Aliphatic	370	1.3E-03	Inc	6.7E-08	1.0E-01	na	2.9E-01	1.3E-02	Inc	2.3E-07 5.9E-08	0.013
Diesel Range Organics, Aromatic	185	6.7E-04	Inc	3.3E-08	4.0E-02	na	5.7E-01	1.7E-02	Inc		na
Residual Range Organics	1,539	na	na	na°	na	na	na	na	na®	na <sup>e</sup>	na 0.0025
Residual Range Organics, Aliphatic	1,385	5.0E-03	Inc	2.5E-07	2.0E+00	na	na	2.5E-03	Inc	Inc	0.0025
Residual Range Organics, Aromatic	462	1.7E-03	Inc	8.3E-08	3.0E-02	na	na	5.6E-02	Inc	Inc	0.050
										н	0.089
es:											
Based on the maximum or 95 percent upper of	confidence limit (95% U	CL) on the me	an					HI	Hazard ind	ex.	
								HQ	Hazard quo	otient.	
concentration detected at the site.	and in the sumulative H	Lectimate						Inc	Incomplete	pathway.	
Consistent with EPA policy, lead is not evalu Risks associated with indicator compounds a	rated in the cumulative h	risk and haz	ard					mg/kd-d	Milligrams	per kilogram p	er day.
Risks associated with indicator compounds a	he menued in cumulative	etroleum mit	tures					na	not availab	le	
estimates for each site. However, the health	nazarus associated with p		luioo								
will be evaluated and reported separately.		udroserbone	measured as I	DRO (method 8	100)						
		iyurocarbons	measureu as i	Sito (include c	100)						
Exposure dose and noncancer hazards were	calculated for performing		000 ali	photic							
by segregating total DRO concentrations int	o aliphatic and aromatic	fractions, assu	iming 80% ali	phatic							
by segregating total DRO concentrations int hydrocarbons and 40% aromatic hydrocarbo	o aliphatic and aromatic ins (ADEC, 2000c).	fractions, assu	iming 80% ali	phatic							
by segregating total DRO concentrations int hydrocarbons and 40% aromatic hydrocarbo Exposure dose and noncancer hazards were of	o aliphatic and aromatic ns (ADEC, 2000c). calculated for petroleum l	fractions, assungtions, assungtions	iming 80% ali measured as l	phatic RRO (method )							
by segregating total DRO concentrations int hydrocarbons and 40% aromatic hydrocarbo Exposure dose and noncancer hazards were of	o aliphatic and aromatic ns (ADEC, 2000c). calculated for petroleum l	fractions, assungtions, assungtions	iming 80% ali measured as l	phatic RRO (method )							
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbo Exposure dose and noncancer hazards were by segregating total RRO concentrations into	o aliphatic and aromatic ns (ADEC, 2000c). calculated for petroleum l o aliphatic and aromatic	fractions, assungtions, assungtions	iming 80% ali measured as l	phatic RRO (method )							
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbon Exposure dose and noncancer hazards were of by segregating total RRO concentrations into hydrocarbons and 30% aromatic hydrocarbon Doses and noncancer hazards shown only for	o aliphatic and aromatic ns (ADEC, 2000c). calculated for petroleum l o aliphatic and aromatic ns (ADEC, 2000c). r noncarcinogenic chemic	fractions, assund hydrocarbons fractions, assunctions, assunctions	measured as l measured as l uming 90% ali lable toxicity	phatic RRO (method ) phatic values.							
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbon Exposure dose and noncancer hazards were of by segregating total RRO concentrations into hydrocarbons and 30% aromatic hydrocarbon Doses and noncancer hazards shown only for	o aliphatic and aromatic ns (ADEC, 2000c). calculated for petroleum l o aliphatic and aromatic ns (ADEC, 2000c). r noncarcinogenic chemic	fractions, assund hydrocarbons fractions, assunctions, assunctions	measured as l measured as l uming 90% ali lable toxicity	phatic RRO (method ) phatic values.							
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbo Exposure dose and noncancer hazards were of by segregating total RRO concentrations into hydrocarbons and 30% aromatic hydrocarbo Doses and noncancer hazards shown only fo Absorbed doses were calculated for dermal of a medium	o aliphatic and aromatic ns (ADEC, 2000c). calculated for petroleum l o aliphatic and aromatic ns (ADEC, 2000c). r noncarcinogenic chemic contact with the medium,	fractions, assu hydrocarbons fractions, assu cals with avai and intakes w	uming 80% ali measured as l uming 90% ali lable toxicity vere calculated	phatic RRO (method) phatic values. I for ingestion of							
by segregating total DRO concentrations int hydrocarbons and 40% aromatic hydrocarbo	o aliphatic and aromatic ns (ADEC, 2000c). calculated for petroleum l o aliphatic and aromatic ns (ADEC, 2000c). r noncarcinogenic chemic contact with the medium,	fractions, assund hydrocarbons fractions, assund cals with avait and intakes w of incurring	uming 80% ali measured as l uming 90% ali lable toxicity vere calculated an adverse he	phatic RRO (method) phatic values. for ingestion of alth							

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 9 - Housing and Operations Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust				Dathara	. Encoifie	Uazard	Chemical-
	Soil	Ingestion	Dermal	Inhalation				Pathway-Specific			Specific
	Concentration <sup>*</sup>	Dose	Dose	Dose			(mg/kg-d)	Soil	n 1	Dust	HO
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											0.00000000011
Aluminum	0.000036	3.9E-11	0.0E+00	2.0E-15		1.0E+00	1.4E-03	3.9E-11	0.0E+00	1.4E-12	0.00000000041
Antimony	14	1.5E-04	0.0E+00	7.3E-09		4.0E-04	4.0E-04	3.7E-01	0.0E+00	1.8E-05	0.37
Arsenic	17	1.8E-04	1.7E-05	9.0E-09		3.0E-04	3.0E-04	6.0E-01	5.7E-02	3.0E-05	0.66
Cadmium	4.1	4.5E-05	1.4E-07	2.2E-09		5.0E-04	5.0E-04	8.9E-02	2.8E-04	4.4E-06	0.089
Chromium	29	3.2E-04	0.0E+00	1.6E-08		1.5E+00	1.5E+00	2.1E-04	0.0E+00	1.1E-08	0.00021
Cobalt	38	4.1E-04	0.0E+00	2.1E-08		2.0E-02	5.7E-06	2.1E-02	0.0E+00	3.6E-03	0.024
Copper	98	1.1E-03	0.0E+00	5.3E-08	3.7E-02	3.7E-02	3.7E-02	2.9E-02	0.0E+00	1.4E-06	0.029
	276	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>						
Lead	970	1.1E-02	0.0E+00	5.3E-07	1.4E-01	1.4E-01	1.4E-05	7.6E-02	0.0E+00	3.8E-02	0.113
Manganese	0.21	2.3E-06	0.0E+00	1.1E-10	3.0E-04		3.0E-04	7.7E-03	0.0E+00	3.8E-07	0.0077
Mercury	27	3.0E-04	0.0E+00	1.5E-08	2.0E-02	2.0E-02	2.0E-02	1.5E-02	0.0E+00	7.3E-07	0.015
Nickel	1.0	1.1E-05	0.0E+00	5.4E-10		5.0E-03	5.0E-03	2.2E-03	0.0E+00	1.1E-07	0.0022
Selenium	0.28	3.1E-06	0.0E+00	1.5E-10	7.0E-05		7.0E-05	4.4E-02	0.0E+00	2.2E-06	0.044
Thallium	459	5.0E-03	0.0E+00	2.5E-07	3.0E-01	3.0E-01	3.0E-01	1.7E-02	0.0E+00	8.3E-07	0.017
Zinc	433	5.02-05	0.01100	2.2.2 07							
VOLATILE ORGANIC COMPOUNDS			0.05.00	7 76 11	2 95 01	2.8E-01	6.3E-01	5.6E-06	0.0E+00	1.2E-10	0.0000056
1,1,1-Trichloroethane	0.14	1.6E-06	0.0E+00	7.7E-11	2.8E-01		5.7E-05	1.9E-06	0.0E+00	9.5E-11	0.0000019
1,2-Dibromoethane	0.00001	1.1E-10	0.0E+00	5.4E-15	5.7E-05	9.0E-04	9.0E-04	8.3E-04	0.0E+00	4.1E-08	0.00083
1,3-Dichlorobenzene	0.068	7.4E-07	0.0E+00	3.7E-11			9.0E-04	9.6E-07	0.0E+00	4.8E-11	0.0000096
1,3-Dichloropropane	0.000097	1.1E-09	0.0E+00	5.3E-14	1.1E-03		1.1E-03	9.0E-07	0.0E+00	4.5E-13	0.0000000091
2,2-Dichloropropane	0.00000092	1.0E-11	0.0E+00	5.0E-16	1.1E-03		2.0E-02	2.5E-09	0.0E+00	1.2E-13	0.000000025
2-Chlorotoluene	0.0000045	4.9E-11	0.0E+00	2.4E-15	2.0E-02				na	na	0
2-Chloroethyl vinyl ether	0.0000026	2.8E-11	0.0E+00	1.4E-15	na	na	na	na	0.0E+00	2.0E-13	0.0000000012
2-Hexanone	0.0000087	9.5E-11	0.0E+00	4.7E-15	8.0E-02		2.3E-02	1.2E-09		na	0.0000000012
4-Bromophenyl phenyl ether	0.0000024	2.6E-11	0.0E+00	1.3E-15	na	na	na	na	na		0
4-Chlorophenyl phenyl ether	0.0000029	3.2E-11	0.0E+00	1.6E-15	na	na	па	na	na	na 2.5E-14	0.00000000051
4-Isopropyltoluene	0.0000047	5.1E-11	0.0E+00	2.5E-15	1.0E-01		1.0E-01	5.1E-10	0.0E+00	1.4E-07	0.0028
Bromomethane	0.36	3.9E-06	0.0E+00	2.0E-10	1.4E-03		1.4E-03	2.8E-03	0.0E+00		0.000060
Toluene	1.1	1.2E-05	0.0E+00	6.0E-10	2.0E-01	2.0E-01	1.1E-01	6.0E-05	0.0E+00	5.4E-09	0.000000
SEMIVOLATILE ORGANIC COMPOUNDS											
	0.0000019	2.1E-11	6.6E-12	1.0E-15	2.9E-05	2.9E-05	2.9E-05	7.2E-07	2.3E-07	3.6E-11	0.0000094
3-Nitroaniline	0.025	2.7E-07	8.5E-08	1.3E-11		2.0E-02	2.0E-02	1.3E-05	4.2E-06	6.6E-10	0.000018
4-Chlorotoluene	0.00030	3.2E-10	1.0E-10	1.6E-14	2.9E-05		2.9E-05	1.1E-05	3.5E-06	5.6E-10	0.000015
4-Nitroaniline	0.00013	1.5E-09	4.6E-10	7.2E-14		5.0E-04	5.7E-04	2.9E-06	9.2E-07	1.3E-10	0.000038
4-Nitrophenol	0.00013	1.5E-09	4.015-10	1.20-14	51012 01						
## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 9 - Housing and Operations Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	ay-Specific	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)		nce Dose ( Dermal	mg/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ
2-Methyl-4,6-dinitrophenol	0.0000037	4.0E-11	1.3E-11	2.0E-15	5.0E-04	5.0E-04	5.7E-04	8.1E-08	2.6E-08	3.5E-12	0.0000001
										HI	1.4
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	462	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	nad	nad
Diesel Range Organics, Aliphatic	370	4.0E-03	Inc	2.0E-07	1.0E-01	na	2.9E-01	4.0E-02	Inc	6.9E-07 1.8E-07	0.040 0.050
Diesel Range Organics, Aromatic	185	2.0E-03	Inc	1.0E-07	4.0E-02	na	5.7E-01	5.0E-02	Inc	na <sup>e</sup>	na°
Residual Range Organics	1,539	na	na	na	na <sup>e</sup>	na <sup>e</sup>	na <sup>e</sup>	na <sup>e</sup>	na	na Inc	0.0076
Residual Range Organics, Aliphatic	1,385	1.5E-02	Inc	7.5E-07	2.0E+00	na	na	7.6E-03 1.7E-01	Inc Inc	Inc	0.17
Residual Range Organics, Aromatic	462	5.0E-03	Inc	2.5E-07	3.0E-02	na	na	1.76-01	me	me	
										HI	0.27
tes:											
Based on the maximum or 95 percent upper co	onfidence limit (95% UCI	L) on the mea	in					HI	Hazard in		
concentration detected at the site.								HQ	Hazard qu		
Consistent with EPA policy, lead is not evaluated	ated in the cumulative HI	estimate.						Inc		te pathway.	
Risks associated with indicator compounds are	e included in cumulative	risk and haza	rd					mg/kg	-	is per kilogram	
estimates for each site. However, the health h	azards associated with pe	troleum mixt	ures					mg/kd-d		ns per kilogram	per day.
will be evaluated and reported separately.								na	not availa	ble	
Exposure dose and noncancer hazards were ca	alculated for petroleum hy	drocarbons n	neasured as D	RO (method	8100)						
by segregating total DRO concentrations into	aliphatic and aromatic fr	actions, assur	ning 80% alip	ohatic							
hydrocarbons and 40% aromatic hydrocarbons											
Exposure dose and noncancer hazards were ca	alculated for petroleum hy	drocarbons n	neasured as R	RO (method	)						
by segregating total RRO concentrations into	aliphatic and aromatic fr	actions, assur	ning 90% alip	ohatic							
hydrocarbons and 30% aromatic hydrocarbon	s (ADEC, 2000c).										
Doses and noncancer hazards shown only for	noncarcinogenic chemica	als with availa	able toxicity v	alues.							
Absorbed doses were calculated for dermal co of a medium.	ontact with the medium, a	nd intakes we	ere calculated	for ingestion	or inhalation	on					
Noncancer bazards are unitless values which i	represent the probability of	of incurring a	n adverse hea	lth							
effect. They are calculated using the following											

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 9 - Housing and Operations Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	6-11	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific H	lazard	Chemical-
	Soil		Dose	Dose	Deferer	nce Dose (m	- (kg-d)	Soil		Dust	Specific
	Concentration <sup>a</sup>	Dose (mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(mg/kg)	(mg/kg-u)	(ing/kg-u)	(mg/kg-u)	0111				1.		
INORGANICS								1 05 12	0.0E+00	2.3E-14	0.00000000000013
Aluminum	0.0000036	1.0E-13	0.0E+00	3.2E-17	1.0E+00	1.0E+00	1.4E-03	1.0E-13 9.6E-04	0.0E+00	3.0E-07	0.0010
Antimony	14	3.9E-07	0.0E+00	1.2E-10	4.0E-04	4.0E-04	4.0E-04	9.6E-04	6.3E-04	4.9E-07	0.0022
Arsenic	17	4.7E-07	1.9E-07	1.5E-10	3.0E-04	3.0E-04	3.0E-04		3.1E-06	7.2E-08	0.00024
Cadmium	4.1	1.2E-07	1.5E-09	3.6E-11	5.0E-04	5.0E-04	5.0E-04	2.3E-04		1.7E-10	0.00000056
Chromium	29	8.4E-07	0.0E+00	2.6E-10	1.5E+00	1.5E+00	1.5E+00	5.6E-07	0.0E+00	5.9E-05	0.00011
Cobalt	38	1.1E-06	0.0E+00	3.3E-10	2.0E-02	2.0E-02	5.7E-06	5.4E-05	0.0E+00	2.3E-08	0.000076
Copper	98	2.8E-06	0.0E+00	8.6E-10	3.7E-02	3.7E-02	3.7E-02	7.6E-05	0.0E+00		na <sup>b</sup>
	276	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	nab	nab	na <sup>b</sup>	
Lead	970	2.8E-05	0.0E+00	8.5E-09	1.4E-01	1.4E-01	1.4E-05	2.0E-04	0.0E+00	6.1E-04	0.00081
Manganese	0.21	6.0E-09	0.0E+00	1.9E-12	3.0E-04	3.0E-04	3.0E-04	2.0E-05	0.0E+00	6.2E-09	0.000020
Mercury	27	7.7E-07	0.0E+00	2.4E-10	2.0E-02	2.0E-02	2.0E-02	3.9E-05	0.0E+00	1.2E-08	0.000039
Nickel	1.0	2.9E-08	0.0E+00	8.8E-12	5.0E-03	5.0E-03	5.0E-03	5.7E-06	0.0E+00	1.8E-09	0.0000057
Selenium	0.28	8.0E-09	0.0E+00	2.5E-12	7.0E-05	7.0E-05	7.0E-05	1.1E-04	0.0E+00	3.5E-08	0.00011
Thallium		1.3E-05	0.0E+00	4.0E-09	3.0E-01	3.0E-01	3.0E-01	4.4E-05	0.0E+00	1.3E-08	0.000044
Zinc	459	1.3E-03	0.06+00	4.01-07	5.015 01	51015 01					
VOLATILE ORGANIC COMPOUNDS							( 25 01	1.5E-08	0.0E+00	2.0E-12	0.00000015
1.1.1-Trichloroethane	0.14	4.1E-09	0.0E+00	1.3E-12	2.8E-01	2.8E-01	6.3E-01	5.0E-09	0.0E+00	1.5E-12	0.0000000050
1.2-Dibromoethane	0.000010	2.9E-13	0.0E+00	8.8E-17	5.7E-05	5.7E-05	5.7E-05		0.0E+00	6.6E-10	0.0000022
1,3-Dichlorobenzene	0.068	1.9E-09	0.0E+00	6.0E-13	9.0E-04	9.0E-04	9.0E-04	2.2E-06	0.0E+00	7.7E-13	0.000000025
1,3-Dichloropropane	0.000097	2.8E-12	0.0E+00	8.5E-16	1.1E-03	1.1E-03	1.1E-03	2.5E-09	0.0E+00	7.3E-15	0.00000000024
2.2-Dichloropropane	0.0000092	2.6E-14	0.0E+00	8.0E-18	1.1E-03	1.1E-03	1.1E-03	2.4E-11		2.0E-15	0.0000000000064
2-Chlorotoluene	0.0000045	1.3E-13	0.0E+00	4.0E-17	2.0E-02	2.0E-02	2.0E-02	6.4E-12	0.0E+00		0.000000000000
2-Chloroethyl vinyl ether	0.0000026	7.4E-14	0.0E+00	2.3E-17	na	na	na	na	na	na 3.3E-15	0.0000000000031
2-Hexanone	0.0000087	2.5E-13	0.0E+00	7.6E-17	8.0E-02	8.0E-02	2.3E-02	3.1E-12	0.0E+00		0.0000000000000000000000000000000000000
4-Bromophenyl phenyl ether	0.0000024	6.8E-14	0.0E+00	2.1E-17	na	na	na	na	na	na	0.0
	0.0000029	8.3E-14	0.0E+00	2.5E-17	na	na	na	na	na	na	0.0000000000013
4-Chlorophenyl phenyl ether	0.0000047	1.3E-13	0.0E+00	4.1E-17	1.0E-01	1.0E-01	1.0E-01	1.3E-12	0.0E+00	4.1E-16	
4-Isopropyltoluene	0.36	1.0E-08	0.0E+00	3.2E-12	1.4E-03	1.4E-03	1.4E-03	7.3E-06	0.0E+00	2.3E-09	0.0000073
Bromomethane	1.1	3.1E-08	0.0E+00	9.7E-12	2.0E-01	2.0E-01	1.1E-01	1.6E-07	0.0E+00	8.8E-11	0.0000016
Toluene	1.1	5.112-00	0.01100								
SEMIVOLATILE ORGANIC COMPOUNDS					2.05.05	2.9E-05	2.9E-05	1.9E-09	2.5E-09	5.8E-13	0.000000043
3-Nitroaniline	0.0000019	5.4E-14	7.2E-14	1.7E-17	2.9E-05		2.9E-03 2.0E-02	3.5E-08	4.6E-08	1.1E-11	0.00000081
4-Chlorotoluene	0.025	7.0E-10	9.2E-10	2.2E-13	2.0E-02	2.0E-02		2.9E-08	3.9E-08	9.0E-12	0.00000068
4-Nitroaniline	0.000030	8.5E-13	1.1E-12	2.6E-16	2.9E-05	2.9E-05	2.9E-05	-	1.0E-08	2.0E-12	0.00000018
4-Nitrophenol	0.00013	3.8E-12	5.0E-12	1.2E-15	5.0E-04	5.0E-04	5.7E-04	7.6E-09		5.7E-12	0.00000000049
2-Methyl-4,6-dinitrophenol	0.0000037	1.1E-13	1.4E-13	3.2E-17	5.0E-04	5.0E-04	5.7E-04	2.1E-10	2.8E-10	J./E-14	0.000000000

0.0046

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## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 9 - Housing and Operations Landfill - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Inhalation				Pathy	way-Specific I		Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
PETROLEUM HYDROCARBONS <sup>e</sup>		4	4	d	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	462	na <sup>d</sup>	nad	nad		na	2.9E-01	1.1E-04	Inc	1.1E-08	0.00011
Diesel Range Organics, Aliphatic	370	1.1E-05	Inc	3.2E-09	1.0E-01 4.0E-02	na	5.7E-01	1.3E-04	Inc	2.8E-09	0.00013
Diesel Range Organics, Aromatic	185	5.3E-06	Inc	1.6E-09		1000	na	na°	na	na"	na
Residual Range Organics	1,539	na	na	na	na	na		2.0E-05	Inc	Inc	0.000020
Residual Range Organics, Aliphatic	1,385	4.0E-05	Inc	1.2E-08	2.0E+00	na	na	4.4E-04	Inc	Inc	0.00044
Residual Range Organics, Aromatic	462	1.3E-05	Inc	4.1E-09	3.0E-02	na	na	4.46-04	ine		
0 0										Ш	0.00070
es: Based on the maximum or 95 percent upper concentration detected at the site. Consistent with EPA policy, lead is not eval	uated in the cumulative H	II estimate.						HI HQ Inc	Hazard inde Hazard quot Incomplete Milligrams 1	ient. pathway.	
Based on the maximum or 95 percent upper concentration detected at the site. Consistent with EPA policy, lead is not eval Risks associated with indicator compounds estimates for each site. However, the health will be evaluated and reported separately. Exposure dose and noncancer hazards were	uated in the cumulative F are included in cumulativ hazards associated with calculated for petroleum	I estimate. re risk and haz petroleum mi hydrocarbons	eard xtures s measured as	DRO (metho	d 8100)			HQ	Hazard quot Incomplete Milligrams	ient. pathway. per kilogram. per kilogram per d	ay.
Based on the maximum or 95 percent upper concentration detected at the site. Consistent with EPA policy, lead is not eval Risks associated with indicator compounds estimates for each site. However, the health will be evaluated and reported separately. Exposure dose and noncancer hazards were	uated in the cumulative F are included in cumulativ hazards associated with calculated for petroleum	I estimate. re risk and haz petroleum mi hydrocarbons	eard xtures s measured as	DRO (metho lliphatic	d 8100)			HQ Inc mg/kg mg/kd-d	Hazard quot Incomplete Milligrams Milligrams	ient. pathway. per kilogram. per kilogram per d	ay.
Based on the maximum or 95 percent upper concentration detected at the site. Consistent with EPA policy, lead is not eval Risks associated with indicator compounds a estimates for each site. However, the health will be evaluated and reported separately. Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocarbo	uated in the cumulative F are included in cumulativ hazards associated with calculated for petroleum to aliphatic and aromatic ons (ADEC, 2000c).	HI estimate. re risk and haz petroleum mi hydrocarbons fractions, ass	ard xtures measured as unning 80% a	liphatic				HQ Inc mg/kg mg/kd-d	Hazard quot Incomplete Milligrams Milligrams	ient. pathway. per kilogram. per kilogram per d	ay.
Based on the maximum or 95 percent upper concentration detected at the site. Consistent with EPA policy, lead is not eval Risks associated with indicator compounds a estimates for each site. However, the health will be evaluated and reported separately. Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocarbo	uated in the cumulative F are included in cumulativ hazards associated with calculated for petroleum to aliphatic and aromatic ons (ADEC, 2000c).	HI estimate. re risk and haz petroleum mi hydrocarbons fractions, ass	ard xtures measured as unning 80% a	liphatic				HQ Inc mg/kg mg/kd-d	Hazard quot Incomplete Milligrams Milligrams	ient. pathway. per kilogram. per kilogram per d	ay.
Based on the maximum or 95 percent upper concentration detected at the site. Consistent with EPA policy, lead is not eval Risks associated with indicator compounds estimates for each site. However, the health will be evaluated and reported separately. Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocarbo Exposure dose and noncancer hazards were by segregating total RRO concentrations in	uated in the cumulative F are included in cumulativ hazards associated with calculated for petroleum to aliphatic and aromatic ons (ADEC, 2000c). calculated for petroleum to aliphatic and aromatic	H estimate. re risk and haz petroleum mi hydrocarbons fractions, ass hydrocarbons	card xtures measured as uming 80% a measured as	RRO (metho				HQ Inc mg/kg mg/kd-d	Hazard quot Incomplete Milligrams Milligrams	ient. pathway. per kilogram. per kilogram per d	ay.
Based on the maximum or 95 percent upper concentration detected at the site. Consistent with EPA policy, lead is not eval Risks associated with indicator compounds a estimates for each site. However, the health will be evaluated and reported separately. Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocarbo Exposure dose and noncancer hazards were by segregating total RRO concentrations in hydrocarbons and 30% aromatic hydrocarbo	uated in the cumulative F are included in cumulative hazards associated with calculated for petroleum to aliphatic and aromatic ons (ADEC, 2000c). calculated for petroleum to aliphatic and aromatic ons (ADEC, 2000c).	II estimate. e risk and haz petroleum mi hydrocarbons fractions, ass hydrocarbons fractions, ass	eard xtures measured as uming 80% a measured as uming 90% a	aliphatic RRO (metho aliphatic				HQ Inc mg/kg mg/kd-d	Hazard quot Incomplete Milligrams Milligrams	ient. pathway. per kilogram. per kilogram per d	ay.
Based on the maximum or 95 percent upper concentration detected at the site. Consistent with EPA policy, lead is not eval Risks associated with indicator compounds estimates for each site. However, the health will be evaluated and reported separately. Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocarbo Exposure dose and noncancer hazards were by segregating total RRO concentrations in	uated in the cumulative H are included in cumulative hazards associated with calculated for petroleum to aliphatic and aromatic ons (ADEC, 2000c). calculated for petroleum to aliphatic and aromatic ons (ADEC, 2000c).	II estimate. re risk and haz petroleum mi hydrocarbons fractions, ass hydrocarbons fractions, ass	and tures measured as uming 80% a measured as uming 90% a ilable toxicity	aliphatic RRO (metho aliphatic y values.	d )	on		HQ Inc mg/kg mg/kd-d	Hazard quot Incomplete Milligrams Milligrams	ient. pathway. per kilogram. per kilogram per d	ay.

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## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

-		Groundwater	Ingestion	Dermal	VOC Inhalation			1	Pathway	Specific Ca	ncer Risk VOC	Chemical- Specific
	Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	lope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	Inhalation	Risk
-	INORGANICS Cobalt	0.037	1.4E-04	7.7E-07	Inc	na	па	9.8E+00	na	na	Inc	0.0E+00
	VOLATILE ORGANIC COMPOUNDS Benzene	0.00075	2.9E-06	8.1E-07	8.6E-05	5.5E-02	5.5E-02	2.7E-02	1.6E-07	4.4E-08	2.3E-06	2.5E-06
	DIOXINS/FURANS 2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD) Toxicity Equivalents (TEQ)	0.000000054	2.1E-11	3.9E-10	Inc	1.5E+05	1.5E+05	1.5E+05	3.1E-06	5.9E-05	Inc	6.2E-05
1	Notes: Based on the maximum or 95 percent upper con	fidence limit (95%	UCL) on the	e mean				1	ILCR		ILCR	6E-05
	<ul> <li>concentration detected at the site.</li> <li>1) Doses and cancer risks shown only for carcinog</li> <li>2) Absorbed doses were calculated for dermal con calculated for ingestion or inhalation of a medi</li> <li>3) Cancer risks are unitless values which represent effect. They are calculated using the following</li> </ul>	tact with the mediu um. the probability of	im, and intak	adverse heal	th	Factor.			Inc mg/L mg/kg-d VOC na	0	per liter. per kilogram ganic compou	

## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	V.OC Inhalation				Pathwa	y-Specific Ca		Chemical-
	Concentration <sup>*</sup>	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer S Oral	lope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	VOC Inhalation	Specific Risk
Constituent INORGANICS Cobalt	(mg/L)	5.5E-04	3.0E-06	Inc	na	na	9.8E+00	na	na	Inc	0.0E+00
VOLATILE ORGANIC COMPOUNDS Benzene	0.00075	1.1E-05	3.1E-06	3.3E-05	5.5E-02	5.5E-02	2.7E-02	6.1E-07	1.7E-07	9.0E-07	1.7E-06
DIOXINS/FURANS 2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD) Toxicity Equivalents (TEQ)	0.000000054	8.0E-11	1.5E-09	Inc	1.5E+05	1.5E+05	1.5E+05	1.2E-05	2.3E-04	Inc	2.4E-04
										ILCR	2E-04
Notes: Based on the maximum or 95 percent upper cont concentration detected at the site.								ILCR Inc mg/L	Incomplete Milligrams	per liter.	
<ol> <li>Doses and cancer risks shown only for carcinoge</li> <li>Absorbed doses were calculated for dermal contraction calculated for ingestion or inhalation of a mediu</li> <li>Cancer risks are unitless values which represent effect. They are calculated using the following for the foll</li></ol>	act with the mediur m. the probability of it	n, and intakes ncurring an a	s were dverse health	1	Factor.			mg/kg-đ VOC na	Milligrams	per kilogram pe anic compound	

## TAB 3

## CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water Ingestio		Ingestion Dermal In	VOC Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer S Oral	lope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	VOC Inhalation	Specific Risk
INORGANICS Cobalt	0.037	1.4E-05	5.8E-08	Inc	na	na	9.8E+00	na	na	Inc	0.0E+00
VOLATILE ORGANIC COMPOUNDS Benzene	0.00075	2.9E-07	6.0E-08	8.8E-07	5.5E-02	5.5E-02	2.7E-02	1.6E-08	3.3E-09	3.2E-05	3.2E-05
DIOXINS/FURANS 2,3,7,8-Tetrachlorodibenzo-p-dioxins (TCDD) Toxicity Equivalents (TEQ)	0.000000054	2.1E-12	2.9E-11	Inc	1.5E+05	1.5E+05	1.5E+05	3.2E-07	4.4E-06	Inc	4.7E-06
										ILCR	4E-05
<ul> <li>Notes:</li> <li>Based on the maximum or 95 percent upper con concentration detected at the site.</li> <li>1) Doses and cancer risks shown only for carcinog</li> <li>2) Absorbed doses were calculated for dermal cont calculated for ingestion or inhalation of a media</li> </ul>	enic chemicals wit	h available to:	xicity values.					ILCR Inc mg/L mg/kg-d VOC	Incomplete Milligrams Milligrams Volatile or	per liter. per kilogram ganic compour	ber day.
<ol> <li>Cancer risks are unitless values which represent effect. They are calculated using the following</li> </ol>	the probability of	incurring an a Risk = Exposu	dverse health are Dose x Can	cer Slope Facto	or.			na	Not availab	ole.	

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		•	Dermal	VOC Inhalation				Pathw	ay-Specific H	lazard	Chemica
	Surface Water	Ingestion	Dermal Dose	Dose	Referen	nce Dose (	mg/kg-d)			VOC	Specific
Generality	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(ing is)	(			3						
INORGANICS					1.05.00	1.05+00	1.4E-03	1.4E+00	6.5E-02	Inc	1.5
Aluminum	164	1.4E+00	6.5E-02	Inc	1.0E+00	1.0E+00 4.0E-04	4.0E-04	2.5E+00	1.2E-01	Inc	2.7
Antimony	0.12	1.0E-03	4.8E-05	Inc	4.0E-04	4.0E-04 7.0E-02	4.0E-04	1.4E-01	6.6E-03	Inc	0.15
Barium	1.2	9.8E-03	4.6E-04	Inc	7.0E-02		5.7E-06	1.6E-02	3.0E-04	Inc	0.016
Cobalt	0.037	3.1E-04	5.9E-06	Inc	2.0E-02	2.0E-02			nab	na <sup>b</sup>	nab
Lead, Dissolved	0.30	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab		Inc	0.14
Manganese	2.2	1.9E-02	8.9E-04	Inc	1.4E-01	1.4E-01	1.4E-05	1.4E-01	6.4E-03		0.039
Nickel	0.091	7.7E-04	7.3E-06	Inc	2.0E-02	2.0E-02	2.0E-02	3.8E-02	3.6E-04	Inc	0.039
Vanadium	0.15	1.3E-03	5.9E-05	Inc	7.0E-03	7.0E-03	7.0E-03	1.8E-01	8.5E-03	Inc	0.19
vanadium	0110										
VOLATILE ORGANIC COMPOUNDS					4.017.02	4.0E-03	8.6E-03	1.6E-03	1.5E-03	6.1E-03	0.0092
Benzene	0.00075	6.3E-06	6.2E-06	5.3E-05	4.0E-03	4.0E-03	0.0E-05	1.01-05	1.02 00		
			к.							HI	4.6
				\$.)							
PETROLEUM HYDROCARBONS	1	d	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad
Diesel Range Organics	7.7	na <sup>d</sup>			1.0E-01	na	2.9E-01	5.2E-01	Inc	1.2E-01	0.64
Diesel Range Organics, Aliphatic	6.2	5.2E-02	Inc	3.5E-02	4.0E-01	na	5.7E-01	6.5E-01	Inc	3.0E-02	0.68
Diesel Range Organics, Aromatic	3.1	2.6E-02	Inc	1.7E-02			na	na <sup>e</sup>	na <sup>e</sup>	na°	na
Gasoline Range Organics	4.2	na°	na®	na°	na	na°		5.0E-03	Inc	3.3E-06	0.005
Gasoline Range Organics, Aliphatic	2.9	2.5E-02	Inc	1.7E-05	5.0E+00	na	5.3E+00		Inc	1.1E-04	0.089
Gasoline Range Organics, Aromatic	2.1	1.8E-02	Inc	1.2E-05	2.0E-01	na	1.1E-01	8.9E-02	Inc	1.112-04	0.000
			-							HI	1.4
otes:									Hazard inde		
Based on the maximum or 95 percent upper co	nfidence limit (95%	UCL) on the	mean		e			HI			
								HQ	Hazard quot	ient.	
concentration detected at the site.		- III estimate						Inc	Incomplete	pathway.	
Consistent with EPA policy, lead is not evaluated	ted in the cumulativ	e m estimate	hazard					mg/L	Milligrams	per liter.	
Risks associated with indicator compounds are	e included in cumula	ith petroleum	mixtures					mg/kd-d		ber kilogram p	er day.
estimates for each site. However, the health h will be evaluated and reported separately.	azarus associateu w	ui peu oleum						na	not available		

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

#### TABLE ----4

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Surface Water Ingestion Dermai Innatation <u>Pathway-Operate Mathway-Operate Mat</u>					VOC						
Concentration <sup>a</sup> Dose Dose Dose Reference Dose (mg/kg-d) VOC Specific		Surface Water	Ingestion	Dermal	Inhalation			Pathwa	ay-Specific H	lazard	Chemical-
HO			0	Dose	Dose	Reference Dose (mg/	(kg-d)			VOC	Specific
	Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inl	halation 1	Ingestion	Dermal	Inhalation	HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

-

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathw	ay-Specific H	lazard	Chemica
	Concentration <sup>a</sup>	Dose	Dose	Dose	Referen	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS		5 45.00	2.5E-01	Inc	1.0E+00	1.0E+00	1.4E-03	5.4E+00	2.5E-01	Inc	5.6
Aluminum	164	5.4E+00	1.9E-04	Inc	4.0E-04	4.0E-04	4.0E-04	9.9E+00	4.7E-01	Inc	10
Antimony	0.12	3.9E-03	1.9E-04 1.8E-03	Inc	7.0E-04	7.0E-02	1.4E-04	5.4E-01	2.6E-02	Inc	0.57
Barium	1.2	3.8E-02 1.2E-03	2.3E-05	Inc	2.0E-02	2.0E-02	5.7E-06	6.1E-02	1.1E-03	Inc	0.062
Cobalt	0.037		na <sup>b</sup>	na <sup>b</sup>	nab	nab	na <sup>b</sup>				
Lead, Dissolved	0.30	nab			na 1.4E-01	1.4E-01	1.4E-05	5.3E-01	2.5E-02	Inc	0.55
Manganese	2.2	7.4E-02	3.5E-03	Inc Inc	2.0E-02	2.0E-02	2.0E-02	1.5E-01	1.4E-03	Inc	0.15
Nickel	0.091	3.0E-03	2.8E-05		7.0E-02	7.0E-02	7.0E-02	7.0E-01	3.3E-02	Inc	0.73
Vanadium	0.15	4.9E-03	2.3E-04	Inc	7.0E-03	7.02-05	7.02 05	102 01			
VOLATILE ORGANIC COMPOUNDS							0 (5 02	6.1E-03	6.0E-03	3.9E-03	0.016
Benzene	0.00075	2.5E-05	2.4E-05	3.3E-05	4.0E-03	4.0E-03	8.6E-03	0.1E-05	0.0E-03	5.72-05	0.010
										HI	18
PETROLEUM HYDROCARBONS				25					đ	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	7.7	na <sup>d</sup>	nad	nad	nad	na <sup>d</sup>	na	na <sup>d</sup>	na <sup>d</sup>		na 2.5
Diesel Range Organics, Aliphatic	6.2	2.0E-01	Inc	1.4E-01	1.0E-01	na	2.9E-01	2.0E+00	Inc	4.7E-01	2.5
Diesel Range Organics, Aromatic	3.1	1.0E-01	Inc	6.8E-02	4.0E-02	na	5.7E-01	2.5E+00	Inc	1.2E-01	
Gasoline Range Organics	4.2	na°	na	na	na®	na	na°	na°	na	na°	na°
Gasoline Range Organics, Aliphatic	2.9	9.7E-02	Inc	6.7E-05	5.0E+00	na	5.3E+00	1.9E-02	Inc	1.3E-05	0.019
Gasoline Range Organics, Ariphatic	2.1	6.9E-02	Inc	4.8E-05	2.0E-01	na	1.1E-01	3.5E-01	Inc	4.4E-04	0.35
										HI	5.5
otes:											
Based on the maximum or 95 percent upper	confidence limit (9	5% UCL) on	the mean					HI	Hazard inde		
concentration detected at the site.								HQ	Hazard quot		
Consistent with EPA policy, lead is not eval	usted in the cumula	tive HI estim	ate.					Inc	Incomplete p	oathway.	
Risks associated with indicator compounds a	are included in cum	ulative risk a	nd hazard					mg/L	Milligrams p		ar dau
estimates for each site. However, the health	hazards associated	with petroleu	im mixtures					mg/kd-d		er kilogram p	ber day.
will be evaluated and reported separately.								na	not available		
Exposure dose and noncancer hazards were		1		and an DRO (	nothed \$10	0)		VOC	Volatile org	anic compoun	d.

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

#### TAB 15

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation		Pathway-Specific	Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)		VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion Dermal	Inhalation	HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathw	ay-Specific	Hazard	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	Referen	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(119.2)										
INORGANICS					1.05.00	1.0E+00	1.4E-03	1.9E-01	1.9E-03	Inc	0.19
Aluminum	164	1.9E-01	1.9E-03	Inc	1.0E+00	4.0E-04	4.0E-03	3.4E-01	3.4E-03	Inc	0.35
Antimony	0.12	1.4E-04	1.4E-06	Inc	4.0E-04	4.0E-04 7.0E-02	4.0E-04	1.9E-02	1.9E-04	Inc	0.019
Barium	1.2	1.3E-03	1.3E-05	Inc	7.0E-02		5.7E-04	2.1E-02	8.4E-06	Inc	0.0021
Cobalt	0.037	4.2E-05	1.7E-07	Inc	2.0E-02	2.0E-02			na <sup>b</sup>	na <sup>b</sup>	nab
Lead, Dissolved	0.30	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>		Inc	0.018
Manganese	2.2	2.6E-03	2.6E-05	Inc	1.4E-01	1.4E-01	1.4E-05	1.8E-02	1.8E-04	Inc	0.005200
Nickel	0.091	1.0E-04	2.1E-07	Inc	2.0E-02	2.0E-02	2.0E-02	5.2E-03	1.0E-05	Inc	0.005200
Vanadium	0.15	1.7E-04	1.7E-06	Inc	7.0E-03	7.0E-03	7.0E-03	2.4E-02	2.4E-04	Inc	0.025
Vanadidin											
VOLATILE ORGANIC COMPOUNDS					10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -			0.15.04	4.4E-05	3.0E-07	0.00026
Benzene	0.00075	8.5E-07	1.8E-07	2.6E-09	4.0E-03	4.0E-03	8.6E-03	2.1E-04	4.4E-05	5.02-07	0.00010
Delizene										HI	0.60
											0.00
PETROLEUM HYDROCARBONS <sup>c</sup>										4	na <sup>d</sup>
	7.7	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	nad	nad	na <sup>d</sup>	
Diesel Range Organics	6.2	7.0E-03	Inc	1.7E-06	1.0E-01	na	2.9E-01	7.0E-02	Inc	5.8E-06	0.07
Diesel Range Organics, Aliphatic	3.1	3.5E-03	Inc	8.4E-07	4.0E-02	na	5.7E-01	8.8E-02	Inc	1.5E-06	0.088
Diesel Range Organics, Aromatic			na°	na°	na	na®	na	na	na®	na	na
Gasoline Range Organics	4.2	na		8.4E-10	2.0E+00	na	na	1.7E-03	Inc	na	0.0017
Gasoline Range Organics, Aliphatic	2.9	3.4E-03	Inc	6.0E-10	3.0E-02	na	na	8.0E-02	Inc	na	0.080
Gasoline Range Organics, Aromatic	2.1	2.4E-03	Inc	0.0E-10	J.0L-02						
										HI	0.24
Notes:							14 				
<sup>a</sup> Based on the maximum or 95 percent upper	confidence limit (95	5% UCL) on	the mean					HI	Hazard inde		
concentration detected at the site.	contractice man (*							HQ	Hazard quo Incomplete		
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	uated in the cumula	tive HI estimation	ate.					Inc	•	-	
<ul> <li>Risks associated with indicator compounds a</li> </ul>	are included in cum	ulative risk ar	nd hazard					mg/L	Milligrams	-	
estimates for each site. However, the health	hazards associated	with netroleu	m mixtures					mg/kd-d	Milligrams	per kilogram	per day.
	nazarus associateu	and periode						na	not availab	le	
will be evaluated and reported separately.						0)				ganic compour	nd
<sup>d</sup> Exposure dose and noncancer hazards were	calculated for petro	leum hydroca	rbons measur	ed as DRO (n	nethod 810	0)		VOC	volatile or	same compou	

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation		Pathway-	Specific Ha	zard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Ingestion	Dermal ]	VOC Inhalation	Specific HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	Inhalation				Pathw	ay-Specific I		Chemic
	Concentration <sup>a</sup>	Dose	Dose	Dose	Referen	nce Dose (				VOC	Specifi
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS	164	5.4E+00	2.5E-01	Inc	1.0E+00	1.0E+00	1.4E-03	5.4E+00	2.5E-01	Inc	5.6
Aluminum	0.12	3.9E-03	1.9E-04	Inc	4.0E-04	4.0E-04	4.0E-04	9.9E+00	4.7E-01	Inc	10
Antimony		3.9E-03	1.8E-03	Inc	7.0E-02	7.0E-02	1.4E-04	5.4E-01	2.6E-02	Inc	0.57
Barium	1.2	1.2E-02	2.3E-05	Inc	2.0E-02	2.0E-02	5.7E-06	6.1E-02	1.1E-03	Inc	0.06
Cobalt	0.037			na <sup>b</sup>	nab	na <sup>b</sup>	nab				
Lead, Dissolved	0.30	na <sup>b</sup>	nab		na 1.4E-01	1.4E-01	1.4E-05	5.3E-01	2.5E-02	Inc	0.5
Manganese	2.2	7.4E-02	3.5E-03	Inc		2.0E-02	2.0E-02	1.5E-01	1.4E-03	Inc	0.15
Nickel	0.091	3.0E-03	2.8E-05	Inc	2.0E-02		7.0E-03	7.0E-01	3.3E-02	Inc	0.73
Vanadium	0.15	4.9E-03	2.3E-04	Inc	7.0E-03	7.0E-03	7.0E-03	7.02-01	5.52 02		
VOLATILE ORGANIC COMPOUNDS							0.65.02	6.1E-03	6.0E-03	3.9E-03	0.01
Benzene	0.00075	2.5E-05	2.4E-05	3.3E-05	4.0E-03	4.0E-03	8.6E-03	0.1E-03	0.02-05	5.72 00	
										HI	18
PETROLEUM HYDROCARBONS									đ	na <sup>d</sup>	na
	7.7	nad	nad	nad	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>		
Diesel Range Organics	6.2	2.0E-01	Inc	1.4E-01	1.0E-01	na	2.9E-01	2.0E+00	Inc	4.7E-01	2.5
Diesel Range Organics, Aliphatic	3.1	1.0E-01	Inc	6.8E-02	4.0E-02	na	5.7E-01	2.5E+00	Inc	1.2E-01	2.0
Diesel Range Organics, Aromatic			na°	na	na°	na	na®	na	na	na	na
Gasoline Range Organics	4.2	na®		6.7E-05	5.0E+00	na	5.3E+00	1.9E-02	Inc	1.3E-05	0.0
Gasoline Range Organics, Aliphatic	2.9	9.7E-02	Inc		2.0E-01	na	1.1E-01	3.5E-01	Inc	4.4E-04	0.3
Gasoline Range Organics, Aromatic	2.1	6.9E-02	Inc	4.8E-05	2.06-01	па	1.1.2 01				
										HI	5.5
es:								н	Hazard inde	x.	
Based on the maximum or 95 percent upper	confidence limit (9	5% UCL) on	the mean						Hazard quo	tient	
concentration detected at the site.								HQ			
Consistent with EPA policy, lead is not eval	lusted in the cumule	ative HI estim	nate.					Inc	Incomplete		
Consistent with EPA policy, lead is not eval Risks associated with indicator compounds	are included in cum	ulative risk a	nd hazard					mg/L	Milligrams	per liter.	
Risks associated with indicator compounds	are menueu m cun	und to hok t	m mixtures					mg/kd-d	Milligrams	per kilogram	ber day.
estimates for each site. However, the health	hazards associated	with petrole	uni mixtures						not availabl		
will be evaluated and reported separately.								na VOC	Volatile org		
Exposure dose and noncancer hazards were											

#### TAB 15

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation		Pathw	ay-Specific I	lazard	Chemical-
1997 - 19	Concentration <sup>a</sup>	Dose	Dose		Reference Dose (mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)		Ingestion	Dermal	Inhalation	HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

• Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method) by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathw	ay-Specific	Hazard	Chemica
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specifie
	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(ing/L)	(mg/kg-u)	(mg/kg d)	(119.19.1)							
INORGANICS								1 05 01	1.9E-03	Inc	0.19
Aluminum	164	1.9E-01	1.9E-03	Inc	1.0E+00	1.0E+00	1.4E-03	1.9E-01	3.4E-03	Inc	0.35
Antimony	0.12	1.4E-04	1.4E-06	Inc	4.0E-04	4.0E-04	4.0E-04	3.4E-01	1.9E-04	Inc	0.019
Barium	1.2	1.3E-03	1.3E-05	Inc	7.0E-02	7.0E-02	1.4E-04	1.9E-02		Inc	0.002
Cobalt	0.037	4.2E-05	1.7E-07	Inc	2.0E-02	2.0E-02	5.7E-06	2.1E-03	8.4E-06		nab
Lead, Dissolved	0.30	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	
	2.2	2.6E-03	2.6E-05	Inc	1.4E-01	1.4E-01	1.4E-05	1.8E-02	1.8E-04	Inc	0.018
Manganese	0.091	1.0E-04	2.1E-07	Inc	2.0E-02	2.0E-02	2.0E-02	5.2E-03	1.0E-05	Inc	0.00520
Nickel	0.15	1.7E-04	1.7E-06	Inc	7.0E-03	7.0E-03	7.0E-03	2.4E-02	2.4E-04	Inc	0.025
Vanadium	0.15	1.72 01									
VOLATILE ORGANIC COMPOUNDS							0 (5 02	2.1E-04	4.4E-05	3.0E-07	0.0002
Benzene	0.00075	8.5E-07	1.8E-07	2.6E-09	4.0E-03	4.0E-03	8.6E-03	2.1E-04	4.42-05	5.00-07	0.000
										HI	0.60
PETROLEUM HYDROCARBONS <sup>e</sup>								- 5a	4	na <sup>d</sup>	na <sup>d</sup>
	7.7	na <sup>d</sup>	nad	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>		
Diesel Range Organics	6.2	7.0E-03	Inc	1.7E-06	1.0E-01	na	2.9E-01	7.0E-02	Inc	5.8E-06	0.07
Diesel Range Organics, Aliphatic	3.1	3.5E-03	Inc	8.4E-07	4.0E-02	na	5.7E-01	8.8E-02	Inc	1.5E-06	0.088
Diesel Range Organics, Aromatic		na	na°	na®	na	na	na	na	na	na	na®
Gasoline Range Organics	4.2	3.4E-03	Inc	8.4E-10	2.0E+00	na	na	1.7E-03	Inc	na	0.001
Gasoline Range Organics, Aliphatic	2.9	-		6.0E-10	3.0E-02	na	na	8.0E-02	Inc	na	0.080
Gasoline Range Organics, Aromatic	2.1	2.4E-03	Inc	0.02-10	5.02-02						
										HI	0.24
tes: Based on the maximum or 95 percent upper	confidence limit (05	% UCL) on t	he mean					HI	Hazard inde	ex.	
	confidence milit (95	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						HQ	Hazard quo	tient.	
concentration detected at the site.								Inc	Incomplete	pathway.	
Consistent with EPA policy, lead is not evaluated	uated in the cumulat	ive HI estima	ate.						-		
Risks associated with indicator compounds a	are included in cum	lative risk an	d hazard					mg/L	Milligrams	-	
estimates for each site. However, the health	hazards associated	with petroleu	m mixtures					mg/kd-d	Milligrams	per kilogram	per day.

estimates for each site. However, the health hazards associated with petroleum mixtures

will be evaluated and reported separately.

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

not available

Volatile organic compound.

na

VOC

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 9 - Housing and Operations Landfill - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation		Pathway-Specifi	c Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Ingestion Derma	VOC Inhalation	Specific HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 10 - Buried Drum Field - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific		Chemical-
	Concentration"	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS Thallium	0.34	1.2E-06	0.0E+00	6.1E-11	6.6E-05	6.6E-05	6.6E-05	1.9E-02	0.0E+00	9.3E-07 HI	0.019 0.019
PETROLEUM HYDROCARBONS <sup>e</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic	26,500 21,200 10,600	na <sup>d</sup> 7.7E-02 3.9E-02	na <sup>d</sup> Inc Inc	na <sup>d</sup> 3.8E-06 1.9E-06	na <sup>d</sup> 1.0E-01 4.0E-02	na <sup>d</sup> na na	na <sup>d</sup> 2.9E-01 5.7E-01	na <sup>d</sup> 7.7E-01 9.6E-01	na <sup>d</sup> Inc Inc	na <sup>d</sup> 1.3E-05 3.4E-06 HI	na <sup>d</sup> 0.77 0.96 <b>1.7</b>
<ul> <li>Notes:</li> <li>Based on the maximum or 95 percent upper configeon concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evaluated</li> <li>Risks associated with indicator compounds are interestimates for each site. However, the health hazar will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were calculated by segregating total DRO concentrations into align hydrocarbons and 40% aromatic hydrocarbons (A</li> </ul>	in the cumulative H cluded in cumulative rds associated with p lated for petroleum obtaic and aromatic DEC, 2000c).	Il estimate. e risk and haz petroleum min hydrocarbons fractions, assu	ard ktures measured as uming 80% al	iphatic	8100)	•		HI HQ Inc mg/kg mg/kd-d na	0.00	otient. pathway. per kilogram per kilogram	
<ol> <li>Doses and noncancer nazards shown only for non</li> <li>Absorbed doses were calculated for dermal contat of a medium.</li> <li>Noncancer hazards are unitless values which repr effect. They are calculated using the following for</li> </ol>	ct with the medium, esent the probability	of incurring	an adverse he	alth	or inhalation						

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### NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 10 - Buried Drum Field - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific	Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose			(mg/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Thallium	0.34	3.7E-06	0.0E+00	1.8E-10	7.0E-05	7.0E-05	7.0E-05	5.3E-02	0.0E+00	2.6E-06	0.053
										НІ	0.053
PETROLEUM HYDROCARBONS <sup>e</sup>											0.055
Diesel Range Organics	26,500	na <sup>d</sup>	na <sup>đ</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	21,200	2.3E-01	Inc	1.1E-05	1.0E-01	na	2.9E-01	2.3E+00	Inc	4.0E-05	2.3
Diesel Range Organics, Aromatic	10,600	1.2E-01	Inc	5.7E-06	4.0E-02	na	5.7E-01	2.9E+00	Inc	1.0E-05	2.9
										HI	5.2
otes:											
<sup>a</sup> Based on the maximum or 95 percent upper co	onfidence limit (95% UC	L) on the mea	an					HI	Hazard inc	lex.	
concentration detected at the site.								HQ	Hazard qu	otient.	
<sup>b</sup> Consistent with EPA policy, lead is not evaluated	ted in the cumulative HI	estimate.						Inc	Incomplete	e pathway.	
e Risks associated with indicator compounds are	included in cumulative	risk and haza	rd					mg/kg	Milligram	s per kilogram	<b>.</b> .
estimates for each site. However, the health ha	azards associated with pe	troleum mixt	ures					mg/kd-d	Milligrams	s per kilogram	per day.
will be evaluated and reported separately.								na	not availab	ole	
<sup>d</sup> Exposure dose and noncancer hazards were ca	lculated for petroleum hy	drocarbons n	neasured as I	ORO (method	8100)						
by segregating total DRO concentrations into	aliphatic and aromatic fr	actions, assur	ning 80% ali	phatic							
hydrocarbons and 40% aromatic hydrocarbons	(ADEC, 2000c).										
) Doses and noncancer hazards shown only for n ) Absorbed doses were calculated for dermal co	U U				or inhalat	ion					

of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 10 - Buried Drum Field - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					way-Specific		Chemica
	Concentration"	Dose	Dose	Dose	Referer	nce Dose (r		Soil		Dust	Specifi
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS									0.07.00	4.3E-08	0.00014
Thallium	0.34	9.7E-09	0.0E+00	3.0E-12	7.0E-05	7.0E-05	7.0E-05	1.4E-04	0.0E+00	4.3E-08	0.0001
										m	0.0001
PETROLEUM HYDROCARBONS <sup>e</sup>									d	d	nad
Diesel Range Organics	26,500	nad	na <sup>d</sup>	na <sup>d</sup>	nad	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup> 6.4E-07	na 0.006
Diesel Range Organics, Aliphatic	21,200	6.1E-04	Inc	1.9E-07	1.0E-01	na	2.9E-01	6.1E-03 7.6E-03	Inc Inc	6.4E-07 1.6E-07	0.007
Diesel Range Organics, Aromatic	10,600	3.0E-04	Inc	9.3E-08	4.0E-02	na	5.7E-01	7.0E-03	inc	1.012-07	0.007
										HI	0.014
les:								н	Hazard inde	x.	
Based on the maximum or 95 percent upper co concentration detected at the site. Consistent with EPA policy, lead is not evalua Risks associated with indicator compounds are estimates for each site. However, the health ha will be evaluated and reported separately.	ated in the cumulative l e included in cumulativ azards associated with	H estimate. ve risk and ha petroleum m	zard ixtures					HI HQ Inc mg/kg mg/kd-d na		ient. pathway. per kilogram. per kilogram pe	r day.
Based on the maximum or 95 percent upper co concentration detected at the site. Consistent with EPA policy, lead is not evalua Risks associated with indicator compounds are estimates for each site. However, the health ha will be evaluated and reported separately. Exposure dose and noncancer hazards were ca by segregating total DRO concentrations into	ated in the cumulative l e included in cumulative azards associated with alculated for petroleum aliphatic and aromatic	I estimate. ve risk and ha petroleum m hydrocarbon	zard ixtures s measured a	s DRO (metho aliphatic	od 8100)			HQ Inc mg/kg mg/kd-d	Hazard quot Incomplete Milligrams Milligrams	ient. pathway. per kilogram. per kilogram pe	r day.
Based on the maximum or 95 percent upper co concentration detected at the site. Consistent with EPA policy, lead is not evalua Risks associated with indicator compounds are estimates for each site. However, the health ha will be evaluated and reported separately. Exposure dose and noncancer hazards were ca	ated in the cumulative l e included in cumulative azards associated with alculated for petroleum aliphatic and aromatic s (ADEC, 2000c).	II estimate. ve risk and ha petroleum m hydrocarbon fractions, as	zard ixtures s measured a suming 80%	aliphatic	od 8100)			HQ Inc mg/kg mg/kd-d	Hazard quot Incomplete Milligrams Milligrams	ient. pathway. per kilogram. per kilogram pe	r day.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 11- Fuel Storage Tank Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

TABI

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-	Specific Car	cer Risk	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer Sl	ope Factor	(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
VOLATILE ORGANIC COMPOUNDS Ethylbenzene	0.85	3.4E-07	0.0E+00	2.5E-11	3.9E-03	3.9E-03	3.9E-03	1.3E-09	0.0E+00	9.8E-14 ILCR	1.3E-09 1E-09
Notes: Based on the maximum or 95 percent upper confi Doses and cancer risks shown only for carcinoger Based on the maximum or 95 percent upper confi Doses and cancer risks shown only for carcinoger Absorbed doses were calculated for dermal conta of a medium	nic chemicals with a dence limit (95% U nic chemicals with a	vailable toxic CL) on the m vailable toxic	eity values. ean concentra city values.	ation detected	at the site.	on		ILCR Inc mg/kg mg/kg-d	Incomplet Milligram	al lifetime can e pathway. s per kilogram s per kilogram	L.

Cancer risks are unitless values which represent the probability of incurring an adverse health

## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 11 - Fuel Storage Tank Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathwa	y-Specific C	ancer Risk	Chemical-
Constituent	Concentration <sup>®</sup> (mg/kg)	Dose (mg/kg-d)	Dose	Dose (mg/kg-d)	Cancer Slo Oral		(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
VOLATILE ORGANIC COMPOUNDS Ethylbenzene	0.85	1.0E-06	0.0E+00	7.5E-11	3.9E-03	3.9E-03	3.9E-03	4.0E-09	0.0E+00	2.9E-13	4.0E-09
			27 2							ILCR	4E-09
otes: Based on the maximum or 95 percent upper confidence lin	nit (95% UCL) on the	mean concentr	ation detected	d in soil tundr	a			ILCR		l lifetime cancer	risk.
								Inc	Incomplete		
<ul> <li>and soil gravel at the site.</li> <li>Doses and cancer risks shown only for carcinogenic chem.</li> <li>Absorbed doses were calculated for dermal contact with the of a medium.</li> </ul>	icals with available tox he medium, and intakes	ticity values. s were calculate	ed for ingesti	on or inhalati	on			mg/kg mg/kg-d	Milligrams Milligrams	per kilogram. per kilogram pe	r day.

### TABL

## CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 11 - Fuel Storage Tank Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Soil Concentration <sup>a</sup> (mg/kg)	Soil Ingestion Dose (mg/kg-d)	Soil Dermal Dose (mg/kg-d)	Dust Inhalation Dose (mg/kg-d)	Cancer S Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil	-Specific Ca Dermal	ancer Risk Dust Inhalation	Chemical- Specific Risk
VOLATILE ORGANIC COMPOUN Ethylbenzene		8.3E-09	0.0E+00	2.6E-12	3.9E-03	3.9E-03	3.9E-03	3.3E-11	0.0E+00	1.0E-14	3.3E-11 3E-11
<ul> <li>Based on the maximum or 95 percent u</li> <li>Doses and cancer risks shown only for</li> <li>Absorbed doses were calculated for detof a medium</li> <li>Cancer risks are unitless values which</li> </ul>	carcinogenic chemicals with a rmal contact with the medium,	vailable toxic and intakes v	ity values. vere calculate			ion		ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	al lifetime cance pathway. per kilogram. per kilogram p	

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT

## SITE 11 - Fuel Storage Tank Area - SOIL

# NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

-

	6-11	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	ay-Specific I	Hazard	Chemical-
	Soil Concentration <sup>*</sup>	Dose	Dose	Dose	Referen	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal		Ingestion	Dermal	Inhalation	HQ
Constituent	(iiig/kg)	(116/118 0/									
VOLATILE ORGANIC COMPOUNDS Ethylbenzene	0.85	3.1E-06	0.0E+00	1.5E-10	1.0E-01	1.0E-01	2.9E-01	3.1E-05	0.0E+00	5.3E-10	0.000031
Emylocazene										HI	0.000031
PETROLEUM HYDROCARBONS <sup>e</sup>		4	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	69,100	nad	Inc	na 1.0E-05	1.0E-01	na	2.9E-01	2.0E+00	Inc	3.4E-05	2.0
Diesel Range Organics, Aliphatic	55,280	2.0E-01 1.0E-01	Inc	5.0E-06	4.0E-02	na	5.7E-01	2.5E+00	Inc	8.8E-06	2.5
Diesel Range Organics, Aromatic	27,640	na <sup>e</sup>	na	na	na	na®	na	na	na°	na	na
Gasoline Range Organics	192	na 4.9E-04	Inc	2.4E-08	2.0E+00	na	na	2.4E-04	Inc	Inc	0.00024 0.012
Gasoline Range Organics, Aliphatic	134 96	4.9E-04 3.5E-04	Inc	1.7E-08	3.0E-02	na	na	1.2E-02	Inc	Inc	0.012
Gasoline Range Organics, Aromatic	90	5.52 04								HI	4.5
<ul> <li>Notes:</li> <li>Based on the maximum or 95 percent upper confidence concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evaluated</li> <li>Risks associated with indicator compounds are indestimates for each site. However, the health hazar will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were calcul by segregating total DRO concentrations into aligh hydrocarbons and 40% aromatic hydrocarbons (A</li> <li>Exposure dose and noncancer hazards were calcul by segregating total RRO concentrations into aligh hydrocarbons and 30% aromatic hydrocarbons (A</li> <li>Doses and noncancer hazards shown only for non 2) Absorbed doses were calculated for dermal contations.</li> <li>Noncancer hazards are unitless values which represent the set of the se</li></ul>	in the cumulative F cluded in cumulative rds associated with lated for petroleum phatic and aromatic DEC, 2000c). lated for petroleum phatic and aromatic DEC, 2000c). acarcinogenic chemic twith the medium	II estimate. e risk and haz petroleum mi hydrocarbons fractions, ass hydrocarbons fractions, ass icals with ava , and intakes y of incurring	eard xtures s measured as uming 80% a s measured as suming 90% a illable toxicity were calculate g an adverse h	RRO (method liphatic / values. ed for ingestion wealth	)			HI HQ Inc mg/kg mg/kd-d na		otient. e pathway. s per kilogram. s per kilogram	

### 

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 11 - Fuel Storage Tank - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					y-Specific		Chemical
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral		(mg/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ
Construction											
VOLATILE ORGANIC COMPOUNDS											
Ethylbenzene	0.85	9.3E-06	0.0E+00	4.6E-10	1.0E-01	1.0E-01	2.9E-01	9.3E-05	0.0E+00	1.6E-09	0.000093
										HI	0.000093
PETROLEUM HYDROCARBONS <sup>e</sup>											
Diesel Range Organics	69,100	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	nad	nad	nad	nad	nad	nad
Diesel Range Organics, Aliphatic	55,280	6.0E-01	Inc	3.0E-05	1.0E-01	na	2.9E-01	6.0E+00	Inc	1.0E-04	6.0
Diesel Range Organics, Aromatic	27,640	3.0E-01	Inc	1.5E-05	4.0E-02	na	5.7E-01	7.5E+00	Inc	2.6E-05	7.5
Gasoline Range Organics	192	na®	na®	na°	na®	na	na	na	na	na°	na®
Gasoline Range Organics, Aliphatic	134	1.5E-03	Inc	7.3E-08	2.0E+00	na	na	7.3E-04	Inc	Inc	0.00073
Gasoline Range Organics, Aromatic	96	1.0E-03	Inc	5.2E-08	3.0E-02	na	na	3.5E-02	Inc	Inc	0.035
										HI	14
tes:											
Based on the maximum or 95 percent upper con	nfidence limit (95% UC	CL) on the me	an					HI	Hazard in		
concentration detected at the site.								HQ	Hazard qu		
Consistent with EPA policy, lead is not evaluat	ed in the cumulative H	estimate.						Inc	Incomplet	e pathway.	
Risks associated with indicator compounds are	included in cumulative	risk and haza	ard					mg/kg	Milligram	s per kilogran	<b>1</b> .
estimates for each site. However, the health ha								mg/kd-d	Milligram	s per kilogran	n per day.
								na	not availa	ble	
will be evaluated and reported separately.			monourod as l	DRO (method	18100)						
will be evaluated and reported separately.	culated for petroleum h	ydrocarbons	measured as i	Ditto (intenior							
Exposure dose and noncancer hazards were cal	culated for petroleum h	ydrocarbons ractions, assu	ming 80% ali	iphatic							
Exposure dose and noncancer hazards were cal by segregating total DRO concentrations into a	aliphatic and aromatic f	ydrocarbons ractions, assu	ming 80% ali	iphatic							
Exposure dose and noncancer hazards were cal by segregating total DRO concentrations into a hydrocarbons and 40% aromatic hydrocarbons	aliphatic and aromatic f (ADEC, 2000c).	ractions, assu	ming 80% al	iphatic							
Exposure dose and noncancer hazards were cal by segregating total DRO concentrations into a hydrocarbons and 40% aromatic hydrocarbons Exposure dose and noncancer hazards were cal	aliphatic and aromatic f (ADEC, 2000c). Iculated for petroleum h	ractions, assu ydrocarbons	ming 80% ali	iphatic RRO (methoo							
Exposure dose and noncancer hazards were cal by segregating total DRO concentrations into a hydrocarbons and 40% aromatic hydrocarbons Exposure dose and noncancer hazards were cal by segregating total RRO concentrations into a	aliphatic and aromatic f (ADEC, 2000c). Iculated for petroleum h aliphatic and aromatic f	ractions, assu ydrocarbons	ming 80% ali	iphatic RRO (methoo							
Exposure dose and noncancer hazards were cal by segregating total DRO concentrations into a hydrocarbons and 40% aromatic hydrocarbons Exposure dose and noncancer hazards were cal by segregating total RRO concentrations into a hydrocarbons and 30% aromatic hydrocarbons	aliphatic and aromatic f (ADEC, 2000c). Iculated for petroleum h aliphatic and aromatic f (ADEC, 2000c).	ractions, assu ydrocarbons ractions, assu	ming 80% ali measured as l ming 90% ali	iphatic RRO (methoo phatic							
Exposure dose and noncancer hazards were cal by segregating total DRO concentrations into a hydrocarbons and 40% aromatic hydrocarbons Exposure dose and noncancer hazards were cal	aliphatic and aromatic f (ADEC, 2000c). Iculated for petroleum h aliphatic and aromatic f (ADEC, 2000c).	ractions, assund ydrocarbons ractions, assund als with avail	ming 80% ali measured as l ming 90% ali able toxicity	iphatic RRO (methoo iphatic values.	1)						

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 11 - Fuel Storage Tank - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust		Pathwa	- Specific I	Jazard	Chemical-
	Soil	Ingestion	Dermal	Inhalation		Pathwa	y-specific 1		
	Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)	Soil		Dust	Specific
	00000	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(mg/kg)	(Ing/kg-u)	(116,16,17)	(					

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 11 - Fuel Storage Tank Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Groundwater Concentration <sup>a</sup> (mg/L)	Ingestion Dose (mg/kg-d)	Dermal Dose (mg/kg-d)	VOC Inhalation Dose (mg/kg-d)	Cancer S Oral	lope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation		-Specific Ca Dermal	ncer Risk VOC Inhalation	Chemical- Specific Risk
VOLATILE ORGANIC COMPOUNDS Benzene Methylene chloride	0.010 0.011	3.8E-05 4.2E-05	1.1E-05 2.6E-06	1.1E-04 5.0E-05	5.5E-02 7.5E-03	5.5E-02 7.5E-03	2.7E-02 1.6E-03	2.1E-06 3.2E-07	6.0E-07 1.9E-08	3.1E-06 8.1E-08 ILCR	5.8E-06 4.2E-07 6E-06
Notes: * Based on the maximum or 95 percent upper concentration detected at the site. 1) Doses and cancer risks shown only for carcinol of the standard for dermel of the standard for the standard for dermel of the standard for the standard fo	ogenic chemicals with	h available to	oxicity values	i.	e - 26	а.		ILCR Inc mg/L mg/kg-d	Incomplete Milligrams		

Volatile organic compound.

VOC

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 11 - Fuel Storage Tank Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Surface Water Concentration <sup>a</sup> (mg/L)	Ingestion Dose (mg/kg-d)	Dermal Dose (mg/kg-d)	VOC Inhalation Dose (mg/kg-d)		ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation		y-Specific Car Dermal	ncer Risk VOC Inhalation	Chemical- Specific Risk
VOLATILE ORGANIC COMPOUNDS Benzene Methylene chloride	0.010 0.011	1.5E-04 1.6E-04	4.2E-05 1.0E-05	4.5E-04 2.0E-04	5.5E-02 7.5E-03	5.5E-02 7.5E-03	2.7E-02 1.6E-03	8.2E-06 1.2E-06	2.3E-06 7.5E-08	1.2E-05 3.1E-07 ILCR	2.3E-05 1.6E-06 2E-05
Notes: Based on the maximum or 95 percent upper of	onfidence limit (95%	6 UCL) on th	e mean	1 1 1				ILCR Inc	Incremental Incomplete p	lifetime cancer pathway.	risk.

Milligrams per liter.

Milligrams per kilogram per day.

Volatile organic compound.

mg/L

VOC

mg/kg-d

concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

#### TAB

## CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 11 - Fuel Storage Tank Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

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Constituent	Surface Water Concentration <sup>a</sup> (mg/L)	Ingestion Dose (mg/kg-d)	Dermal Dose (mg/kg-d)	VOC Inhalation Dose (mg/kg-d)	Cancer Sl Oral	lope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation		-Specific Ca Dermal	VOC Inhalation	Chemical- Specific Risk
Constituent VOLATILE ORGANIC COMPOUNDS Benzene Methylene chloride	0.010 0.011	3.9E-06 4.3E-06	8.1E-07 1.9E-07	1.2E-05 5.2E-06	5.5E-02 7.5E-03	5.5E-02 7.5E-03	2.7E-02 1.6E-03	2.2E-07 3.2E-08	4.5E-08 1.4E-09	3.2E-07 8.3E-09 ILCR	5.8E-07 4.2E-08 6E-07
<ul> <li>Based on the maximum or 95 percent upper of concentration detected at the site.</li> <li>Doses and cancer risks shown only for carcin 2) Absorbed doses were calculated for dermal of calculated for ingestion or inhalation of a more calculated for signature for the site.</li> </ul>	ogenic chemicals wo	vith available	toxicity valu kes were					ILCR Inc mg/L mg/kg-d VOC	Incomplete Milligrams Milligrams		per day.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 11 - Fuel Storage Tank Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathw	ay-Specific		Chemical
	Concentration <sup>a</sup>	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere	nce Dose ( Dermal	mg/kg-d) Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ
Constituent	(mg/L)	(ing/kg-u)	(ing/kg-u)	(ing/ing d/							
VOLATILE ORGANIC COMPOUNDS						4.05.03	8 (E 02	2.1E-02	2.1E-02	8.2E-02	0.12
Benzene	0.010	8.5E-05	8.3E-05	7.0E-04	4.0E-03	4.0E-03	8.6E-03 8.6E-01	1.5E-02	3.3E-04	3.6E-04	0.0022
Methylene chloride	0.011	9.3E-05	2.0E-05	3.1E-04	6.0E-02	6.0E-02		3.4E-03	4.9E-02	6.8E-02	0.12
n-Propylbenzene	0.016	1.4E-04	1.9E-03	2.7E-03	4.0E-02	4.0E-02	4.0E-02	3.46-05	4.76-02	0.02 02	
POLYNUCLEAR AROMATIC HYDROCARBONS Naphthalene	0.39	3.3E-03	1.1E-02	Inc	2.0E-02	2.0E-02	8.6E-04	1.6E-01	5.4E-01	Inc HI	0.71 <b>0.95</b>
PETROLEUM HYDROCARBONS <sup>e</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Gasoline Range Organics, Aliphatic Gasoline Range Organics, Aromatic	45 36 18 1.1 0.77 0.55	na <sup>d</sup> 3.0E-01 1.5E-01 na <sup>e</sup> 6.5E-03 4.6E-03	na <sup>d</sup> Inc Inc Inc Inc	na <sup>d</sup> 2.0E-01 1.0E-01 na <sup>e</sup> 8.6E-02 6.1E-02	na <sup>d</sup> 1.0E-01 4.0E-02 na <sup>e</sup> 5.0E+00 2.0E-01	na <sup>d</sup> na na na na	na <sup>d</sup> 2.9E-01 5.7E-01 na <sup>e</sup> 5.3E+00 1.1E-01	na <sup>d</sup> 3.0E+00 3.8E+00 na <sup>e</sup> 1.3E-03 2.3E-02	na <sup>d</sup> Inc Inc Inc Inc	na <sup>d</sup> 7.0E-01 1.8E-01 na <sup>e</sup> 1.6E-02 5.6E-01 HI	na <sup>d</sup> 3.7 4.0 na <sup>e</sup> 0.018 0.58 <b>8.3</b>
<ul> <li>Notes:</li> <li>Based on the maximum or 95 percent upper confidence lim concentration detected at the site.</li> <li>Consistent with EPA policy, lead is not evaluated in the cure Risks associated with indicator compounds are included in estimates for each site. However, the health hazards associ will be evaluated and reported separately.</li> <li>Exposure dose and noncancer hazards were calculated for proceeding the second second</li></ul>	nulative HI estimate cumulative risk and ated with petroleum	e. hazard mixtures	d as DRO (m	ethod 8100)				HI HQ Inc mg/L mg/kd-d na VOC	not availab	tient. pathway. per liter. per kilogram	

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

• Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

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### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 11 - Fuel Storage Tank Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				VOC					
	Surface Water	Ingestion	Dermal	Inhalation		Pathway	y-Specific I	lazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion	Dermal	Inhalation	HQ

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 11 - Fuel Tank Storage Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathw	ay-Specific I	Hazard	Chemica
		Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specifi
_	Concentration <sup>a</sup> (mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal		Ingestion	Dermal	Inhalation	HQ
Constituent	(mg/L)	(mg/kg-u)	(mg/kg-u)	(Ing ng u)							
VOLATILE ORGANIC COMPOUNDS								0.05.00	0.05.02	3.2E-01	0.48
Benzene	0.010	3.3E-04	3.2E-04	2.7E-03	4.0E-03	4.0E-03	8.6E-03	8.2E-02	8.0E-02 1.3E-03	1.4E-03	0.008
Methylene chloride	0.011	3.6E-04	7.6E-05	1.2E-03	6.0E-02	6.0E-02	8.6E-01	6.0E-03	1.9E-03	2.6E-01	0.47
n-Propylbenzene	0.016	5.3E-04	7.6E-03	1.1E-02	4.0E-02	4.0E-02	4.0E-02	1.3E-02	1.96-01	2.02-01	0
POLYNUCLEAR AROMATIC HYDRO	CARBONS						0 (5 04	6.4E-01	2.1E+00	Inc	2.7
Naphthalene	0.39	1.3E-02	4.2E-02	Inc	2.0E-02	2.0E-02	8.6E-04	0.46-01	2.111+00	Inc	
										HI	3.7
PETROLEUM HYDROCARBONS									4	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	45	na <sup>d</sup>	na <sup>d</sup>	nad	nad	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na 2.7E+00	na 15
Diesel Range Organics, Aliphatic	36	1.2E+00	Inc	7.9E-01	1.0E-01	na	2.9E-01	1.2E+01	Inc	6.9E-01	15
Diesel Range Organics, Aromatic	18	5.9E-01	Inc	3.9E-01	4.0E-02	na	5.7E-01	1.5E+01	Inc	na <sup>e</sup>	na®
Gasoline Range Organics	1.1	na	nae	na	na	na®	na°	na°	na	na 6.3E-02	0.06
Gasoline Range Organics, Aliphatic	0.77	2.5E-02	Inc	3.3E-01	5.0E+00	na	5.3E+00	5.1E-03	Inc	2.2E+00	2.3
Gasoline Range Organics, Aromatic	0.55	1.8E-02	Inc	2.4E-01	2.0E-01	na	1.1E-01	9.0E-02	Inc	2.20100	2.0
										HI	32
tes:	3	£ 4				Α.		н	Hazard inde	x	
Based on the maximum or 95 percent upper	confidence limit (9	5% UCL) on	the mean						Hazard quot		
concentration detected at the site.								HQ	Incomplete		
Consistent with EPA policy, lead is not eval	uated in the cumula	tive HI estim	ate.					Inc	Milligrams		
Risks associated with indicator compounds a	are included in cum	ulative risk a	nd hazard					mg/L mg/kd-d		per kilogram	per day.
estimates for each site. However, the health	hazards associated	with petroleu	im mixtures					na	not available	-	
will be evaluated and reported separately. Exposure dose and noncancer hazards were	calculated for petro	leum hydroca	arbons measu	red as DRO (1	method 810	)0)		VOC	Volatile org	anic compour	nd.
Exposure dose and noncancer nazards were by segregating total DRO concentrations in	to alighatic and arou	matic fraction	s assuming	80% aliphatic							
by segregating total DRO concentrations in	to anphatic and aro	made maetion	, abouting								
hydrocarbons and 40% aromatic hydrocarbo Exposure dose and noncancer hazards were	ons (ADEC, 2000c).										

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 11 - Fuel Tank Storage Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

					VOC					
		Surface Water	Ingestion	Dermal	Inhalation	_	Pathway	y-Specific I	Hazard	Chemical-
		Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)			VOC	Specific
(	Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion	Dermal	Inhalation	HQ

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

### NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 11 - Fuel Tank Storage Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	Inhalation				Pathy	way-Specific	Hazard VOC	Chemic
	Concentration <sup>*</sup>	Dose	Dose	Dose		nce Dose (	0 9	Incestion	Dermal	Inhalation	HQ
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermai	Innalation	nų
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.010	1.1E-05	2.4E-06	3.4E-05	4.0E-03	4.0E-03	8.6E-03	2.9E-03	5.9E-04	4.0E-03	0.007
Methylene chloride	0.011	1.3E-05	5.6E-07	1.5E-05	6.0E-02	6.0E-02	8.6E-01	2.1E-04	9.3E-06	1.8E-05	0.000
Propylbenzene	0.016	1.8E-05	5.6E-05	1.3E-04	4.0E-02	4.0E-02	4.0E-02	4.6E-04	1.4E-03	3.3E-03	0.003
POLYNUCLEAR AROMATIC HYDROCARBONS					- 				1 65 02	Inc	0.03
Naphthalene	0.39	4.5E-04	3.1E-04	Inc	2.0E-02	2.0E-02	8.6E-04	2.2E-02	1.5E-02	Inc	0.05
PETROLEUM HYDROCARBONS <sup>c</sup>											
	45	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	nad	naď	nad	nad	na
Diesel Range Organics	36	4.1E-02	Inc	9.9E-03	1.0E-01	na	2.9E-01	4.1E-01	Inc	3.4E-02	0.4
Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic	18	2.1E-02	Inc	4.9E-03	4.0E-02	na	5.7E-01	5.1E-01	Inc	8.7E-03	0.5
		na	na	na	na"	na <sup>e</sup>	na°	na°	na	na	na
Gasoline Range Organics	1.1 0.77	8.8E-04	Inc	4.2E-03	5.0E+00	na	5.3E+00	1.8E-04	Inc	7.9E-04	0.000
Gasoline Range Organics, Aliphatic	0.55	6.3E-04	Inc	3.0E-03	2.0E-01	na	1.1E-01	3.1E-03	Inc	2.7E-02	0.03
Gasoline Range Organics, Aromatic	0.55	0.000								н	1.0
25:											
Based on the maximum or 95 percent upper confidence limit	(95% UCL) on the	mean						HI	Hazard inde	х.	
concentration detected at the site.	()) // 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0							HQ	Hazard quot	ient.	
	lative HI estimate							Inc	Incomplete	pathway.	
Consistent with EPA policy, lead is not evaluated in the cumu Risks associated with indicator compounds are included in cu	mulative risk and h	azard						mg/L	Milligrams	per liter.	
estimates for each site. However, the health hazards associated								mg/kd-d	Milligrams	per kilogram p	er day.
								na	not available		
will be evaluated and reported separately. Exposure dose and noncancer hazards were calculated for pet	roleum hydrocarbo	ns measured a	s DRO (meth	od 8100)				VOC	Volatile org	anic compoun	d.
Exposure dose and noncancer hazards were calculated for per	rometic fractions	cuming 80%	alinhatic	ou or or ,							
by segregating total DRO concentrations into aliphatic and a		summe oo w	unphilite								
hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000		no money of a	GRO (meth	od 8015)							
Exposure dose and noncancer hazards were calculated for per	troleum hydrocarbo	ns measured a	s GRO (meth	00 0015)							
by segregating total GRO concentrations into aliphatic and a		ssuming 70%	aliphatic								
hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000	c).										
Doses and noncancer hazards shown only for noncarcinogeni											

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 13- Heat and Electrical Power Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-	Specific Car	ncer Risk	Chemical-
Constitution	Concentration <sup>a</sup>	Dose	Dose	Dose		ope Factor		- Soil	Dermal	Dust Inhalation	Specific Risk
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermai	Innalation	RISK
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.012	4.9E-09	0.0E+00	3.6E-13	5.5E-02	5.5E-02	2.7E-02	2.7E-10	0.0E+00	9.7E-15	2.7E-10
Ethylbenzene	1.4	5.8E-07	0.0E+00	4.2E-11	3.9E-03	3.9E-03	3.9E-03	2.2E-09	0.0E+00	1.6E-13	2.2E-09
POLYCHLORINATED BIPHENYLS	115	4.6E-05	2.6E-05	3.4E-09	2.0E+00	2.0E+00	2.0E+00	9.3E-05	5.1E-05	6.8E-09	1.4E-04
PCB-1260 (Aroclor 1260)	115	4.0E-05	2.0E-03	3.4E-09	2.06+00	2.06+00	2.06+00	9.5E-05	J.1E-05	0.81-09	1.46-04
										ILCR	1E-04
Notes:								2			
<ul> <li>Based on the maximum or 95 percent upper con</li> <li>Doses and cancer risks shown only for carcinogo</li> <li>Based on the maximum or 95 percent upper con</li> </ul>	enic chemicals with a	vailable toxic	ity values.					ILCR Inc mg/kg	Incomplet	al lifetime can e pathway. s per kilogram	1
Doses and cancer risks shown only for carcinoge 3) Absorbed doses were calculated for dermal cont	enic chemicals with a	vailable toxic	ity values.			on		mg/kg-d	Milligram	s per kilogram	per day.

of a medium

Cancer risks are unitless values which represent the probability of incurring an adverse health

## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 13 - Heat and Electrical Power Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation			5	Pathwa	y-Specific C	ancer Risk	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer Slo		(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific Risk
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	KISK
VOLATILE ORGANIC COMPOUNDS Benzene Ethylbenzene	0.012 1.4	1.5E-08 1.7E-06	0.0E+00 0.0E+00	1.1E-12 1.3E-10	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.7E-02 3.9E-03	8.1E-10 6.7E-09	0.0E+00 0.0E+00	2.9E-14 4.9E-13	8.1E-10 6.7E-09
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	115	1.4E-04	7.7E-05	1.0E-08	2.0E+00	2.0E+00	2.0E+00	2.8E-04	1.5E-04	2.0E-08	4.3E-04
										ILCR	4E-04

#### Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected in soil tundra

and soil gravel at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

ILCRIncremental lifetime cancer risk.IncIncomplete pathway.mg/kgMilligrams per kilogram.

mg/kg-d Milligrams per kilogram per day.

#### TABL

### CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 13 - Heat and Electrical Power Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil Concentration <sup>a</sup>	Soil Ingestion Dose	Soil Dermal Dose	Dust Inhalation Dose	Cancer SI	ope Factor	(mg/kg-d) <sup>-1</sup>	Pathway- Soil	Specific Ca	ancer Risk Dust	Chemical- Specific
C	onstituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)		Oral	Dermal	Inhalation		Dermal	Inhalation	Risk
В	OLATILE ORGANIC COMPOUNDS enzene hylbenzene	0.012 1.4	1.2E-10 1.4E-08	0.0E+00 0.0E+00	3.7E-14 4.3E-12	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.7E-02 3.9E-03	6.6E-12 5.5E-11	0.0E+00 0.0E+00	9.9E-16 1.7E-14	6.6E-12 5.5E-11
	OLYCHLORINATED BIPHENYLS CB-1260 (Aroclor 1260)	115	1.1E-06	2.1E-06	3.5E-10	2.0E+00	2.0E+00	2.0E+00	2.3E-06	4.2E-06	6.9E-10	6.4E-06
					7						ILCR	6E-06

Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

 ILCR
 Incremental lifetime cancer risk.

 Inc
 Incomplete pathway.

 mg/kg
 Milligrams per kilogram.

 mg/kg-d
 Milligrams per kilogram per day.
### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 13 - Heat and Electrical Power Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	ay-Specific l	Hazard	Chemical
	Concentration <sup>*</sup>	Dose	Dose	Dose	Referen	ce Dose (m	ng/kg-d)	Soil		Dust	Specific
Tom stituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(Ing/kg)	(ing/kg-d)	(ing ing of	(				- 3			
OLATILE ORGANIC COMPOUNDS									0.05.00	2.6E-10	0.00001
Benzene	0.012	4.4E-08	0.0E+00	2.2E-12	4.0E-03	4.0E-03	8.6E-03	1.1E-05	0.0E+00	8.9E-10	0.000052
thylbenzene	1.4	5.2E-06	0.0E+00	2.6E-10	1.0E-01	1.0E-01	2.9E-01	5.2E-05	0.0E+00	2.5E-08	0.00007
n,p-Xylene	4.0	1.5E-05	0.0E+00	7.2E-10	2.0E-01	2.0E-01	2.9E-02	7.3E-05	0.0E+00 0.0E+00	5.0E-08	0.00001
-Xylene	0.80	2.9E-06	0.0E+00	1.4E-10	2.0E-01	2.0E-01	2.9E-02	1.5E-05			0.00001
oluene	0.80	2.9E-06	0.0E+00	1.4E-10	2.0E-01	2.0E-01	1.1E-01	1.5E-05	0.0E+00	1.3E-09	0.00001
OLYCHLORINATED BIPHENYLS							2 05 05	2 15.01	9.3E+00	1.0E-03	30
PCB-1260 (Aroclor 1260)	115	4.2E-04	1.9E-04	2.1E-08	2.0E-05	2.0E-05	2.0E-05	2.1E+01	9.3E+00	1.0E-03	50
POLYNUCLEAR AROMATIC HYDROCARBO	<b>DNS</b> 15	5.4E-05	2.2E-05	2.7E-09	2.0E-02	2.0E-02	8.6E-04	2.7E-03	1.1E-03	3.1E-06	0.0038
Japhthalene	10									HI	30
PETROLEUM HYDROCARBONS <sup>e</sup>											
	12,000	nad	na <sup>d</sup>	na <sup>d</sup>	naď	nad	nad	na <sup>d</sup>	nad	na <sup>d</sup>	naď
Diesel Range Organics	9,600	3.5E-02	Inc	1.7E-06	1.0E-01	na	2.9E-01	3.5E-01	Inc	6.0E-06	0.35
Diesel Range Organics, Aliphatic	4,800	1.7E-02	Inc	8.7E-07	4.0E-02	na	5.7E-01	4.4E-01	Inc	1.5E-06	0.44
Diesel Range Organics, Aromatic		na	na	na°	na	na	na	na	na®	na	na
Gasoline Range Organics	294 206	7.5E-04	Inc	3.7E-08	5.0E+00	na	5.3E+00	1.5E-04	Inc	7.0E-09	0.000149
Gasoline Range Organics, Aliphatic	147	5.4E-04	Inc	2.7E-08	2.0E-01	na	1.1E-01	2.7E-03	Inc	2.4E-07	0.002
Gasoline Range Organics, Aromatic			naf	na	naf	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	naf	na <sup>f</sup>	naf
Residual Range Organics	1,072	na			2.0E+00	na	na	1.8E-03	Inc	Inc	0.001
Residual Range Organics, Aliphatic	965	3.5E-03	Inc	1.7E-07	3.0E+00	na	na	3.9E-02	Inc	Inc	0.039
Residual Range Organics, Aromatic	322	1.2E-03	Inc	5.8E-08	3.0E-02	lla	nu	0.72 02			
										HI	0.83
es:			1					ні	Hazard ind	ex.	
Based on the maximum or 95 percent upper confide	ence limit (95% U	CL) on the m	ean					HQ	Hazard que		
concentration detected at the site.									Incomplete		
Consistent with EPA policy, lead is not evaluated in Risks associated with indicator compounds are incl	uded in cumulativ	e risk and haz	ard					Inc mg/kg	Milligrams	per kilogram	
estimates for each site. However, the health hazard	s associated with	petroleum mi	xtures					mg/kd-d	Milligrams	per kilogram	per day.

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

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#### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 13 - Heat and Electrical Power Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathway-Specific	Hazard	Chemical-
Constituent	Concentration <sup>®</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d)           Oral         Dermal         Inhalation	Soil Ingestion Derma	Dust Inhalation	Specific HQ

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

• Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015) by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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### NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 13 - Heat and Electrical Power Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Ingestion	Dermal	Inhalation					y-Specific		Chemic
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose	(mg/kg-d)	Soil		Dust	Specifi
onstituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
OLATILE ORGANIC COMPOUNDS											
enzene	0.012	1.3E-07	0.0E+00	6.6E-12	4.0E-03		8.6E-03	3.3E-05	0.0E+00	7.7E-10	0.0000
thylbenzene	1.4	1.6E-05	0.0E+00	7.7E-10	1.0E-01		2.9E-01	1.6E-04	0.0E+00	2.7E-09	0.0001
,p-Xylene	4.0	4.4E-05	0.0E+00	2.2E-09	2.0E-01		2.9E-02	2.2E-04	0.0E+00	7.5E-08	0.0002
Xylene	0.80	8.7E-06	0.0E+00	4.3E-10	2.0E-01		2.9E-02	4.4E-05	0.0E+00	1.5E-08	0.0000
oluene	0.80	8.7E-06	0.0E+00	4.3E-10	2.0E-01	2.0E-01	1.1E-01	4.4E-05	0.0E+00	3.9E-09	0.0000
OLYNUCLEAR AROMATIC HYDROCAR	BONS										
aphthalene	15	1.6E-04	6.7E-05	8.1E-09	2.0E-02	2.0E-02	8.6E-04	8.2E-03	3.4E-03	9.4E-06	0.012
OLYCHLORINATED BIPHENYLS											
CB-1260 (Aroclor 1260)	115	1.3E-03	5.6E-04	6.2E-08	2.0E-05	2.0E-05	2.0E-05	6.3E+01	2.8E+01	3.1E-03	91
										HI	91
ETROLEUM HYDROCARBONS <sup>e</sup>									4	đ	na <sup>d</sup>
iesel Range Organics	12,000	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	nad	na <sup>d</sup>	nad	nad	nad	
viesel Range Organics, Aliphatic	9,600	1.0E-01	Inc	5.2E-06	1.0E-01	na	2.9E-01	1.0E+00	Inc	1.8E-05	1.0
viesel Range Organics, Aromatic	4,800	5.2E-02	Inc	2.6E-06	4.0E-02	na	5.7E-01	1.3E+00	Inc	4.6E-06	1.3
asoline Range Organics	294	na°	na	na°	na	na®	na	na°	na	na	na
asoline Range Organics, Aliphatic	205.8	2.2E-03	Inc	1.1E-07	5.0E+00	na	5.3E+00	4.5E-04	Inc	2.1E-08	0.000
asoline Range Organics, Aromatic	147	1.6E-03	Inc	8.0E-08	2.0E-01	na	1.1E-01	8.0E-03	Inc	7.2E-07	0.00
• •	1,072	na <sup>f</sup>	naf	na <sup>f</sup>	naf	na <sup>f</sup>	naf	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>
esidual Range Organics	965	1.1E-02	Inc	5.2E-07	2.0E+00	na	na	5.3E-03	Inc	Inc	0.00
esidual Range Organics, Aliphatic esidual Range Organics, Aromatic	322	3.5E-03	Inc	1.7E-07	3.0E-02	na	na	1.2E-01	Inc	Inc	0.12
		۰.,								НІ	2.5
s:		• • •								НІ	
ased on the maximum or 95 percent upper confi	dence limit (95% UC	CL) on the me	an					HI	Hazard in	dex.	
								HQ	Hazard qu	otient.	
concentration detected at the site.		I estimate.						Inc		e pathway.	

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 13 - Heat and Electrical Power Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation			Pathwa	ay-Specific	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral	ence Dose (m Dermal I	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ
										non dau
estimates for each site. However, the health has	zards associated with p	etroleum mix	tures				mg/kd-d		s per kilogram	per day.
will be evaluated and reported separately.							na	not availab	ble	
Exposure dose and noncancer hazards were cale					8100)					
by segregating total DRO concentrations into a	liphatic and aromatic fi	ractions, assu	ming 80% al	iphatic						
hydrocarbons and 40% aromatic hydrocarbons										
Exposure dose and noncancer hazards were cale	culated for petroleum h	ydrocarbons	measured as	GRO (method	8015)					
by segregating total GRO concentrations into a	liphatic and aromatic fi	ractions, assu	ming 70% al	iphatic						
hydrocarbons and 50% aromatic hydrocarbons	(ADEC, 2000c).									
Exposure dose and noncancer hazards were call		ydrocarbons	measured as	RRO (method	)					
by segregating total RRO concentrations into a										
hydrocarbons and 30% aromatic hydrocarbons	(ADEC, 2000c).									
Doses and noncancer hazards shown only for n Absorbed doses were calculated for dermal con of a medium.	oncarcinogenic chemic stact with the medium, a	als with avail and intakes w	able toxicity ere calculate	values. d for ingestion	or inhala	ation				
Noncancer hazards are unitless values which re effect. They are calculated using the following	present the probability formula: Noncancer I	of incurring a HI = Exposur	an adverse he e Dose/Refer	alth ence dose.						

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### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 13 - Heat and Electrical Power Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathy	way-Specific I	lazard	Chemica
	Concentration <sup>*</sup>	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
					7.		×				
OLATILE ORGANIC COMPOUNDS								1 05 07	0.05.00	6.3E-11	0.000000
Benzene	0.012	3.5E-10	0.0E+00	1.1E-13	3.0E-03	3.0E-03	1.7E-03	1.2E-07	0.0E+00	4.3E-11	0.000000
thylbenzene	1.4	4.1E-08	0.0E+00	1.3E-11	1.0E-01	1.0E-01	2.9E-01	4.1E-07	0.0E+00	4.3E-11 1.2E-09	0.000000
n,p-Xylene	4.0	1.1E-07	0.0E+00	3.5E-11	2.0E-01	2.0E-01	2.9E-02	5.7E-07	0.0E+00	2.4E-10	0.000000
-Xylene	0.80	2.3E-08	0.0E+00	7.0E-12	2.0E-01	2.0E-01	2.9E-02	1.1E-07	0.0E+00		0.000000
oluene	0.80	2.3E-08	0.0E+00	7.0E-12	2.0E-01	2.0E-01	1.1E-01	1.1E-07	0.0E+00	6.4E-11	0.00000
OLYCHLORINATED BIPHENYLS										5.05.05	0.47
CB-1260 (Aroclor 1260)	115	3.3E-06	6.1E-06	1.0E-09	2.0E-05	2.0E-05	2.0E-05	1.6E-01	3.0E-01	5.0E-05	0.47
OLYNUCLEAR AROMATIC HYDROCA	RBONS								2 75 05	1.5E-07	0.0000
Japhthalene	15	4.3E-07	7.3E-07	1.3E-10	2.0E-02	2.0E-02	8.6E-04	2.1E-05	3.7E-05	1.5E-07	0.0000
										ні	0.47
PETROLEUM HYDROCARBONS							4	đ	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	12,000	nad	nad	nad	nad	na <sup>d</sup>	naď	na <sup>d</sup>		na 2.9E-07	0.002
Diesel Range Organics, Aliphatic	9,600	2.7E-04	Inc	8.4E-08	1.0E-01	na	2.9E-01	2.7E-03	Inc		0.002
Diesel Range Organics, Aromatic	4,800	1.4E-04	Inc	4.2E-08	4.0E-02	na	5.7E-01	3.4E-03	Inc	7.4E-08	
	294	na	na°	na®	na°	na	na	na	na"	na	na
Gasoline Range Organics	294	5.9E-06	Inc	1.8E-09	5.0E+00	na	5.3E+00	1.2E-06	Inc	3.4E-10	0.00000
Gasoline Range Organics, Aliphatic	147	4.2E-06	Inc	1.3E-09	2.0E-01	na	1.1E-01	2.1E-05	Inc	1.2E-08	0.0000
Gasoline Range Organics, Aromatic		naf	naf	naf	naf	naf	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	naf	naf
Residual Range Organics	1,072			8.5E-09	2.0E+00	na	na	1.4E-05	Inc	Inc	0.0000
Residual Range Organics, Aliphatic	965	2.8E-05	Inc Inc	8.5E-09 2.8E-09	3.0E+00	na	na	3.1E-04	Inc	Inc	0.0003
Residual Range Organics, Aromatic	322	9.2E-06	Inc	2.00-09	5.01-02	ha	ina				0.000
										HI	0.006
es:									Hazard inde		
Based on the maximum or 95 percent upper con	fidence limit (95% U	JCL) on the n	nean					HI HQ	Hazard nide		
concentration detected at the site.								Inc	Incomplete p		
Consistent with EPA policy, lead is not evaluate	ed in the cumulative	HI estimate.								-	
Risks associated with indicator compounds are	included in cumulati	ve risk and ha	zard					mg/kg	Milligrams p		÷.,
estimates for each site. However, the health has	zards associated with	petroleum m	ixtures					mg/kd-d	Milligrams p	per kilogram pe	er day.
sumates for each site. However, the health has								0.000	not available		

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

#### TAB 7

### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 13 - Heat and Electrical Power Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathway	-Specific H	lazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose _ (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

• Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015) by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

<sup>f</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method ) by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

- 1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.
- 2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium
- 3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 13 - Heat and Electrical Power Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Groundwater Concentration <sup>a</sup>	Ingestion Dose	Dermal Dose	VOC Inhalation Dose	Cancer Sl	ope Factor	(mg/kg-d) <sup>-1</sup>	Pathway-	Specific Ca	ncer Risk VOC	Chemical- Specific
-	Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
	INORGANICS Arsenic	0.073	2.8E-04	3.8E-06	Inc	1.5E+00	1.5E+00	1.5E+01	4.2E-04	5.7E-06	Inc	4.2E-04
	VOLATILE ORGANIC COMPOUNDS Benzene Ethylbenzene	0.12 0.14	4.6E-04 5.3E-04	1.3E-04 5.4E-04	1.4E-03 2.4E-03	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.7E-02 3.9E-03	2.5E-05 2.1E-06	7.1E-06 2.1E-06	3.7E-05 9.3E-06	7.0E-05 1.3E-05

Notes:		
<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean	IL	LCR Incremental lifetime cancer risk.
<ul> <li>concentration detected at the site.</li> <li>1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.</li> <li>2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.</li> </ul>	mį	nc Incomplete pathway. ng/L Milligrams per liter. ng/kg-d Milligrams per kilogram per day. /OC Volatile organic compound.

ILCR

5E-04

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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#### CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 13 - Heat and Electrical Power Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation			2	Pathway	-Specific Ca	ncer Risk	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer S	lope Factor				VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS Arsenic	0.073	1.1E-03	1.5E-05	Inc	1.5E+00	1.5E+00	1.5E+01	1.6E-03	2.2E-05	Inc	1.7E-03
VOLATILE ORGANIC COMPOUNDS Benzene Ethylbenzene	0.12 0.14	1.8E-03 2.1E-03	5.1E-04 2.1E-03	5.4E-03 9.3E-03	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.7E-02 3.9E-03	9.8E-05 8.0E-06	2.8E-05 8.1E-06	1.4E-04 3.6E-05	2.7E-04 5.2E-05
										ILCR	2E-03

Incremental lifetime cancer risk.

Milligrams per kilogram per day.

Volatile organic compound.

Incomplete pathway.

Milligrams per liter.

ILCR

mg/L

VOC

mg/kg-d

Inc

#### Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean

concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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# CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 13 - Heat and Electrical Power Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Surface Water	Ingestion	Dermal	VOC Inhalation Dose	Cancer SI	ope Factor	(mg/kg-d) <sup>-1</sup>	Pathway	-Specific Ca	ncer Risk VOC	Chemical Specific
Constituent		Concentration <sup>*</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	(mg/kg-d)	Oral	Dermal		Ingestion	Dermal	Inhalation	Risk
INORGANICS Arsenic		0.073	2.9E-05	2.9E-07	Inc	1.5E+00	1.5E+00	1.5E+01	4.3E-05	4.3E-07	Inc	4.3E-05
VOLATILE ORGANI Benzene	C COMPOUNDS	0.12	4.7E-05	9.7E-06	1.4E-04	5.5E-02	5.5E-02	2.7E-02 3.9E-03	2.6E-06 2.1E-07	5.3E-07 1.6E-07	3.8E-06 2.5E-07	6.9E-06 6.2E-07
Ethylbenzene		0.14	5.4E-05	4.0E-05	6.5E-05	3.9E-03	3.9E-03	5.92-05	2.112-07	1.02.07	ILCR	5E-05
otes: Based on the maximum concentration detected a	the site.	confidence limit (95%					ĝ.		ILCR Inc mg/L	Incomplete Milligrams	•	er risk.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## TAB 71

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 13 - Heat and Electrical Power Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific	Hazard	Chemica
	Concentration <sup>a</sup>	Dose	Dose	Dose	Defere	nce Dose (	mg/kg-d)			VOC	Specifi
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal		Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Arsenic	0.073	6.2E-04	2.9E-05	Inc	3.0E-04	3.0E-04	3.0E-04	2.1E+00	9.7E-02	Inc	2.2
Copper	0.21	1.8E-03	8.4E-05	Inc	3.7E-02	3.7E-02	3.7E-02	4.8E-02	2.3E-03	Inc	0.050
Lead	0.45	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead, Dissolved	0.015	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab
Nickel	0.17	1.4E-03	6.8E-05	Inc	2.0E-02	2.0E-02	2.0E-02	7.2E-02	3.4E-03	Inc	0.075
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.12	1.0E-03	9.9E-04	8.5E-03	4.0E-03	4.0E-03	8.6E-03	2.5E-01	2.5E-01	9.8E-01	1.5
Ethylbenzene	0.14	1.2E-03	4.1E-03	1.5E-02	1.0E-01	1.0E-01	2.9E-01	1.2E-02	4.1E-02	5.1E-02	0.10
Toluene	0.17	1.4E-03	3.1E-03	1.4E-02	2.0E-01	2.0E-01	1.1E-01	7.2E-03	1.5E-02	1.3E-01	0.15
										HI	4.0
PETROLEUM HYDROCARBONS <sup>e</sup>											4
Diesel Range Organics	100	na <sup>d</sup>	nad	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na <sup>d</sup>	nad	nad	nad
Diesel Range Organics, Aliphatic	80	6.8E-01	Inc	4.5E-01	1.0E-01	na	2.9E-01	6.8E+00	Inc	1.6E+00	8.3
Diesel Range Organics, Aromatic	40	3.4E-01	Inc	2.3E-01	4.0E-02	na	5.7E-01	8.5E+00	Inc	4.0E-01	8.8
Gasoline Range Organics	4.0	na®	na®	na®	na	na®	na®	na	na	na	na°
Gasoline Range Organics, Aliphatic	2.8	2.4E-02	Inc	3.1E-01	5.0E+00	na	5.3E+00	4.7E-03	Inc	5.9E-02	0.064
Gasoline Range Organics, Aromatic	2.0	1.7E-02	Inc	2.2E-01	2.0E-01	na	1.1E-01	8.5E-02	Inc	2.0E+00	2.1
Residual Range Organics	2.3	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	naf	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	naf
Residual Range Organics, Aliphatic	2.1	1.7E-02	Inc	1.2E-05	2.0E+00	na	na	8.7E-03	Inc	Inc	0.008
Residual Range Organics, Aromatic	0.69	5.8E-03	Inc	4.1E-06	3.0E-02	na	na	1.9E-01	Inc	Inc	0.19
							8 - 1 1			HI	20
tes:											
Based on the maximum or 95 percent upper of	confidence limit (95	% UCL) on t	he mean					HI	Hazard inde		
concentration detected at the site.								HQ	Hazard quot		
Consistent with EPA policy, lead is not evalu	ated in the cumulat	ive HI estima	te.					Inc	Incomplete	pathway.	
Risks associated with indicator compounds a	re included in cumu	lative risk an	d hazard					mg/L	Milligrams		
estimates for each site. However, the health	hazards associated	with petroleur	m mixtures					mg/kd-d		per kilogram p	ber day.
will be evaluated and reported separately.								na	not available	e	

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 13 - Heat and Electrical Power Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose	Referer Oral		mg/kg-d) Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ
<ul> <li><sup>d</sup> Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocarbo</li> <li><sup>e</sup> Exposure dose and noncancer hazards were by segregating total GRO concentrations in hydrocarbons and 50% aromatic hydrocarbo</li> <li><sup>f</sup> Exposure dose and noncancer hazards were by segregating total RRO concentrations in hydrocarbons and 30% aromatic hydrocarbo</li> <li><sup>f</sup> Doses and noncancer hazards shown only for 2) Absorbed doses were calculated for dermal</li> </ul>	calculated for petrole to aliphatic and arom ons (ADEC, 2000c). calculated for petrole to aliphatic and arom ons (ADEC, 2000c). calculated for petrole to aliphatic and arom ons (ADEC, 2000c). on noncarcinogenic cl	eum hydrocar natic fractions eum hydrocar natic fractions eum hydrocar natic fractions hemicals with	bons measur s, assuming 8 bons measur s, assuming 7 bons measur s, assuming 9 n available to	red as DRO (m 50% aliphatic red as GRO (m 70% aliphatic red as RRO (m 90% aliphatic xicity values.	ethod 8100 ethod 8015 ethod )	5)		VOC	Volatile org	anic compound	đ.
<ul><li>2) Absorbed doses were calculated for dermal of a medium</li><li>3) Noncancer hazards are unitless values whic effect. They are calculated using the follow</li></ul>	h represent the proba	bility of incu	rring an adve	erse health							

### TA: .72

### NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 13 - Heat and Electrical Power Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Path	way-Specific	Hazard	Chemic
	Concentration <sup>*</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specif
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Arsenic	0.073	2.4E-03	1.1E-04	Inc	3.0E-04	3.0E-04	3.0E-04	8.0E+00	3.8E-01	Inc	8.4
Copper	0.21	6.9E-03	3.3E-04	Inc	3.7E-02	3.7E-02	3.7E-02	1.9E-01	8.8E-03	Inc	0.20
Lead	0.45	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead, Dissolved	0.015	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	nab				
Nickel	0.17	5.6E-03	5.3E-05	Inc	2.0E-02	2.0E-02	2.0E-02	2.8E-01	2.6E-03	Inc	0.28
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.12	3.9E-03	3.9E-03	3.3E-02	4.0E-03	4.0E-03	8.6E-03	9.9E-01	9.6E-01	3.8E+00	5.8
Ethylbenzene	0.14	4.6E-03	1.6E-02	5.7E-02	1.0E-01	1.0E-01	2.9E-01	4.6E-02	1.6E-01	2.0E-01	0.40
Toluene	0.17	5.6E-03	1.2E-02	5.4E-02	2.0E-01	2.0E-01	1.1E-01	2.8E-02	6.0E-02	4.9E-01	0.58
										HI	16
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	100	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>						
Diesel Range Organics, Aliphatic	80	2.6E+00	Inc	1.8E+00	1.0E-01	na	2.9E-01	2.6E+01	Inc	6.0E+00	32
Diesel Range Organics, Aromatic	40	1.3E+00	Inc	8.8E-01	4.0E-02	na	5.7E-01	3.3E+01	Inc	1.5E+00	34
Gasoline Range Organics	4.0	na®	na®	na	na®	na°	na	na	na°	na	na
Gasoline Range Organics, Aliphatic	2.8	9.2E-02	Inc	1.2E+00	5.0E+00	na	5.3E+00	1.8E-02	Inc	2.3E-01	0.25
Gasoline Range Organics, Aromatic	2.0	6.6E-02	Inc	8.7E-01	2.0E-01	na	1.1E-01	3.3E-01	Inc	7.9E+00	8.2
Residual Range Organics	2.3	naf	naf	naf	naf	na <sup>f</sup>					
Residual Range Organics, Aliphatic	2.1	6.8E-02	Inc	3.5E-04	2.0E+00	na	na	3.4E-02	Inc	Inc	0.034
Residual Range Organics, Aromatic	0.69	2.3E-02	Inc	1.2E-04	3.0E-02	na	na	7.6E-01	Inc	Inc	0.76
										HI	76
es:			×								
Based on the maximum or 95 percent upper	confidence limit (9	5% UCL) on	the mean					HI	Hazard index		
concentration detected at the site.								HQ	Hazard quoti	ient.	
Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.								Inc	Incomplete p	bathway.	
isks associated with indicator compounds are included in cumulative risk and hazard								mg/L	Milligrams p	ber liter.	
Aisks associated with indicator compounds		Levith materia						mg/kd-d		er kilogram pe	r dav.
estimates for each site. However, the health	hazards associated	with petrole	um mixtures					ing/ku-u	Winngrams p		

will be evaluated and reported separately.

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not available

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 13 - Heat and Electrical Power Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Concentration <sup>a</sup> Dose Dose Dose Reference Dose (mg/kg-d) VOC Sp		Surface Water	Ingestion	Dermal	VOC Inhalation				Path	way-Specific	Hazard	Chemical-
Constituent       (mg/kg-d)       (mg/kg-d) <th></th> <th></th> <th>-</th> <th></th> <th>-</th> <th></th> <th></th> <th></th> <th>Insection</th> <th>Dermal</th> <th></th> <th>Specific HQ</th>			-		-				Insection	Dermal		Specific HQ
<ul> <li><sup>b</sup> Exposure dose and noncancer hazards were calculated for performing performing 80% aliphatic hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).</li> <li><sup>c</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015) by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).</li> <li><sup>r</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015) by segregating total GRO concentrations (ADEC, 2000c).</li> <li><sup>r</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method ) by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).</li> <li><sup>1</sup>) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.</li> <li><sup>2</sup>) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium</li> </ul>	Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Innalation	Ingestion	Dermai	Innalation	
a) b) a meaning the second s	<ul> <li><sup>d</sup> Exposure dose and noncancer hazards were by segregating total DRO concentrations hydrocarbons and 40% aromatic hydrocarle</li> <li><sup>e</sup> Exposure dose and noncancer hazards were by segregating total GRO concentrations hydrocarbons and 50% aromatic hydrocarle</li> <li><sup>f</sup> Exposure dose and noncancer hazards were by segregating total RRO concentrations hydrocarbons and 30% aromatic hydrocarle</li> <li>1) Doses and noncancer hazards shown only</li> <li>2) Absorbed doses were calculated for dermation of a medium</li> </ul>	e calculated for petro into aliphatic and aro bons (ADEC, 2000c) re calculated for petro into aliphatic and aro bons (ADEC, 2000c) re calculated for petro into aliphatic and aro bons (ADEC, 2000c) for noncarcinogenic al contact with the me	oleum hydroc matic fraction oleum hydroc matic fraction oleum hydroc matic fraction chemicals wi edium, and in	ns, assuming arbons meas ns, assuming arbons meas ns, assuming th available t takes were ca	80% aliphatic ured as GRO (1 70% aliphatic ured as RRO (1 90% aliphatic toxicity values. alculated for in	method 80 method )	015)		VOC	Volatile orga	anic compound.	
a) Noncancer hazards are unities values which represent the processing of interning areas are unities values which represent the processing of interning areas are areas are unities values which represent the processing of interning areas are areas are unities values which represent the processing of interning areas are areas are unities values which represent the processing of interning areas are areas are unities values which represent the processing of interning areas areas are areas are areas are	3) Noncancer hazards are unitless values whi	ich represent the prob wing formula: None	bability of inc cancer HI = E	curring an add Exposure Dos	verse health se/Reference do	ose.						

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### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 13 - Heat and Electrical Power Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific I	lazard	Chemica
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specifi
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Arsenic	0.073	8.3E-05	8.3E-07	Inc	3.0E-04	3.0E-04	3.0E-04	2.8E-01	2.8E-03	Inc	0.28
Copper	0.21	2.4E-04	2.4E-06	Inc	3.7E-02	3.7E-02	3.7E-02	6.5E-03	6.5E-05	Inc	0.006
Lead	0.45	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab
	0.015	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead, Dissolved Nickel	0.17	1.9E-04	3.9E-07	Inc	2.0E-02	2.0E-02	2.0E-02	9.7E-03	1.9E-05	Inc	0.009
VICKEI	0.17	1.76-04	5.76-07	Inc	2.02 02	2.02 02					
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.12	1.4E-04	2.8E-05	4.1E-04	4.0E-03	4.0E-03	8.6E-03	3.4E-02	7.1E-03	4.8E-02	0.08
Ethylbenzene	0.14	1.6E-04	1.2E-04	7.1E-04	1.0E-01	1.0E-01	2.9E-01	1.6E-03	1.2E-03	2.5E-03	0.005
Toluene	0.17	1.9E-04	8.8E-05	6.8E-04	2.0E-01	2.0E-01	1.1E-01	9.7E-04	4.4E-04	6.2E-03	0.007
										ні	0.40
THE AND A THE AND A CARDON OF											0.40
PETROLEUM HYDROCARBONS <sup>e</sup>	100	d	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	100	nad		na 2.2E-02	na 1.0E-01	na	2.9E-01	9.1E-01	Inc	7.6E-02	0.99
Diesel Range Organics, Aliphatic	80	9.1E-02	Inc	1.1E-02	4.0E-01	na	5.7E-01	1.1E+00	Inc	1.9E-02	1.2
Diesel Range Organics, Aromatic	40	4.6E-02	Inc				na	na	na	na°	na®
Gasoline Range Organics	4.0	na®	na <sup>e</sup>	na	na	na	na 5.3E+00	na 6.4E-04	Inc	2.9E-03	0.003
Gasoline Range Organics, Aliphatic	2.8	3.2E-03	Inc	1.5E-02	5.0E+00	na	1.1E-01	1.1E-02	Inc	9.9E-02	0.11
Gasoline Range Organics, Aromatic	2.0	2.3E-03	Inc	1.1E-02	2.0E-01	na	-		naf	naf	naf
Residual Range Organics	2.3	na <sup>f</sup>	na	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>		Inc	0.001
Residual Range Organics, Aliphatic	2.1	2.4E-03	Inc	5.9E-07	2.0E+00	na	na	1.2E-03	Inc	Inc	0.001
Residual Range Organics, Aromatic	0.69	7.9E-04	Inc	2.0E-07	3.0E-02	na	na	2.6E-02	Inc	me	0.020
										HI	2.3
es:								· · · · ·		18 <sup>- 2</sup>	
Based on the maximum or 95 percent upper ca	onfidence limit (95	% UCL) on th	ne mean					HI	Hazard index		
concentration detected at the site.								HQ	Hazard quoti		
Consistent with EPA policy, lead is not evaluate	ated in the cumulati	ive HI estima	te.					Inc	Incomplete p	athway.	
Risks associated with indicator compounds ar	e included in cumu	lative risk and	d hazard					mg/L	Milligrams p	er liter.	
estimates for each site. However, the health h	azards associated v	with petroleur	n mixtures					mg/kd-d	Milligrams p	er kilogram p	ber day.
will be evaluated and reported separately.	azarus associateu v	nu peu oleur						na	not available		

will be evaluated and reported separately.

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# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 13 - Heat and Electrical Power Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

80 B		Incestion	Dermal	VOC Inhalation				Pathy	vay-Specific	Hazard	Chemical-
	Surface Water Concentration <sup>a</sup>	Ingestion Dose	Dose	Dose _		ence Dose (	mg/kg-d) Inhalation		Dermal	VOC Inhalation	Specific HQ
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermai	Innalation	ingestion	Derman		
<sup>d</sup> Exposure dose and noncancer hazards were on by segregating total DRO concentrations into	calculated for petrole to aliphatic and arom	eum hydrocar atic fractions	bons measure , assuming 80	ed as DRO (me 0% aliphatic	thod 810	0)		VOC	Volatile org	anic compound	1.
hydrocarbons and 40% aromatic hydrocarbo											
• Exposure dose and noncancer hazards were	calculated for petrole	eum hydrocar	bons measure	ed as GRO (me	thod 801	5)					
by segregating total GRO concentrations in	to aliphatic and arom	atic fractions	, assuming 7	0% aliphatic							
hydrocarbons and 50% aromatic hydrocarbo	ns (ADEC, 2000c).										
f Exposure dose and noncancer hazards were	calculated for petrole	eum hydrocar	bons measure	ed as RRO (me	thod)						
by segregating total RRO concentrations int	to aliphatic and arom	atic fractions	, assuming 9	0% aliphatic							
hydrocarbons and 30% aromatic hydrocarbo											
) Doses and noncancer hazards shown only for c) Absorbed doses were calculated for dermal	r noncarcinogenic cl	nemicals with ium, and inta	available to kes were calc	cicity values.	stion or i	nhalation					
of a medium	represent the proba	bility of incu	rring an adve	rse health							
effect. They are calculated using the follow	ing formula: Nonca	incer HI = Ex	posure Dose/	Reference dos	е.						

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#### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 15- Buried Fuel Line Spill Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation					Specific Ca		Chemical-
	Concentration*	Dose	Dose	Dose		ope Factor	00	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
VOLATILE ORGANIC COMPOUNDS Ethylbenzene	1.0	4.0E-07	0.0E+00	2.9E-11	3.9E-03	3.9E-03	3.9E-03	1.6E-09	0.0E+00	1.1E-13	1.6E-09 2E-09
Notes:										illen	
<ul> <li><sup>a</sup> Based on the maximum or 95 percent upper confid</li> <li>1) Doses and cancer risks shown only for carcinogeni</li> <li>2) Based on the maximum or 95 percent upper confid</li> <li>Doses and cancer risks shown only for carcinogeni</li> </ul>	Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site. Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values. Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site. Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values. Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium										cer risk. per day.
Cancer risks are unitless values which represent the	e probability of incu	urring an adv	erse health								

### CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 15 - Buried Fuel Line Spill Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathwa	y-Specific C	ancer Risk	Chemical-
	Concentration <sup>a</sup>	Dose	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Slo Oral	pe Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-u)	(ing/kg-u)	- Oran	2000			0		
VOLATILE ORGANIC COMPOUNDS Ethylbenzene	1.0	1.2E-06	0.0E+00	8.8E-11	3.9E-03	3.9E-03	3.9E-03	4.7E-09	0.0E+00	3.4E-13	4.7E-09
									1	ILCR	5E-09
<ul> <li>btes:</li> <li>Based on the maximum or 95 percent upper co and soil gravel at the site.</li> <li>Doses and cancer risks shown only for carcino, Absorbed doses were calculated for dermal con of a medium.</li> </ul>	genic chemicals with	available toxic	ity values.					ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	lifetime cancer pathway. per kilogram. per kilogram pe	

 Cancer risks are unitless values which represent the probability of incurring an adverse nearin effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

#### TABL

### CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 15 - Buried Fuel Line Spill Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
VOLATILE ORGANIC COMPOUNDS Ethylbenzene	1.0	9.8E-09	0.0E+00	3.0E-12	3.9E-03	3.9E-03	3.9E-03	3.8E-11	0.0E+00	1.2E-14	3.8E-11
						2				ILCR	4E-11
betes: Based on the maximum or 95 percent upper confi Doses and cancer risks shown only for carcinoger Absorbed doses were calculated for dermal conta- of a medium		ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	l lifetime cance pathway. per kilogram. per kilogram p							

#### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 15 - Buried Fuel Line Spill Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					ay-Specific l		Chemical
	<b>Concentration</b> <sup>®</sup>	Dose	Dose	Dose	Refere	nce Dose (n		Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
NORGANICS											
Ethylbenzene	1.0	3.6E-06	0.0E+00	1.8E-10	1.0E-01	1.0E-01	2.9E-01	3.6E-05	0.0E+00	6.2E-10	0.000030
n,p-Xylene	1.8	6.6E-06	0.0E+00	3.3E-10	2.0E-01	2.0E-01	2.9E-02	3.3E-05	0.0E+00	1.1E-08	0.00003
-Xylene	0.015	5.5E-08	0.0E+00	2.7E-12	2.0E-01	2.0E-01	2.9E-02	2.7E-07	0.0E+00	9.3E-11	0.000000
POLYNUCLEAR AROMATIC HYDROCAR	BONS										
Naphthalene	28	1.0E-04	4.2E-05	5.1E-09	2.0E-02	2.0E-02	8.6E-04	5.1E-03	2.1E-03	5.9E-06	0.0072
										HI	0.0073
PETROLEUM HYDROCARBONS								4		đ	d
Diesel Range Organics	16,000	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup> 0.47
Diesel Range Organics, Aliphatic	12,800	4.7E-02	Inc	2.3E-06	1.0E-01	na	2.9E-01	4.7E-01	Inc	8.0E-06	0.47
Diesel Range Organics, Aromatic	6,400	2.3E-02	Inc	1.2E-06	4.0E-02	na	5.7E-01	5.8E-01	Inc	2.0E-06	
Gasoline Range Organics	110	nae	na	na	na®	na	na®	na	na°	na	na®
Gasoline Range Organics, Aliphatic	77	2.8E-04	Inc	1.4E-08	5.0E+00	па	5.3E+00	5.6E-05	Inc	2.6E-09	0.00005
Gasoline Range Organics, Aromatic	55	2.0E-04	Inc	9.9E-09	2.0E-01	na	1.1E-01	1.0E-03	Inc	9.0E-08	0.001
										н	1.0
es:								ні	Hazard inde	ex.	
Based on the maximum or 95 percent upper conf	idence limit (95% UC	L) on the mea	n					HQ	Hazard quo	tient.	
concentration detected at the site.								Inc	Incomplete		
Consistent with EPA policy, lead is not evaluated	in the cumulative HI	estimate.						100000		per kilogram.	
Risks associated with indicator compounds are in	cluded in cumulative	risk and hazar	rd					mg/kg			an day
estimates for each site. However, the health haza	ards associated with pe	etroleum mixt	ures					mg/kd-d	U	per kilogram	ber day.
will be evaluated and reported separately.								na	not availabl	le	
Exposure dose and noncancer hazards were calcu	lated for petroleum h	ydrocarbons n	neasured as D	RO (method 81)	00)						
by segregating total DRO concentrations into ali	phatic and aromatic fr	actions, assur	ning 80% alip	hatic							
hydrocarbons and 40% aromatic hydrocarbons (A											
Exposure dose and noncancer hazards were calcu	lated for petroleum h	vdrocarbons n	neasured as G	RO (method 80	15)						
exposure dose and noncancer nazards were calcu	nated for perioreun n										
by segregating total GRO concentrations into ali	photic and acomatic f	actions accur	ning 70% alin	hatic							

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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### NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 15 - Buried Fuel Line Spill Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					y-Specific		Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral		(mg/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ
VOL ATH FORCANIC COMPOUNDS											
VOLATILE ORGANIC COMPOUNDS Ethylbenzene	1.0	1.1E-05	0.0E+00	5.4E-10	1 0F-01	1.0E-01	2.9E-01	1.1E-04	0.0E+00	1.9E-09	0.00011
m,p-Xylene	1.8	2.0E-05	0.0E+00	9.8E-10	2.0E-01		2.9E-01	9.8E-05	0.0E+00	3.4E-08	0.00010
o-Xylene	0.015	1.6E-07	0.0E+00	8.1E-12		2.0E-01	2.9E-02	8.2E-07	0.0E+00	2.8E-10	0.000008
POLYNUCLEAR AROMATIC HYDROCA	RBONS										
Naphthalene	28	3.1E-04	1.3E-04	1.5E-08	2.0E-02	2.0E-02	8.6E-04	1.5E-02	6.3E-03	1.8E-05	0.022
										HI	0.022
PETROLEUM HYDROCARBONS											
Diesel Range Organics	16,000	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	12,800	1.4E-01	Inc	6.9E-06	1.0E-01	na	2.9E-01	1.4E+00	Inc	2.4E-05	1.4
Diesel Range Organics, Aromatic	6,400	7.0E-02	Inc	3.5E-06	4.0E-02	na	5.7E-01	1.7E+00	Inc	6.1E-06	1.7
Gasoline Range Organics	110	nae	na	na®	na®	na	nae	na	na°	na®	na®
Gasoline Range Organics, Aliphatic	77	8.4E-04	Inc	4.2E-08	5.0E+00	na	5.3E+00	1.7E-04	Inc	7.9E-09	0.00017
Gasoline Range Organics, Aromatic	55	6.0E-04	Inc	3.0E-08	2.0E-01	na	1.1E-01	3.0E-03	Inc	2.7E-07	0.0030
										HI	3.1
otes:							-				
<sup>a</sup> Based on the maximum or 95 percent upper con	fidence limit (95% UC	L) on the me	an					HI	Hazard ind		
concentration detected at the site.								HQ	Hazard qu	otient.	
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	d in the cumulative HI	estimate.						Inc	Incomplet	e pathway.	
e Risks associated with indicator compounds are i	ncluded in cumulative	risk and haza	ard					mg/kg	Milligram	s per kilogram	n.
estimates for each site. However, the health haz								mg/kd-d	Milligram	s per kilogran	n per day.
will be evaluated and reported separately.								na	not availal	ole	
<sup>d</sup> Exposure dose and noncancer hazards were calc	ulated for petroleum h	ydrocarbons	measured as I	DRO (method	8100)						
by segregating total DRO concentrations into a	iphatic and aromatic fi	ractions, assu	ming 80% ali	iphatic							
hydrocarbons and 40% aromatic hydrocarbons (											
• Exposure dose and noncancer hazards were calc											

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 15 - Buried Fuel Line Spill Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathwa	y-Specific Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation		Dust Dermal Inhalation	Specific HQ

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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#### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 15 - Buried Fuel Line Spill Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Path	way-Specific H	azard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (r	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
VOLATILE ORGANIC COMPOUNDS											
Ethylbenzene	1.0	2.9E-08	0.0E+00	8.8E-12	1.0E-01	1.0E-01	2.9E-01	2.9E-07	0.0E+00	3.0E-11	0.000002
m,p-Xylene	1.8	5.1E-08	0.0E+00	1.6E-11	2.0E-01	2.0E-01	2.9E-02	2.6E-07	0.0E+00	5.5E-10	0.0000002
o-Xylene	0.015	4.3E-10	0.0E+00	1.3E-13	2.0E-01	2.0E-01	2.9E-02	2.1E-09	0.0E+00	4.5E-12	0.0000000
POLYNUCLEAR AROMATIC HYDROC	ARBONS										
Naphthalene	28	8.0E-07	1.4E-06	2.5E-10	2.0E-02	2.0E-02	8.6E-04	4.0E-05	6.9E-05	2.9E-07	0.00011
									1	ні	0.00011
PETROLEUM HYDROCARBONS <sup>e</sup>											
Diesel Range Organics	16,000	na <sup>d</sup>	nad	nad	nad	nad	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	nad
Diesel Range Organics, Aliphatic	12,800	3.7E-04	Inc	1.1E-07	1.0E-01	na	2.9E-01	3.7E-03	Inc	3.9E-07	0.0037
Diesel Range Organics, Aromatic	6,400	1.8E-04	Inc	5.6E-08	4.0E-02	na	5.7E-01	4.6E-03	Inc	9.9E-08	0.0046
Gasoline Range Organics	110	na	na <sup>c</sup>	na	na	na <sup>e</sup>	na	na	na	na	na
Gasoline Range Organics, Aliphatic	77	2.2E-06	Inc	6.8E-10	5.0E+00	na	5.3E+00	4.4E-07 7.8E-06	Inc Inc	1.3E-10 4.4E-09	0.0000004
Gasoline Range Organics, Aromatic	55	1.6E-06	Inc	4.8E-10	2.0E-01	na	1.1E-01	7.82-00	ine		
										HI	0.0082
tes:	-Edance limit (050 I	(CI) on the m						ні	Hazard index.		
Based on the maximum or 95 percent upper co	onndence limit (95% U	(CL) on the n	ican					HQ	Hazard quotie	nt	
concentration detected at the site.									Incomplete pa		
Consistent with EPA policy, lead is not evalua			rord					Inc	Milligrams pe		
Risks associated with indicator compounds are								mg/kg	Milligrams pe	•	r dav
estimates for each site. However, the health ha	azards associated with	peutoleum m	ixtures					mg/kd-d	not available	r knogram pe	l uay.
will be evaluated and reported separately. Exposure dose and noncancer hazards were ca	loulated for netroleum	hydrocarbon	measured as	DRO (metho	od 8100)			na	not available		
by segregating total DRO concentrations into					a 0100)						
hydrocarbons and 40% aromatic hydrocarbons		nacuons, ass	uning 00 % t	inplatic							
Exposure dose and noncancer hazards were ca		hydrocarbons	s measured as	GRO (metho	od 8015)						
by segregating total GRO concentrations into											
hydrocarbons and 50% aromatic hydrocarbons											
Doses and noncancer hazards shown only for r		cale with ave	ilable toxicit	, walnes							

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation

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### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 15 - Buried Fuel Line Spill Area - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathw	vay-Specific H	lazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalatio	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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#### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 15 - Buried Fuel Line Spill Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Cancer Sl	ope Factor	$(mg/kg-d)^{-1}$	_		VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS											
Arsenic	0.11	4.2E-04	5.8E-06	Inc	1.5E+00	1.5E+00	1.5E+01	6.3E-04	8.6E-06	Inc	6.4E-04
										ILCR	6E-04
otes:									_		
	er confidence limit	(95% UCL) o	on the mean					ILCR		l lifetime cance	risk.
<sup>a</sup> Based on the maximum or 95 percent upp								Inc	Incomplete	nathway	
concentration detected at the site.		s with availab	ble toxicity v	alues.				Inc mg/L	Incomplete Milligrams		
concentration detected at the site. ) Doses and cancer risks shown only for can	rcinogenic chemical			alues.				Inc mg/L mg/kg-d	Milligrams		er day.
	rcinogenic chemical al contact with the n			alues.				mg/L	Milligrams Milligrams	per liter.	

# CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 15 - Buried Fuel Line Spill Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathwa	y-Specific Ca	ncer Risk	Chemical-
	Surface Water Concentration <sup>*</sup>	Dose (mg/kg-d)	Dose	Dose	Cancer Sl Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	VOC Inhalation	Specific Risk
Constituent INORGANICS Arsenic	(mg/L) 0.11	1.6E-03	2.2E-05	Inc	1.5E+00	1.5E+00	1.5E+01	2.5E-03	3.4E-05	Inc	2.5E-03
Aiscuit										ILCR	2E-03
tes: Based on the maximum or 95 percent to concentration detected at the site.	upper confidence limit (95 carcinogenic chemicals w			es.				ILCR Inc mg/L mg/kg-d	Incomplete Milligrams		

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### CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 15 - Buried Fuel Line Spill Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Surface Water	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca	ancer Risk	Chemical-
Constituent		Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer S Oral	lope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	VOC Inhalation	Specific Risk
INORGANICS Arsenic		0.11	4.3E-05	4.3E-07	Inc	1.5E+00	1.5E+00	1.5E+01	6.5E-05	6.5E-07	Inc	6.5E-05
otes:							2 a				ILCR	7E-05
Based on the maximum concentration detered boses and cancer	risks shown only for carcin	ogenic chemicals wi	th available to	oxicity values	5.				ILCR Inc mg/L	Incomplete Milligrams	per liter.	
calculated for ing	vere calculated for dermal constraints of a me estion or inhalation of a me nitless values which represe	dium.			th				mg/kg-d VOC		per kilogram p ganic compound	

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 15 - Buried Fuel Line Spill Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathw	vay-Specific I		Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Arsenic	0.11	9.3E-04	4.4E-05	Inc	3.0E-04	3.0E-04	3.0E-04	3.1E+00	1.5E-01	Inc	3.2
Arsenic, Dissolved	0.006	5.1E-05	2.4E-06	Inc	3.0E-04	3.0E-04	3.0E-04	1.7E-01	8.0E-03	Inc	0.18
Lead	0.68	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>					
Nickel	0.20	1.7E-03	1.6E-05	Inc	2.0E-02	2.0E-02	2.0E-02	8.5E-02	8.0E-04	Inc	0.085
										HI	3.5
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	960	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	768	6.5E+00	Inc	4.3E+00	1.0E-01	na	2.9E-01	6.5E+01	Inc	1.5E+01	80
Diesel Range Organics, Aromatic	384	3.2E+00	Inc	2.2E+00	4.0E-02	na	5.7E-01	8.1E+01	Inc	3.8E+00	85
Residual Range Organics	3.8	na	na°	na	na®	na®	na°	na	na	na®	na
Residual Range Organics, Aliphatic	3.4	2.9E-02	Inc	2.0E-05	2.0E+00	na	na	1.4E-02	Inc	Inc	0.014
Residual Range Organics, Aromatic	1.1	9.6E-03	Inc	6.7E-06	3.0E-02	na	na	3.2E-01	Inc	Inc	0.32
										HI	165
Notes:									Hazard inde	v	
<sup>a</sup> Based on the maximum or 95 percent upper	er confidence limit (95	5% UCL) on t	he mean					HI	Hazard quot		
concentration detected at the site.								HQ	-		
<sup>b</sup> Consistent with EPA policy, lead is not eva	aluated in the cumula	tive HI estimation	ate.					Inc	Incomplete		
Please refer to Section 4.2.3.3.3.								mg/L	Milligrams	-	
e Risks associated with indicator compounds	s are included in cum	ulative risk an	d hazard					mg/kd-d	-	per kilogram	per day.
estimates for each site. However, the healt	th hazards associated	with petroleu	m mixtures					na	not availabl		
will be evaluated and reported separately.								VOC	Volatile org	anic compour	nd.
<sup>d</sup> Exposure dose and noncancer hazards were	e calculated for petrol	leum hydroca	rbons measu	red as DRO (1	method 810	)0)			r.		
by segregating total DRO concentrations i	into aliphatic and aror	natic fraction	s, assuming 8	30% aliphatic							
hydrocarbons and 40% aromatic hydrocarb											
<ul> <li>Exposure dose and noncancer hazards were</li> </ul>	e calculated for petro	leum hydroca	rbons measu	red as RRO (1	method)						
by segregating total RRO concentrations i	into aliphatic and aror	natic fraction	s, assuming	0% aliphatic							
	ADEC 2000a)										

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

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### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 15 - Buried Fuel Line Spill Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				VOC				
	Surface Water	Ingestion	Dermal	Inhalation	-	Pathway-Specific	Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)		VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion Dermal	Inhalation	HQ

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 15 - Buried Fuel Line Spill Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	C	Incestion	Dermal	VOC Inhalation				Pathy	vay-Specific	Hazard	Chemical-
Constituent	Surface Water Concentration <sup>a</sup> (mg/L)	Ingestion Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Referen	nce Dose () Dermal	mg/kg-d) Inhalation	1	Dermal	VOC Inhalation	Specific HQ
Constituent	(ing ii)	(ing ing u)	(	(							
INORGANICS									5 <b>5</b> 5 6 1		13
Arsenic	0.11	3.6E-03	1.7E-04	Inc	3.0E-04	3.0E-04	3.0E-04	1.2E+01	5.7E-01 3.1E-02	Inc Inc	0.69
Arsenic, Dissolved	0.0060	2.0E-04	9.3E-06	Inc	3.0E-04	3.0E-04	3.0E-04	6.6E-01		na <sup>b</sup>	nab
Lead	0.68	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab			na 0.33
Nickel	0.20	6.6E-03	6.2E-05	Inc	2.0E-02	2.0E-02	2.0E-02	3.3E-01	3.1E-03	Inc	0.33
										HI	14
PETROLEUM HYDROCARBONS											
Diesel Range Organics	960	na <sup>d</sup>	nad	nad	nad	nad	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	768	2.5E+01	Inc	1.7E+01	1.0E-01	na	2.9E-01	2.5E+02	Inc	5.8E+01	311
Diesel Range Organics, Aromatic	384	1.3E+01	Inc	8.4E+00	4.0E-02	na	5.7E-01	3.2E+02	Inc	1.5E+01	330
Residual Range Organics	3.8	na	na	na	na	na°	na	na°	na	na°	na°
Residual Range Organics, Aliphatic	3.4	1.1E-01	Inc	7.8E-05	2.0E+00	na	na	5.6E-02	Inc	Inc	0.056
Residual Range Organics, Aromatic	1.1	3.7E-02	Inc	2.6E-05	3.0E-02	na	na	1.2E+00	Inc	Inc	1.2
										HI	642
otes:									1. C		
<sup>a</sup> Based on the maximum or 95 percent upper	confidence limit (9)	5% UCL) on	the mean					HI	Hazard inde	x.	
concentration detected at the site.								HQ	Hazard quot	ient.	
	lusted in the cumula	tive HI estim	ate					Inc	Incomplete	pathway.	
<sup>b</sup> Consistent with EPA policy, lead is not eva <sup>c</sup> Risks associated with indicator compounds	are included in cum	ulative risk at	nd hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the health	hazards associated	with petroleu	m mixtures					mg/kd-d	Milligrams	per kilogram p	per day.
	I hazarus associated	with per orea						na	not available		
will be evaluated and reported separately.		1	shone measure	ad as DPO (r	nethod 810	0)		VOC		anic compour	ıd.
<sup>d</sup> Exposure dose and noncancer hazards were	calculated for petro	leum hydroca	roons measur	ed as DRO (I	nethod 810	0)		VUC	volatile org	unio compoun	
by segregating total DRO concentrations in			s, assuming 8	0% aliphatic							
hydrocarbons and 40% aromatic hydrocarb	ons (ADEC, 2000c).				2						
• Exposure dose and noncancer hazards were	calculated for petro	leum hydroca	rbons measur	red as RRO (r	nethod)						
by segregating total RRO concentrations in	nto aliphatic and arou	matic fraction	s, assuming 9	0% aliphatic							
hydrocarbons and 30% aromatic hydrocarb											
injuioeu oons und so to u onnuns injuiceure											
<ol> <li>Doses and noncancer hazards shown only f</li> <li>Absorbed doses were calculated for dermal</li> </ol>	or noncarcinogenic	chemicals with	h available to	xicity values.							

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 15 - Buried Fuel Line Spill Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				VOC			*		
	Surface Water	Ingestion	Dermal	Inhalation		Pathw	ay-Specific I	Hazard	Chemical-
		0	Doce	Dose	Reference Dose (mg/kg-d)			VOC	Specific
	Concentration <sup>*</sup>	Dose	Dose			Ingestion	Dermal	Inhalation	НО
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	ingestion	Derman	Innanación	

of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 15 - Buried Fuel Line Spill Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Conferent Western	Incestion	Dermal	VOC Inhalation				Pathw	ay-Specific	Hazard	Chemical
Constituent	Surface Water Concentration <sup>a</sup> (mg/L)	Ingestion Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere	nce Dose ( Dermal	mg/kg-d) Inhalation	-00	Dermal	VOC Inhalation	Specific HQ
Constituent	(ing 2)	(	(		4						
INORGANICS Arsenic Arsenic, Dissolved	0.11 0.006	1.3E-04 6.8E-06	1.3E-06 6.8E-08 na <sup>b</sup>	Inc Inc na <sup>b</sup>	3.0E-04 3.0E-04 na <sup>b</sup>	3.0E-04 3.0E-04 na <sup>b</sup>	3.0E-04 3.0E-04 na <sup>b</sup>	4.2E-01 2.3E-02 na <sup>b</sup>	4.2E-03 2.3E-04 na <sup>b</sup>	Inc Inc na <sup>b</sup>	0.42 0.023 na <sup>b</sup>
Lead Nickel	0.68 0.20	na <sup>b</sup> 2.3E-04	na 4.6E-07	na Inc	na 2.0E-02	2.0E-02	2.0E-02	1.1E-02	2.3E-05	Inc	0.011
										HI	0.46
<b>PETROLEUM HYDROCARBONS<sup>e</sup></b> Diesel Range Organics Diesel Range Organics, Aliphatic	960 768	na <sup>d</sup> 8.8E-01	na <sup>d</sup> Inc	na <sup>d</sup> 2.1E-01	na <sup>d</sup> 1.0E-01 4.0E-02	na <sup>d</sup> na na	na <sup>d</sup> 2.9E-01 5.7E-01	na <sup>d</sup> 8.8E+00 1.1E+01	na <sup>d</sup> Inc Inc	na <sup>d</sup> 7.3E-01 1.8E-01	na <sup>d</sup> 9.5 11
Diesel Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	384 3.8 3.4 1.1	4.4E-01 na <sup>e</sup> 3.9E-03 1.3E-03	Inc na <sup>e</sup> Inc Inc	1.1E-01 na <sup>e</sup> 9.8E-07 3.3E-07	na <sup>e</sup> 2.0E+00 3.0E-02	na <sup>e</sup> na na	na <sup>°</sup> na na	na <sup>e</sup> 2.0E-03 4.3E-02	na <sup>°</sup> Inc Inc	na <sup>e</sup> Inc Inc	na <sup>e</sup> 0.0020 0.043
otes:										HI	21
Based on the maximum or 95 percent upper concentration detected at the site.								HI HQ	Hazard inde Hazard quo Incomplete	tient.	
<ul> <li><sup>b</sup> Consistent with EPA policy, lead is not ev</li> <li><sup>c</sup> Risks associated with indicator compound estimates for each site. However, the heal will be evaluated and reported separately.</li> </ul>	s are included in cumu th hazards associated	lative risk an with petroleu	id hazard m mixtures					Inc mg/L mg/kd-d na	Milligrams Milligrams not availabl	per liter. per kilogram j	
<sup>d</sup> Exposure dose and noncancer hazards wer by segregating total DRO concentrations hydrocarbons and 40% aromatic hydrocarbons	into aliphatic and aron bons (ADEC, 2000c).	natic fraction	s, assuming 8	0% aliphatic		J)		VOC	volatile org	ane compour	
<ul> <li>Exposure dose and noncancer hazards wer by segregating total RRO concentrations hydrocarbons and 30% aromatic hydrocar</li> </ul>	into aliphatic and aron bons (ADEC, 2000c).	natic fraction	s, assuming 9	0% aliphatic							
<ol> <li>Doses and noncancer hazards shown only</li> <li>Absorbed doses were calculated for derma</li> </ol>	for noncarcinogenic c	hemicals with lium, and inte	h available to akes were cal	xicity values. culated for in	gestion or i	nhalation					

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 15 - Buried Fuel Line Spill Area - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				VOC				
	Surface Water	Ingestion	Dermal	Inhalation		Pathway-S	Specific Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)		VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion D	ermal Inhalation	HQ

of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 16 - Paint and Dope Storage Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-S	Specific Car	ncer Risk	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer SI	ope Factor	(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)		Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
Constituent											
INORGANICS				1 05 10	1 60.00	1.50.00	1.5E+01	3.9E-06	4.6E-07	2.8E-09	4.3E-06
Arsenic	6.4	2.6E-06	3.0E-07	1.9E-10	1.5E+00	1.5E+00	8.4E+00	na	na	2.6E-10	2.6E-10
Beryllium	1.1	4.2E-07	0.0E+00	3.1E-11	na	na	6.3E+00	na	na	4.5E-10	4.5E-10
Cadmium	2.4	9.9E-07	3.9E-09	7.2E-11	na	na	0.36+00	на	ina		
VOLATILE ORGANIC COMPOUNDS							1 (5.02	2 2E 11	0.0E+00	3.5E-16	2.2E-11
Methylene chloride	0.0072	2.9E-09	0.0E+00	2.1E-13	7.5E-03	7.5E-03	1.6E-03	2.2E-11	0.02+00	5.56-10	2.2.2
POLYCHLORINATED BIPHENYLS							2.05.00	6.3E-07	3.5E-07	4.6E-11	9.7E-07
PCB-1260 (Aroclor 1260)	0.78	3.1E-07	1.7E-07	2.3E-11	2.0E+00	2.0E+00	2.0E+00	0.3E-07	5.56-07	4.015 11	
										ILCR	5E-06
tes:										al lifetime car	cer risk
Based on the maximum or 95 percent upper co	nfidence limit (95% U	CL) on the m	ean concentr	ation detected	at the site.			ILCR		te pathway.	ICCI IISK.
Down and senses risks shown only for carcino	genic chemicals with a	vailable toxic	city values.					Inc		is per kilogran	1.
Based on the maximum or 95 percent upper co	nfidence limit (95% U	CL) on the m	ean concenu	ation detected	at the site.			mg/kg		is per kilogram	
Doses and cancer risks shown only for carcino Absorbed doses were calculated for dermal con	genic chemicals with a	valiable toxic	ity values.					mg/kg-d	winigran	o por anogram	
		and intokan	vere calculat	ed for ingestic	on or inhalati	on					

Cancer risks are unitless values which represent the probability of incurring an adverse health

#### TAB 7

#### CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 16 - Paint and Dope Storage Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway	y-Specific C	ancer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Slo Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
Construction											
INORGANICS										0.57.00	1 25 05
Arsenic	6.4	7.7E-06	9.1E-07	5.6E-10	1.5E+00	1.5E+00	1.5E+01	1.2E-05	1.4E-06	8.5E-09	1.3E-05
Beryllium	1.1	1.3E-06	0.0E+00	9.3E-11	na	na	8.4E+00	na	na	7.8E-10	7.8E-10
Cadmium	2.4	3.0E-06	1.2E-08	2.2E-10	na	na	6.3E+00	na	na	1.4E-09	1.4E-09
VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.0072	8.7E-09	0.0E+00	6.4E-13	7.5E-03	7.5E-03	1.6E-03	6.5E-11	0.0E+00	1.0E-15	6.5E-11
POLYCHLORINATED BIPHENYLS											
PCB-1260 (Aroclor 1260)	0.78	9.4E-07	5.2E-07	6.9E-11	2.0E+00	2.0E+00	2.0E+00	1.9E-06	1.0E-06	1.4E-10	2.9E-06

		ILCR 2E-05
Notes:		•
* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected in soil tundra	ILCR	Incremental lifetime cancer risk.
and soil gravel at the site.	Inc	Incomplete pathway. Milligrams per kilogram.
1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.	mg/kg mg/kg-d	Milligrams per kilogram per day.
2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation	mb kB a	iningrame per iningram per s

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

of a medium.

### CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 16 - Paint and Dope Storage Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion Dose	Soil Dermal Dose	Dust Inhalation Dose				Pathway-	Specific Cancer Risk		Chemical-
	Concentration				Cancer Slope Factor (mg/kg-d) <sup>-1</sup>			Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
NORGANICS	6.4	6.2E-08	2.5E-08	1.9E-11	1.5E+00	1.5E+00	1.5E+01	9.4E-08	3.7E-08	2.9E-10	1.3E-07
Arsenic	1.1	1.0E-08	0.0E+00	3.2E-12	na	na	8.4E+00	na	na	2.7E-11	2.7E-11
Beryllium Cadmium	2.4	2.4E-08	3.2E-10	7.4E-12	na	na	6.3E+00	na	na	4.6E-11	4.6E-11
Cadmium	2										
VOLATILE ORGANIC COMPOUNDS								6 AF 10	0.05.00	3.6E-17	5.3E-13
Methylene chloride	0.0072	7.0E-11	0.0E+00	2.2E-14	7.5E-03	7.5E-03	1.6E-03	5.3E-13	0.0E+00	3.0E-17	5.56-15
POLYCHLORINATED BIPHENYLS				0.000.10	2.0E+00	2.0E+00	2.0E+00	1.5E-08	2.8E-08	4.7E-12	4.3E-08
PCB-1260 (Aroclor 1260)	0.78	7.6E-09	1.4E-08	2.3E-12	2.02+00	2.00+00	2.01100	1.50-00	2.01 00		
										ILCR	2E-07

N	2	to	
14	υ	ιc	э.

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

ILCR Incomplete pathway. Inc Milligrams per kilogram. mg/kg

mg/kg-d

Incremental lifetime cancer risk.

Milligrams per kilogram per day.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 16 - Paint and Dope Storage Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion Dose (mg/kg-d)	Dermal Dose (mg/kg-d)	Dust Inhalation				Pathway-Specific Hazard			Chemical
Constituent	Concentration <sup>*</sup>			Dose (mg/kg-d)	Reference Dose (mg/kg-d)			Soil		Dust	Specific
	(mg/kg)				Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS	9.6	3.5E-05	0.0E+00	1.7E-09	4.0E-04	4.0E-04	4.0E-04	8.8E-02	0.0E+00	4.3E-06	0.088
Antimony		2.3E-05	2.2E-06	1.2E-09	4.0E-04	3.0E-04	3.0E-04	7.7E-02	7.4E-03	3.8E-06	0.085
Arsenic	6.4 1.1	3.8E-06	0.0E+00	1.9E-10	2.0E-03	2.0E-03	5.7E-06	1.9E-03	0.0E+00	3.3E-05	0.0019
Beryllium Cadmium	2.4	8.9E-06	2.8E-08	4.4E-10	5.0E-04	5.0E-04	5.0E-04	1.8E-02	5.6E-05	8.8E-07	0.018
Chromium	69	2.5E-04	0.0E+00	1.2E-08	1.5E+00	1.5E+00	1.5E+00	1.7E-04	0.0E+00	8.3E-09	0.0001
		nab	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab
Lead	530 0.26	9.5E-07	0.0E+00	4.7E-11	7.0E-05	7.0E-05	7.0E-05	1.4E-02	0.0E+00	6.7E-07	0.014
Thallium		1.3E-02	0.0E+00	6.4E-07	3.0E-01	3.0E-01	3.0E-01	4.3E-02	0.0E+00	2.1E-06	0.043
Zinc	3,521	1.3E-02	0.06+00	0.42-07	J.0L-01	5.02.01	5.02 01				
VOLATILE ORGANIC COMPOUNDS											0.000000
Methylene chloride	0.0072	2.6E-08	0.0E+00	1.3E-12	6.0E-02	6.0E-02	8.6E-01	4.4E-07	0.0E+00	1.5E-12	0.000000
POLYCHLORINATED BIPHENYLS									( 07 00	7.05.00	0.20
PCB-1260 (Aroclor 1260)	0.78	2.8E-06	1.3E-06	1.4E-10	2.0E-05	2.0E-05	2.0E-05	1.4E-01	6.3E-02	7.0E-06	0.20
										HI	0.45
otes:	(8.)										
<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean								н	Hazard index.		
concentration detected at the site.								HQ	Hazard quotient.		
<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.								Inc	Incomplete pathway.		
e Risks associated with indicator compounds are included in cumulative risk and hazard								mg/kg	Milligrams per kilogram.		
estimates for each site. However, the health hazards associated with petroleum mixtures								mg/kd-d	Milligrams per kilogram per day.		
will be evaluated and reported separately.								na	not available		
<sup>d</sup> Exposure dose and noncancer hazards were cal	culated for petroleum	hydrocarbons	measured as	DRO (method 8	3100)						
by segregating total DRO concentrations into a	liphatic and aromatic	fractions assi	ming 80% al	iphatic							
		inactions, ass	anning oo to un	pinnin							
hydrocarbons and 40% aromatic hydrocarbons	(ADEC, 2000c).			CDO (method (	015)						
• Exposure dose and noncancer hazards were cal	culated for petroleum	hydrocarbons	measured as	GRO (method a	(015)						
by segregating total GRO concentrations into a	aliphatic and aromatic	fractions, ass	uming 70% al	phatic							
hydrocarbons and 50% aromatic hydrocarbons	(ADEC, 2000c).										
f Exposure dose and noncancer hazards were cal	culated for petroleum	hydrocarbons	measured as	RRO (method)							
by segregating total RRO concentrations into a	liphatic and aromatic	fractions, assu	uming 90% ali	phatic							
by segregating total fixed concentrations mile											

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

Page 1 of 2
# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 16 - Paint and Dope Storage Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathwa	y-Specific	Hazard	Chemical-
Constituent	Concentration <sup>*</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation

of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

### TADLE F-90

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 16 - Paint and Dope Storage Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					ay-Specific		Chemical
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere		(mg/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ
Constituent	(Ing/kg)	(mg/kg-u)	(ing/kg-u)	(ing/ing ti)	0141	20000					
INORGANICS											
Antimony	9.6	1.1E-04	1.0E-05	5.2E-09	4.0E-04		4.0E-04	2.6E-01	2.5E-02	1.3E-05	0.29
Arsenic	6.4	7.0E-05	6.6E-06	3.5E-09		3.0E-04	3.0E-04	2.3E-01	2.2E-02	1.2E-05	0.25 0.0064
Beryllium	1.1	1.1E-05	1.1E-06	5.7E-10	2.0E-03		5.7E-06	5.7E-03 5.3E-02	5.5E-04 1.7E-04	1.0E-04 2.7E-06	0.0004
Cadmium	2.4	2.7E-05	8.5E-08	1.3E-09	5.0E-04 1.5E+00		5.0E-04 1.5E+00	5.0E-02	0.0E+00	2.7E-00	0.00050
Chromium	69	7.5E-04	0.0E+00	3.7E-08 na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	nab	nab	na <sup>b</sup>
Lead	530	na <sup>b</sup>	na <sup>b</sup>						na 0.0E+00	2.0E-06	0.041
Thallium	0.26	2.8E-06	0.0E+00	1.4E-10		7.0E-05	7.0E-05	4.1E-02 1.3E-01	0.0E+00	6.4E-06	0.13
Zinc	3,521	3.8E-02	0.0E+00	1.9E-06	3.0E-01	3.0E-01	3.0E-01	1.3E-01	0.02+00	0.46-00	0.15
VOLATILE ORGANIC COMPOUNDS											
Methylene chloride	0.0072	7.9E-08	0.0E+00	3.9E-12	6.0E-02	6.0E-02	8.6E-01	1.3E-06	0.0E+00	4.5E-12	0.000001
POLYCHLORINATED BIPHENYLS											9 2 9
PCB-1260 (Aroclor 1260)	0.78	8.5E-06	3.8E-06	4.2E-10	2.0E-05	2.0E-05	2.0E-05	4.2E-01	1.9E-01	2.1E-05	0.61
										HI	1.4
otes:							-				
<sup>a</sup> Based on the maximum or 95 percent upper confi	idence limit (95% UC	CL) on the me	an					HI	Hazard in	dex.	
concentration detected at the site.								HQ	Hazard qu	otient.	
Consistent with EPA policy, lead is not evaluated	in the cumulative H	I estimate.						Inc	Incomplet	e pathway.	
Risks associated with indicator compounds are in	cluded in cumulative	risk and haza	urd					mg/kg	Milligram	s per kilogran	n.
estimates for each site. However, the health haza								mg/kd-d	Milligram	s per kilogran	n per day.
will be evaluated and reported separately.								na	not availal	ble	
Exposure dose and noncancer hazards were calcu	lated for petroleum h	ydrocarbons	measured as l	DRO (method	8100)						
by segregating total DRO concentrations into ali											
hydrocarbons and 40% aromatic hydrocarbons (A											
• Exposure dose and noncancer hazards were calcu		ydrocarbons	measured as	GRO (method	1 8015)						
by segregating total GRO concentrations into ali											
hydrocarbons and 50% aromatic hydrocarbons (A											

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 16 - Paint and Dope Storage Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

			Soil		Dust				<i>c</i>
		Soil	Ingestion	Dermal	Inhalation		Pathwa	y-Specific Hazard	Chemical-
		<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)	Soil	Dust	Specific
Constituent		(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion	Dermal Inhalation	HQ

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation

of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 16 - Paint and Dope Storage Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific I	Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (r	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Antimony	9.6	2.7E-07	0.0E+00	8.5E-11	4.0E-04	4.0E-04	4.0E-04	6.9E-04	0.0E+00	2.1E-07	0.00069
Arsenic	6.4	1.8E-07	7.2E-08	5.6E-11	3.0E-04	3.0E-04	3.0E-04	6.1E-04	2.4E-04	1.9E-07	0.00085
Beryllium	1.1	3.0E-08	0.0E+00	9.2E-12	2.0E-03	2.0E-03	5.7E-06	1.5E-05	0.0E+00	1.6E-06	0.000017
Cadmium	2.4	7.0E-08	9.2E-10	2.2E-11	5.0E-04	5.0E-04	5.0E-04	1.4E-04	1.8E-06	4.3E-08	0.00014
Chromium	69	2.0E-06	0.0E+00	6.0E-10	1.5E+00	1.5E+00	1.5E+00	1.3E-06	0.0E+00	4.0E-10	0.0000013
	530	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead Thallium	0.26	7.4E-09	0.0E+00	2.3E-12	7.0E-05	7.0E-05	7.0E-05	1.1E-04	0.0E+00	3.3E-08	0.00011
Zinc	3,521	1.0E-04	0.0E+00	3.1E-08	3.0E-01	3.0E-01	3.0E-01	3.3E-04	0.0E+00	1.0E-07	0.00034
VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.0072	2.1E-10	0.0E+00	6.3E-14	6.0E-02	6.0E-02	8.6E-01	3.4E-09	0.0E+00	7.4E-14	0.000000034
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	0.78	2.2E-08	4.1E-08	6.8E-12	2.0E-05	2.0E-05	2.0E-05	1.1E-03	2.1E-03	3.4E-07	0.0032

			and the second se		
			HI	0.0053	
Notes:					
<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean	HI	Hazard index			
concentration detected at the site.	HQ	Hazard quotion			
<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.	Inc	Incomplete p			
<sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazard	mg/kg	Milligrams p	-		
estimates for each site. However, the health hazards associated with petroleum mixtures	mg/kd-d		er kilogram per	day.	
will be evaluated and reported separately.	na	not available			
<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)					
by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic					
hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).					
• Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)					
by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic					
hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).					
Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )					
by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic					
hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).					
1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.					

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 16 - Paint and Dope Storage Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust				~
	Soil	Ingestion	Dermal	Inhalation	-	Pathway-Specific	Hazard	Chemical-
	Concentration	Dose	Dose	Dose	Reference Dose (mg/kg-d)	Soil	Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion Dermal	Inhalation	HQ

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

#### TAB 2

# CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 16 - Paint and Dope Storage Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca	ancer Risk	Chemical
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	VOC Inhalation	Specific Risk
VOLATILE ORGANIC COMPOUNDS bis(2-ethylexyl)phthalate Trichloroethene	0.017 0.0033	6.5E-05 1.3E-05	2.2E-05 2.7E-06	9.6E-09 7.3E-05	1.4E-02 4.0E-01	1.4E-02 4.0E-01	1.4E-02 4.0E-01	9.1E-07 5.0E-06	3.1E-07 1.1E-06	1.3E-10 2.9E-05	1.2E-06 3.5E-05
										ILCR	4E-05
<ul> <li>a Based on the maximum or 95 percent upper conconcentration detected at the site.</li> <li>b) Doses and cancer risks shown only for carcino by Absorbed doses were calculated for dermal concalculated for ingestion or inhalation of a median concentration of a median concentration.</li> </ul>	genic chemicals with the media	th available to	oxicity value	S.				ILCR Inc mg/L mg/kg-d VOC	Incomplete Milligrams Milligrams		per day.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 16 - Paint and Dope Storage Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Surface Water Concentration <sup>*</sup> (mg/L)	Ingestion Dose (mg/kg-d)	Dermal Dose (mg/kg-d)	VOC Inhalation Dose (mg/kg-d)	Cancer Sl Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation		-Specific Ca Dermal	ncer Risk VOC Inhalation	Chemical- Specific Risk
VOLATILE ORGANIC COMPOUNDS bis(2-ethylexyl)phthalate Trichloroethene	0.017 0.0033	2.5E-04 4.9E-05	8.7E-05 1.1E-05	3.7E-08 2.8E-04	1.4E-02 4.0E-01	1.4E-02 4.0E-01	1.4E-02 4.0E-01	3.6E-06 2.0E-05	1.2E-06 4.2E-06	5.2E-10 1.1E-04	4.8E-06 1.4E-04 <b>1E-04</b>

on the mean

Incremental lifetime cancer risk.

Milligrams per kilogram per day.

Volatile organic compound.

Incomplete pathway.

Milligrams per liter.

ILCR

mg/L

VOC

mg/kg-d

Inc

<sup>a</sup> Based on the maximum or 95	percent upper confidence limit (95% UCL)
---	--

concentration detected at the site.

Notes:

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

### CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 16 - Paint and Dope Storage Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathway-	Specific Ca	ncer Risk	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer S	lope Factor	$(mg/kg-d)^{-1}$			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
VOLATILE ORGANIC COMPOUNDS											
bis(2-ethylexyl)phthalate	0.017	6.7E-06	1.7E-06	9.8E-10	1.4E-02	1.4E-02	1.4E-02	9.3E-08	2.3E-08	1.4E-11	1.2E-07
Trichloroethene	0.0033	1.3E-06	2.0E-07	7.4E-06	4.0E-01	4.0E-01	4.0E-01	5.2E-07	8.1E-08	3.0E-06	3.6E-06
										ILCR	4E-06

		ILCK 4D-00
Notes:		
<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean	ILCR	Incremental lifetime cancer risk.
<ul><li>concentration detected at the site.</li><li>1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.</li><li>2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.</li></ul>	Inc mg/L mg/kg-d VOC	Incomplete pathway. Milligrams per liter. Milligrams per kilogram per day. Volatile organic compound.
3) Cancer risks are unitless values which represent the probability of incurring an adverse health		

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 16 - Paint and Dope Storage Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific I	Hazard VOC	Chemic Specif
	Concentration <sup>a</sup>	Dose	Dose	Dose		nce Dose (	mg/kg-d) Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermai	Innalation	ingestion	Derman	Innuntron	
INORGANICS									0.05.03	Inc	0.18
Beryllium	0.040	3.4E-04	1.6E-05	Inc	2.0E-03	2.0E-03	5.7E-06	1.7E-01	8.0E-03	Inc	1.1
Cadmium	0.060	5.1E-04	2.4E-05	Inc	5.0E-04	5.0E-04	5.0E-04	1.0E+00	4.8E-02	Inc	0.12
Copper	0.50	4.2E-03	2.0E-04	Inc	3.7E-02	3.7E-02	3.7E-02	1.1E-01	5.4E-03	Inc	nab
Lead	0.53	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	
Lead, Dissolved	0.0040	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab
Nickel	0.42	3.6E-03	3.4E-05	Inc	2.0E-02	2.0E-02	2.0E-02	1.8E-01	1.7E-03	Inc	0.13
Zinc	1.5	1.3E-02	6.0E-04	Inc	3.0E-01	3.0E-01	3.0E-01	4.2E-02	2.0E-03	Inc	0.04
VOLATILE ORGANIC COMPOUNDS				0.75.04	1 05 01	1.0E-01	1.1E-01	5.6E-04	3.2E-03	8.8E-03	0.01
4-Isopropyltoluene	0.0066	5.6E-05	3.2E-04	9.7E-04	1.0E-01	2.0E-01	2.0E-02	7.2E-03	8.5E-03	2.9E-06	0.0
bis(2-ethylexyl)phthalate	0.017	1.4E-04	1.7E-04	5.9E-08	2.0E-02 4.0E-02	4.0E-02	4.0E-02	9.1E-04	1.3E-02	1.8E-02	0.03
n-Propylbenzene	0.0043	3.6E-05	5.2E-04	7.3E-04	4.0E-02 4.0E-02	4.0E-02 4.0E-02	4.0E-02	8.5E-04	3.2E-03	2.4E-02	0.02
sec-Butylbenzene	0.0040	3.4E-05	1.3E-04 2.1E-05	9.6E-04 4.5E-04	4.0E-02 3.0E-04	4.0E-02 3.0E-04	1.0E-02	9.3E-02	6.9E-02	4.5E-02	0.2
Trichloroethene	0.0033	2.8E-05	2.1E-05	4.56-04	5.06-04	5.01 01	1102 02				
										HI	1.9
es:		1						-			
Based on the maximum or 95 percent upper of	confidence limit (95	5% UCL) on t	he mean					HI	Hazard inde		
concentration detected at the site.	•							HQ	Hazard quot		
Consistent with EPA policy, lead is not evalu	ated in the cumulat	tive HI estima	ite.					Inc	Incomplete	pathway.	
Risks associated with indicator compounds a	re included in cum	ulative risk an	d hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the health	hazards associated	with petroleu	m mixtures					mg/kd-d	Milligrams	per kilogram	per day.
	liazarus associated	with periorea						na	not available		
will be evaluated and reported separately.			1	ad as DRO (r	nethod 810			VOC		anic compour	nd.
Exposure dose and noncancer hazards were o	alculated for petrol	leum hydroca	roons measur					VUC	, oracle of B	une compour	ident H
by segregating total DRO concentrations inte	o aliphatic and aror	natic fraction	s, assuming 8	30% aliphatic							
hydrocarbons and 40% aromatic hydrocarbon	ns (ADEC, 2000c).										
Exposure dose and noncancer hazards were of	alculated for petrol	leum hydroca	rbons measur	red as GRO (1	nethod 801	5)					
by segregating total GRO concentrations int	o aliphatic and aror	natic fraction	s, assuming	0% aliphatic							
by segregating total GRO concentrations int											
hydrocarbons and 50% aromatic hydrocarbon											

#### 

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 16 - Paint and Dope Storage Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				VOC							
Surfa	ce Water	Ingestion	Dermal	Inhalation				Pathw	ay-Specific l	lazard	Chemical-
	ntration <sup>a</sup>	Dose	Dose	Dose	Referen	nce Dose (	mg/kg-d)			VOC	Specific
		(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	·9·2)		(								

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 16 - Paint and Dope Storage Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	way-Specific I	lazard	Chemica
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS							5 7F 0(	( (E 01	3.1E-02	Inc	0.69
Beryllium	0.04	1.3E-03	6.2E-05	Inc	2.0E-03	2.0E-03	5.7E-06	6.6E-01 3.9E+00	1.9E-02	Inc	4.1
Cadmium	0.06	2.0E-03	9.3E-05	Inc	5.0E-04	5.0E-04	5.0E-04 3.7E-02	3.9E+00 4.4E-01	2.1E-02	Inc	0.47
Copper	0.50	1.6E-02	7.8E-04	Inc	3.7E-02	3.7E-02				na <sup>b</sup>	na <sup>b</sup>
Lead	0.53	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>		
Lead, Dissolved	0.004	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab
Nickel	0.42	1.4E-02	1.3E-04	Inc	2.0E-02	2.0E-02	2.0E-02	6.9E-01	6.5E-03	Inc	0.70
Zinc	1.5	4.9E-02	2.3E-03	Inc	3.0E-01	3.0E-01	3.0E-01	1.6E-01	7.8E-03	Inc	0.17
Ene											
VOLATILE ORGANIC COMPOUNDS								0.07.00	1 25 02	3.4E-02	0.049
4-Isopropyltoluene	0.0066	2.2E-04	1.2E-03	3.8E-03	1.0E-01	1.0E-01	1.1E-01	2.2E-03	1.2E-02 3.3E-02	1.1E-05	0.049
bis(2-ethylexyl)phthalate	0.0170	5.6E-04	6.6E-04	2.3E-07	2.0E-02	2.0E-02	2.0E-02	2.8E-02	5.1E-02	7.1E-03	0.13
n-Propylbenzene	0.0043	1.4E-04	2.0E-03	2.8E-03	4.0E-02	4.0E-02	4.0E-02	3.5E-03	1.2E-02	9.4E-02	0.11
sec-Butylbenzene	0.0040	1.3E-04	5.0E-04	3.7E-03	4.0E-02	4.0E-02	4.0E-02	3.3E-03 3.6E-01	1.2E-02 2.7E-01	1.7E-01	0.81
Trichloroethene	0.0033	1.1E-04	8.2E-05	1.7E-03	3.0E-04	3.0E-04	1.0E-02	3.0E-01	2.76-01	1.76-01	0.01
										HI	7.3
otes:		2									
Based on the maximum or 95 percent upper	confidence limit (9	5% UCL) on	the mean					HI	Hazard index	κ.	
concentration detected at the site.								HQ	Hazard quot	ient.	
Consistent with EPA policy, lead is not evalu	usted in the cumula	tive HI estim	ate.					Inc	Incomplete p	oathway.	
Risks associated with indicator compounds a	are included in cum	ulative risk a	nd hazard					mg/L	Milligrams p	ber liter.	
KISKS associated with indicator compounds a	hererde apposisted	with netroleu	m mixtures					mg/kd-d	Milligrams r	er kilogram p	er day.
estimates for each site. However, the health	nazards associated	with periotet	in mixtures						not available		
will be evaluated and reported separately.								na VOC		anic compoun	d.
Doses and noncancer hazards shown only for	r noncarcinogenic o	chemicals wit	h available to	xicity values.		-halatia-		VUC	+ Olathe orga	une compoun	
Absorbed doses were calculated for dermal of	contact with the me	dium, and int	akes were cal	culated for in	gestion or i	nnalation					

of a medium 3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 16 - Paint and Dope Storage Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific l	Hazard	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS	0.04	4.6E-05	4.6E-07	Inc	2.0E-03	2.0E-03	5.7E-06	2.3E-02	2.3E-04	Inc	0.023
Beryllium	0.04	4.0E-05	4.0E-07	Inc	5.0E-05	5.0E-04	5.0E-04	1.4E-01	1.4E-03	Inc	0.14
Cadmium	0.50	5.7E-04	5.7E-06	Inc	3.7E-02	3.7E-02	3.7E-02	1.5E-02	1.5E-04	Inc	0.016
Copper	0.53	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead		na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead, Dissolved	0.004	na 4.8E-04	9.6E-07	Inc	2.0E-02	2.0E-02	2.0E-02	2.4E-02	4.8E-05	Inc	0.024
Vickel	0.42	4.8E-04 1.7E-03	1.7E-05	Inc	3.0E-02	3.0E-01	3.0E-01	5.7E-03	5.7E-05	Inc	0.0058
Zinc	1.5	1.76-05	1.76-03	me	5.02-01	5.00 01	51012 01				
VOLATILE ORGANIC COMPOUNDS									0.05.05	4 25 04	0.00059
4-Isopropyltoluene	0.0066	7.5E-06	9.0E-06	4.7E-05	1.0E-01	1.0E-01	1.1E-01	7.5E-05	9.0E-05	4.3E-04	0.0003
bis(2-ethylexyl)phthalate	0.0170	1.9E-05	4.9E-06	2.9E-09	2.0E-02	2.0E-02	2.0E-02	9.7E-04	2.4E-04	1.4E-07	0.0012
-Propylbenzene	0.0043	4.9E-06	1.5E-05	3.6E-05	4.0E-02	4.0E-02	4.0E-02	1.2E-04	3.7E-04	8.9E-04 1.2E-03	0.0014
sec-Butylbenzene	0.0040	4.6E-06	3.7E-06	4.7E-05	4.0E-02	4.0E-02	4.0E-02	1.1E-04	9.1E-05 2.0E-03	2.2E-03	0.0014
Trichloroethene	0.0033	3.8E-06	5.9E-07	2.2E-05	3.0E-04	3.0E-04	1.0E-02	1.3E-02	2.0E-03	2.20-05	0.017
										HI	0.21
tes:											
Based on the maximum or 95 percent upper of	confidence limit (95	% UCL) on t	he mean					HI	Hazard inde		
concentration detected at the site.								HQ	Hazard quot		
Consistent with EPA policy, lead is not evalu	ated in the cumulat	ive HI estima	ite.					Inc	Incomplete	pathway.	
Risks associated with indicator compounds a	re included in cumu	lative risk an	d hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the health	hazards associated	with petroleur	m mixtures					mg/kd-d	Milligrams	per kilogram	per day.
								na	not available	e	
will be evaluated and reported separately.	-1-ulated for natrol	aum hydroca	rhone measur	ed as DRO (n	nethod 810	0)		VOC	Volatile org	anic compour	nd.
Exposure dose and noncancer hazards were of	calculated for perfor	cum nyuroca	ours measure	0% aliphatic	iourou oro	-,			U.S.	•	
by segregating total DRO concentrations int		natic fractions	s, assuming 8	0% anphatic							
hydrocarbons and 40% aromatic hydrocarbo	ns (ADEC, 2000c).										
Exposure dose and noncancer hazards were of	calculated for petrol	eum hydroca	rbons measur	ed as GRO (n	nethod 801	5)					
by segregating total GRO concentrations int	o aliphatic and aron	natic fraction	s, assuming 7	0% aliphatic							
hydrocarbons and 50% aromatic hydrocarbo	ns (ADEC, 2000c).										
nyurotaroons and so is aromatic ny arotaroo			1	ad as DDO (n	aethod)						

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method)

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 16 - Paint and Dope Storage Building - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation		Pathw	ay-Specific	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation

of a medium 3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

#### TAF 18

### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Soil Concentration <sup>a</sup> (mg/kg)	Soil Ingestion Dose (mg/kg-d)	Soil Dermal Dose (mg/kg-d)	Dust Inhalation Dose (mg/kg-d)	Cancer Sl Oral	ope Factor ( Dermal	mg/kg-d) <sup>-1</sup> Inhalation	Pathway-S Soil Ingestion	Specific Car Dermal	ncer Risk Dust Inhalation	Chemical- Specific Risk
INORGANICS Cadmium	2.2	8.7E-07	3.4E-09	6.3E-11	na	na	6.3E+00	na	na	4.0E-10	4.0E-10
VOLATILE ORGANIC COMPOUNDS Benzene Ethylbenzene	0.74 3.0	3.0E-07 1.2E-06	0.0E+00 0.0E+00	2.2E-11 8.8E-11	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.9E-02 3.9E-03	1.6E-08 4.7E-09	0.0E+00 0.0E+00	6.3E-13 3.4E-13	1.6E-08 4.7E-09
										ILCR	2E-08

Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site. Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

3) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

Incremental lifetime cancer risk. ILCR Incomplete pathway. Inc Milligrams per kilogram. mg/kg Milligrams per kilogram per day. mg/kg-d

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### CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil Concentration <sup>a</sup>	Soil Ingestion Dose	Soil Dermal Dose	Dust Inhalation Dose	Cancer Sle	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil	y-Specific C Dermal	ancer Risk Dust Inhalation	Chemical- Specific Risk
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Orai	Dermai	Innalation	Ingestion	Derman	Innulution	
INORGANICS Cadmium	2.2	2.6E-06	1.0E-08	1.9E-10	na	na	6.3E+00	na	na	1.2E-09	1.2E-09
VOLATILE ORGANIC COMPOUNDS Benzene Ethylbenzene	0.74 3.0	8.9E-07 3.6E-06	0.0E+00 0.0E+00	6.5E-11 2.6E-10	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.7E-02 3.9E-03	4.9E-08 1.4E-08	0.0E+00 0.0E+00	1.8E-12 1.0E-12	4.9E-08 1.4E-08
										ILCR	6E-08

Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected in soil tundra

and soil gravel at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

ILCR Incremental lifetime cancer risk.

Inc Incomplete pathway.

mg/kg Milligrams per kilogram.

mg/kg-d Milligrams per kilogram per day.

#### TABL...0

### CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 19 - Auto Maintenance and Storage Facilities - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-	Specific Ca	ancer Risk	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer SI	ope Factor	(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS Cadmium	2.2	2.1E-08	2.8E-10	6.5E-12	na	na	6.3E+00	na	na	4.1E-11	4.1E-11
VOLATILE ORGANIC COMPOUNDS Benzene Ethylbenzene	0.74 3.0	7.2E-09 2.9E-08	0.0E+00 0.0E+00	2.2E-12 9.0E-12	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.7E-01 3.9E-03	4.0E-10 1.1E-10	0.0E+00 0.0E+00	6.0E-13 3.5E-14	4.0E-10 1.1E-10
										ILCR	6E-10

Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

 ILCR
 Incremental lifetime cancer risk.

 Inc
 Incomplete pathway.

 mg/kg
 Milligrams per kilogram.

mg/kg-d Milligrams per kilogram per day.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust				Pathu	ay-Specific	Hazard	Chemical-
	Soil	Ingestion	Dermal	Inhalation	Defense	nce Dose (n	na/ka_d)	Soil	ay-opecate	Dust	Specific
Constituent	Concentration <sup>®</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Oral	Dermal	Inhalation	-	Dermal	Inhalation	HQ
Consultation					-						
INORGANICS		7.05.00	2 55 00	3.9E-10	5.0E-04	5.0E-04	5.0E-04	1.6E-02	5.0E-05	7.8E-07	0.016
Cadmium	2.2 27	7.8E-06 9.8E-05	2.5E-08 0.0E+00	3.9E-10 4.9E-09	1.5E+00	1.5E+00	1.5E+00	6.5E-02	0.0E+00	3.2E-09	0.000065
Chromium		9.8E-03 na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead	86	na	na	na	па	na	na	na	iiu		
VOLATILE ORGANIC COMPOUNDS										1 55 00	0.000(7
Benzene	0.74	2.7E-06	0.0E+00	1.3E-10	4.0E-03	4.0E-03	8.6E-03	6.7E-04	0.0E+00	1.5E-08	0.00067
Ethylbenzene	3.0	1.1E-05	0.0E+00	5.4E-10	1.0E-01	1.0E-01	2.9E-01	1.1E-04	0.0E+00	1.9E-09	0.00000
m,p-xylene	0.11	4.0E-07	0.0E+00	2.0E-11	2.0E-01	2.0E-01	2.9E-02	2.0E-06	0.0E+00	6.9E-10	0.000056
Toluene	3.10	1.1E-05	0.0E+00	5.6E-10	2.0E-01	2.0E-01	1.1E-01	5.6E-05	0.0E+00	5.1E-09 5.5E-08	0.00016
Xylenes	8.6	3.1E-05	0.0E+00	1.6E-09	2.0E-01	2.0E-01	2.9E-02	1.6E-04	0.0E+00	5.5E-06	0.00010
										HI	0.017
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	13,300	nad	nad	na <sup>d</sup>	nad	na <sup>d</sup>	nad	na <sup>d</sup>	nad	nad	nad
Diesel Range Organics, Aliphatic	10,640	3.9E-02	Inc	1.9E-06	1.0E-01	na	2.9E-01	3.9E-01	Inc	6.6E-06	0.39
Diesel Range Organics, Aromatic	5,320	1.9E-02	Inc	9.6E-07	4.0E-02	na	5.7E-01	4.8E-01	Inc	1.7E-06	0.48
Gasoline Range Organics	6,650	na	na	na°	na	na°	na	na°	na	na	na
Gasoline Range Organics, Aliphatic	4,655	1.7E-02	Inc	8.4E-07	5.0E+00	na	5.3E+00	3.4E-03	Inc	1.6E-07	0.0034
Gasoline Range Organics, Aromatic	3,325	1.2E-02	Inc	6.0E-07	2.0E-01	na	1.1E-01	6.1E-02	Inc	5.5E-06	0.061
								1. T		HI	0.94
Notes:								н	Hazard ind	ex	
<sup>a</sup> Based on the maximum or 95 percent upper c	onfidence limit (95% U	CL) on the mo	ean					HQ	Hazard que		
concentration detected at the site.									Incomplete		
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	ated in the cumulative H	II estimate.						Inc			
e Risks associated with indicator compounds ar	e included in cumulativ	e risk and haz	ard					mg/kg		per kilogram	
estimates for each site. However, the health h	azards associated with	petroleum miz	ctures					mg/kd-d		per kilogram	per day.
will be evaluated and reported separately.								na	not availab	le	
<sup>d</sup> Exposure dose and noncancer hazards were ca	alculated for petroleum	hydrocarbons	measured as	DRO (method	8100)						
by segregating total DRO concentrations into	aliphatic and aromatic	fractions, ass	uming 80% al	iphatic							
hydrocarbons and 40% aromatic hydrocarbon		2. X. X.									
<ul> <li>Exposure dose and noncancer hazards were carbon</li> </ul>	alculated for patrolaum	hydrocarbons	measured as	GRO (method)	8015)						
• Exposure dose and noncancer hazards were ca	alculated for peutoleum	fractions	ming 70% al	inhatic							
by segregating total GRO concentrations into	aliphatic and aromatic	fractions, ass	ining 70% al	iplianc							

#### TAB] 01

#### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust							
	Soil	Ingestion	Dermal	Inhalation			_	Pathwa	y-Specific	Hazard	Chemical-
	Concentration <sup>*</sup>	Dose	Dose	Dose	Refere	nce Dose (m	g/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

ConstituentDoseDoseDoseDoseDoseDoseDoseDoseDoseDoseNormalInhalationIngestionDermalInhalationHQINORGANICSCadmium2.22.3E-057.4E-08 $1.2E-09$ $5.0E-04$ $5.0E-04$ $5.0E-04$ $4.7E-02$ $1.5E-04$ $2.3E-06$ $0.047$ Chromium27 $2.9E-04$ $0.0E+00$ $1.5E+00$ $1.5E+00$ $1.5E+00$ $1.5E+00$ $2.0E-04$ $0.0E+00$ $9.7E-09$ $0.00020$ Lead86 $na^b$ $0.0E+00$ $4.6E-08$ $0.0020$ VOLATILE ORGANIC COMPOUNDS0.74 $8.0E-06$ $0.0E+00$ $4.0E-10$ $4.0E-03$ $4.0E-03$ $8.6E-03$ $2.0E-03$ $0.0E+00$ $4.6E-08$ $0.0020$ Benzene $0.74$ $8.0E-06$ $0.0E+00$ $1.6E-09$ $1.0E-01$ $1.0E-01$ $2.9E-01$ $3.3E-04$ $0.0E+00$ $5.6E-09$ $0.00033$ Ethylbenzene $0.11$ $1.2E-06$ $0.0E+00$ $1.6E-09$ $1.0E-01$ $2.9E-01$ $3.2E-06$ $0.0E+00$ $2.1E-09$ $0.000033$	2.2 27 86 0.74 3.0 0.11 3.1	Dose (mg/kg-d) 2.3E-05 2.9E-04 na <sup>b</sup> 8.0E-06 3.3E-05 1.2E-06 3.4E-05	Dose (mg/kg-d) 7.4E-08 0.0E+00 na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00 0.0E+00	Dose (mg/kg-d) 1.2E-09 1.5E-08 na <sup>b</sup> 4.0E-10 1.6E-09 6.0E-11 1.7E-09	Oral 5.0E-04 1.5E+00 na <sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01	Dermal           5.0E-04           1.5E+00           na <sup>b</sup> 4.0E-03           1.0E-01           2.0E-01           2.0E-01	5.0E-04 1.5E+00 na <sup>b</sup> 8.6E-03 2.9E-01 2.9E-02 1.1E-01	Ingestion 4.7E-02 2.0E-04 na <sup>b</sup> 2.0E-03 3.3E-04 6.0E-06 1.7E-04	1.5E-04 0.0E+00 na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00	Inhalation           2.3E-06           9.7E-09           na <sup>b</sup> 4.6E-08           5.6E-09           2.1E-09           1.5E-08	0.047 0.00020 na <sup>b</sup> 0.0020 0.00033 0.00001 0.000169
Constituent         (mp/kg)	2.2 27 86 0.74 3.0 0.11 3.1	2.3E-05 2.9E-04 na <sup>b</sup> 8.0E-06 3.3E-05 1.2E-06 3.4E-05	7.4E-08 0.0E+00 na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00	1.2E-09 1.5E-08 na <sup>b</sup> 4.0E-10 1.6E-09 6.0E-11 1.7E-09	5.0E-04 1.5E+00 na <sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01	5.0E-04 1.5E+00 na <sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01	5.0E-04 1.5E+00 na <sup>b</sup> 8.6E-03 2.9E-01 2.9E-02 1.1E-01	4.7E-02 2.0E-04 na <sup>b</sup> 2.0E-03 3.3E-04 6.0E-06 1.7E-04	1.5E-04 0.0E+00 na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00	2.3E-06 9.7E-09 na <sup>b</sup> 4.6E-08 5.6E-09 2.1E-09 1.5E-08	0.047 0.00020 na <sup>b</sup> 0.0020 0.00033 0.00001 0.000169
Cadmium       2.2       2.3E-05       7.4E-08       1.2E-09       5.0E-04	27 86 0.74 3.0 0.11 3.1	2.9E-04 na <sup>b</sup> 8.0E-06 3.3E-05 1.2E-06 3.4E-05	0.0E+00 na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00	1.5E-08 na <sup>b</sup> 4.0E-10 1.6E-09 6.0E-11 1.7E-09	1.5E+00 na <sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01	1.5E+00 na <sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01	1.5E+00 na <sup>b</sup> 8.6E-03 2.9E-01 2.9E-02 1.1E-01	2.0E-04 na <sup>b</sup> 2.0E-03 3.3E-04 6.0E-06 1.7E-04	0.0E+00 na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00	9.7E-09 na <sup>b</sup> 4.6E-08 5.6E-09 2.1E-09 1.5E-08	0.00020 na <sup>b</sup> 0.0020 0.00033 0.00001 0.000169
Cadmium       2.2       2.3E-05       7.4E-08       1.2E-09       5.0E-04	27 86 0.74 3.0 0.11 3.1	2.9E-04 na <sup>b</sup> 8.0E-06 3.3E-05 1.2E-06 3.4E-05	0.0E+00 na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00	1.5E-08 na <sup>b</sup> 4.0E-10 1.6E-09 6.0E-11 1.7E-09	1.5E+00 na <sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01	1.5E+00 na <sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01	1.5E+00 na <sup>b</sup> 8.6E-03 2.9E-01 2.9E-02 1.1E-01	2.0E-04 na <sup>b</sup> 2.0E-03 3.3E-04 6.0E-06 1.7E-04	0.0E+00 na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00	9.7E-09 na <sup>b</sup> 4.6E-08 5.6E-09 2.1E-09 1.5E-08	0.00020 na <sup>b</sup> 0.0020 0.00033 0.00001 0.000169
California         27         2.9E-04         0.0E+00         1.5E-08         1.5E+00         1.5E+00         2.0E-04         0.0E+00         9.7E-09         0.00020           Lead         86 $na^h$ </td <td>27 86 0.74 3.0 0.11 3.1</td> <td>2.9E-04 na<sup>b</sup> 8.0E-06 3.3E-05 1.2E-06 3.4E-05</td> <td>na<sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00</td> <td>na<sup>b</sup> 4.0E-10 1.6E-09 6.0E-11 1.7E-09</td> <td>na<sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01</td> <td>na<sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01</td> <td>na<sup>b</sup> 8.6E-03 2.9E-01 2.9E-02 1.1E-01</td> <td>na<sup>b</sup> 2.0E-03 3.3E-04 6.0E-06 1.7E-04</td> <td>na<sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00</td> <td>na<sup>b</sup> 4.6E-08 5.6E-09 2.1E-09 1.5E-08</td> <td>na<sup>b</sup> 0.0020 0.00033 0.00001 0.000169</td>	27 86 0.74 3.0 0.11 3.1	2.9E-04 na <sup>b</sup> 8.0E-06 3.3E-05 1.2E-06 3.4E-05	na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00	na <sup>b</sup> 4.0E-10 1.6E-09 6.0E-11 1.7E-09	na <sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01	na <sup>b</sup> 4.0E-03 1.0E-01 2.0E-01 2.0E-01	na <sup>b</sup> 8.6E-03 2.9E-01 2.9E-02 1.1E-01	na <sup>b</sup> 2.0E-03 3.3E-04 6.0E-06 1.7E-04	na <sup>b</sup> 0.0E+00 0.0E+00 0.0E+00 0.0E+00	na <sup>b</sup> 4.6E-08 5.6E-09 2.1E-09 1.5E-08	na <sup>b</sup> 0.0020 0.00033 0.00001 0.000169
Lead 86 na <sup>b</sup> na <sup></sup>	86 0.74 3.0 0.11 3.1	8.0E-06 3.3E-05 1.2E-06 3.4E-05	0.0E+00 0.0E+00 0.0E+00 0.0E+00	4.0E-10 1.6E-09 6.0E-11 1.7E-09	4.0E-03 1.0E-01 2.0E-01 2.0E-01	4.0E-03 1.0E-01 2.0E-01 2.0E-01	8.6E-03 2.9E-01 2.9E-02 1.1E-01	2.0E-03 3.3E-04 6.0E-06 1.7E-04	0.0E+00 0.0E+00 0.0E+00 0.0E+00	4.6E-08 5.6E-09 2.1E-09 1.5E-08	0.0020 0.00033 0.00001 0.00016
VOLATILE ORGANIC COMPOUNDS           Benzene         0.74         8.0E-06         0.0E+00         4.0E-10         4.0E-03         8.6E-03         2.0E-03         0.0E+00         4.6E-08         0.00032           Benzene         3.0         3.3E-05         0.0E+00         1.6E-09         1.0E-01         2.9E-01         3.3E-04         0.0E+00         2.6E-09         0.00032           may-sylene         0.11         1.2E-06         0.0E+00         1.7E-04         0.0E+00         1.5E-08         0.00046           Toluene         3.1         3.4E-05         0.0E+00         4.7E-09         2.0E-01         2.0E-01         2.9E-02         4.7E-04         0.0E+00         1.5E-08         0.00046           Yelenes         8.6         9.4E-05         0.0E+00         4.7E-09         2.0E-01         2.0E-01         2.9E-02         4.7E-04         0.0E+00         1.5E-08         0.00046           Diesel Range Organics         13.300         na <sup>d</sup>	0.74 3.0 0.11 3.1	8.0E-06 3.3E-05 1.2E-06 3.4E-05	0.0E+00 0.0E+00 0.0E+00 0.0E+00	4.0E-10 1.6E-09 6.0E-11 1.7E-09	4.0E-03 1.0E-01 2.0E-01 2.0E-01	1.0E-01 2.0E-01 2.0E-01	2.9E-01 2.9E-02 1.1E-01	3.3E-04 6.0E-06 1.7E-04	0.0E+00 0.0E+00 0.0E+00	5.6E-09 2.1E-09 1.5E-08	0.00033 0.00001 0.000169
Benzene $0.74$ $8.0E-06$ $0.0E+00$ $4.0E-03$ $4.0E-03$ $8.0E-03$ $2.0E-03$ $0.0E+00$ $6.0E-09$ $0.0003$ Ethylbenzene $3.0$ $3.3E-05$ $0.0E+00$ $1.0E-01$ $1.0E-01$ $2.9E-01$ $2.9E-01$ $3.3E-04$ $0.0E+00$ $5.6E-09$ $0.0003$ mp-xylene $3.1$ $3.4E-05$ $0.0E+00$ $1.7E-09$ $2.0E-01$ $2.9E-01$ $3.2E-04$ $0.0E+00$ $1.5E-08$ $0.00004$ Toluene $3.1$ $3.4E-05$ $0.0E+00$ $4.7E-09$ $2.0E-01$ $2.0E-01$ $2.9E-02$ $4.7E-04$ $0.0E+00$ $1.5E-08$ $0.00004$ Xylenes $8.6$ $9.4E-05$ $0.0E+00$ $4.7E-09$ $2.0E-01$ $1.2E-01$ $1.7E-04$ $0.0E+00$ $1.6E-07$ $0.0004$ Ylenes $13.300$ $na^4$	3.0 0.11 3.1	3.3E-05 1.2E-06 3.4E-05	0.0E+00 0.0E+00 0.0E+00	1.6E-09 6.0E-11 1.7E-09	1.0E-01 2.0E-01 2.0E-01	1.0E-01 2.0E-01 2.0E-01	2.9E-01 2.9E-02 1.1E-01	3.3E-04 6.0E-06 1.7E-04	0.0E+00 0.0E+00 0.0E+00	5.6E-09 2.1E-09 1.5E-08	0.00033 0.00001 0.00016
Benzene $0.74$ $8.0E-06$ $0.0E+00$ $4.0E-03$ $4.0E-03$ $8.0E-03$ $2.0E-03$ $0.0E+00$ $6.0E-09$ $0.00E-03$ $4.0E-03$ $8.0E-03$ $2.0E+03$ $2.0E+03$ $0.0E+00$ $6.0E-10$ $0.0E-03$ $4.0E-03$ $8.0E-03$ $0.0E+00$ $6.0E-10$ $2.9E-01$ $2.9E-01$ $2.9E-01$ $3.3E-04$ $0.0E+00$ $1.E-09$ $0.0003$ $m_p$ -xylene $3.1$ $3.4E-05$ $0.0E+00$ $1.7E-09$ $2.0E-01$ $2.9E-01$ $2.9E-04$ $0.0E+00$ $1.5E-08$ $0.00004$ Xylenes $8.6$ $9.4E-05$ $0.0E+00$ $4.7E-09$ $2.0E-01$ $2.0E-01$ $1.7E-04$ $0.0E+00$ $1.6E-07$ $0.0004$ Xylenes $8.6$ $9.4E-05$ $0.0E+00$ $4.7E-04$ $0.0E+00$ $1.6E-07$ $0.0004$ Ylenes $8.6$ $9.4E-05$ $0.0E+00$ $4.0E-03$ $a.0E-01$ $a.29E-01$ $1.7E-04$ $0.0E+00$ $1.6E-07$ $0.0004$ Diesel Range Organics, Aliphatic $10.640$ $1.2E-01$ $1.0E-06$ $1.0E-01$ $1.5E-06$ $1.2E$ $0.$	3.0 0.11 3.1	3.3E-05 1.2E-06 3.4E-05	0.0E+00 0.0E+00 0.0E+00	1.6E-09 6.0E-11 1.7E-09	1.0E-01 2.0E-01 2.0E-01	1.0E-01 2.0E-01 2.0E-01	2.9E-01 2.9E-02 1.1E-01	3.3E-04 6.0E-06 1.7E-04	0.0E+00 0.0E+00 0.0E+00	5.6E-09 2.1E-09 1.5E-08	0.00033 0.00001 0.00016
Ethylbenzene 3.0 3.3E-05 0.0E+00 1.6E-09 1.0E-01 2.2E-02 6.0E-06 0.0E+00 2.1E-09 0.0000 $\mu_{p}$ -xylne 0.11 1.2E-06 0.0E+00 0.0E+10 0.0E+01 2.0E-01 2.0E-01 2.0E-01 0.0E+00 1.7E-08 0.0000 1.7E-08 0.0E+00 1.7E-08 0.0E+00 1.7E-08 0.0E+00 1.7E-08 0.0E+00 1.7E-08 0.0E+00 1.7E-08 0.0E+00 1.6E-07 0.00004 Xylenes 8.6 9.4E-05 0.0E+00 4.7E-09 2.0E-01 2.0E-01 2.9E-02 4.7E-04 0.0E+00 1.6E-07 0.00004 1.6E-07 0.0004 1.6E-07 0.12 1.2E+00 1.5E-08 0.00016 1.2E-01 1.5E+07 0.11 1.5E+07 0.11 1.5E+07 0.11 1.5E+07 0.11 1.5E+07 0.12 1.5E+07 0.11 1.5E+07 0.11 1.5E+07 0.11 1.5E+07 0.11 1.5E+07 0.11 1.5E+07 0.11 1.5E+07 0.010 1.6E-07 0.0004 1.5E-07 0.010 1.6E-07 0.12 1.5E+07 0.010 1.6E-07 0.018 1.5E+07 0.018 1.5E+07 0.010 1.6E-07 0.018 1.5E+07 0.010 1.6E-07 0.18 1.5E+07 0.010 1.6E-07 0.18 1.5E+07 0.018 1.5E+0	0.11 3.1	1.2E-06 3.4E-05	0.0E+00 0.0E+00	6.0E-11 1.7E-09	2.0E-01 2.0E-01	2.0E-01 2.0E-01	2.9E-02 1.1E-01	6.0E-06 1.7E-04	0.0E+00 0.0E+00	2.1E-09 1.5E-08	0.00001
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	3.1	3.4E-05	0.0E+00	1.7E-09	2.0E-01	2.0E-01	1.1E-01	1.7E-04	0.0E+00	1.5E-08	0.00016
Toluene 3.1 3.4E-05 0.0E+00 1.7E-05 2.0E-01 2.0E-01 2.9E-02 4.7E-04 0.0E+00 1.6E-07 0.00047 $Xy$ lenes 8.6 9.4E-05 0.0E+00 4.7E-09 2.0E-01 2.9E-01 2.9E-01 2.9E-04 0.0E+00 1.6E-07 0.00047 $HI$ 0.050 $HI$ $HI$ 0.05											0.00047
Xylenes8.69.4E-050.0E4004.7E-052.0E-012.0E-01 $E=0.00$ HI0.050 <b>PETROLEUM HYDROCARBONS</b> <sup>c</sup> Diesel Range Organics13,300na <sup>d</sup> na <sup>d</sup> n	8.6	9.4E-05	0.02+00	4.7E-09	2.06-01	2.015-01	2.76-02	1.1 0 .		1.00-07	0.000+1
PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics 13,300 na <sup>d</sup>											
Diesel Range Organics13,300na <sup>d</sup> na <sup>d</sup> na <sup>d</sup> na <sup>d</sup> na <sup>a</sup> <										HI	0.050
Diesel Range Organics13,300na <sup>d</sup> na <sup>d</sup> na <sup>d</sup> na <sup>d</sup> na <sup>a</sup> <								4	d	d	d
Diesel Range Organics, Aliphatic       10,640       1.2E-01       Inc       5.8E-06       1.0E-01       na       2.9E-01       1.2E+00       Inc       5.1E-06       1.5         Diesel Range Organics, Aromatic       5,320       5.8E-02       Inc       2.9E-06       4.0E-02       na       5.7E-01       1.5E+00       Inc       5.1E-06       1.5         Gasoline Range Organics, Aliphatic       6,650       na <sup>6</sup> <t< td=""><td>13,300</td><td>na<sup>d</sup></td><td>na<sup>d</sup></td><td>na<sup>d</sup></td><td></td><td>na</td><td></td><td></td><td></td><td></td><td></td></t<>	13,300	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>		na					
Diesel Range Organics, Aromatic       5,320       5.8E-02       Inc       2.9E-06       4.0E-02       na       5.7E-01       1.3E+00       Inc       3.1E-00       Inc       3.1E-00       Inc       3.1E+00       Inc       3.2E+00       1.0E-02       Inc       4.8E+07       0.010         Gasoline Range Organics, Aromatic       3,325       3.6E-02       Inc       1.8E+06       2.0E+01       na       1.1E-01       1.8E+01       Inc       1.6E+05       0.18         Gasoline Range Organics, Aromatic       3,325       3.6E+02       Inc       1.8E+06       2.0E+01       na       1.1E+01       1.8E+01       Inc       1.6E+05       0.18         Meters       Exercise       Exercise       Inc       Inc       Inc       Inc       Inc	10,640	1.2E-01	Inc			na					
Gasoline Range Organics       6,650       na <sup>e</sup> na	5,320	5.8E-02	Inc	2.9E-06	4.0E-02	na					
Gasoline Range Organics, Aliphatic       4,655       5.1E-02       Inc       2.5E-06       5.0E+00       na       5.3E+00       1.0E-02       Inc       4.8E-07       0.010         Gasoline Range Organics, Aliphatic       3,325       3.6E-02       Inc       1.8E-06       2.0E-01       na       1.1E-01       1.8E-01       Inc       4.8E-07       0.010         Gasoline Range Organics, Aromatic       3,325       3.6E-02       Inc       1.8E-06       2.0E-01       na       1.1E-01       1.8E-01       Inc       4.8E-07       0.010         tes:       Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.       HI       Hazard quotient.       HQ       Hazard quotient.       HQ       Hazard quotient.       Inc       Inc       Inc       Milligrams per kilogram.         Risks associated with indicator compounds are included in cumulative risk and hazard       estimates for each site. However, the health hazards associated with petroleum mixtures       mg/kg       Milligrams per kilogram.       mg/kd-d       Milligrams per kilogram per day.         will be evaluated and reported separately.       na       not available       na       not available	6.650	na	na	na°	na®	na®	na				
Gasoline Range Organics, Aromatic       3,325       3.6E-02       Inc       1.8E-06       2.0E-01       na       1.1E-01       1.8E-01       Inc       1.0E-03       0.10         Gasoline Range Organics, Aromatic       3,325       3.6E-02       Inc       1.8E-06       2.0E-01       na       1.1E-01       1.8E-01       Inc       1.0E-03       0.10         HI       Hazard index.       HI       Hazard index.       HQ       Hazard quotient.       HQ       Hazard quotient.         Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.       Inc       Incomplete pathway.       mg/kg       Milligrams per kilogram.         Risks associated with indicator compounds are included in cumulative risk and hazard       mg/kd-d       Milligrams per kilogram.       mg/kd-d       Milligrams per kilogram per day.         will be evaluated and reported separately.       na       not available       na       not available		5.1E-02	Inc	2.5E-06	5.0E+00	na					
HI       Hi       Hazard index.         Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean       HQ       Hazard quotient.         concentration detected at the site.       HQ       Hazard quotient.         Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.       Inc       Incomplete pathway.         Risks associated with indicator compounds are included in cumulative risk and hazard       mg/kg       Milligrams per kilogram.         estimates for each site. However, the health hazards associated with petroleum mixtures       mg/kd-d       Milligrams per kilogram per day.         will be evaluated and reported separately.       na       not available		3.6E-02	Inc	1.8E-06	2.0E-01	na	1.1E-01	1.8E-01	Inc		
Based on the maximum or 95 percent upper confidence limit (95% UCL) on the meanHIHazard index.concentration detected at the site.HQHazard quotient.Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.IncIncomplete pathway.Risks associated with indicator compounds are included in cumulative risk and hazardmg/kgMilligrams per kilogram.estimates for each site. However, the health hazards associated with petroleum mixturesmg/kd-dMilligrams per kilogram per day.will be evaluated and reported separately.nanot available		8								HI	2.8
Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean       HQ       Hazard quotient.         concentration detected at the site.       Inc       Incomplete pathway.         Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.       mg/kg       Milligrams per kilogram.         Risks associated with indicator compounds are included in cumulative risk and hazard       mg/kd-d       Milligrams per kilogram per day.         will be evaluated and reported separately.       na       not available	4							ш	Hazard in	dex	
concentration detected at the site.HQHazard quotient.Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.IncIncomplete pathway.Risks associated with indicator compounds are included in cumulative risk and hazardmg/kgMilligrams per kilogram.estimates for each site. However, the health hazards associated with petroleum mixturesmg/kd-dMilligrams per kilogram per day.will be evaluated and reported separately.nanot available	limit (95% UC	CL) on the me	an								
Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.IncIncomplete pathway.Risks associated with indicator compounds are included in cumulative risk and hazardmg/kgMilligrams per kilogram.estimates for each site. However, the health hazards associated with petroleum mixturesmg/kd-dMilligrams per kilogram per day.will be evaluated and reported separately.nanot available											
Risks associated with indicator compounds are included in cumulative risk and hazard       mg/kg       Miligrams per kilogram.         estimates for each site. However, the health hazards associated with petroleum mixtures       mg/kd-d       Miligrams per kilogram per day.         will be evaluated and reported separately.       na       not available	cumulative H	I estimate.						Inc			
estimates for each site. However, the health hazards associated with petroleum mixtures mg/kd-d Milligrams per kilogram per day. will be evaluated and reported separately.	in cumulative	risk and haz	ard					mg/kg			
will be evaluated and reported separately.	ociated with n	etroleum mix	tures					mg/kd-d	Milligram	s per kilogram	n per day.
will be evaluated and reported separately.			Contract of the second state of the second sta					-	not availa	ble	
	ooratoo with p							na			
Exposure dose and noncancer hazards were calculated for	c	umulative H n cumulative	umulative HI estimate. n cumulative risk and haz	umulative HI estimate. n cumulative risk and hazard	umulative HI estimate. n cumulative risk and hazard	n cumulative HI estimate.	n cumulative HI estimate.	n cumulative HI estimate.	aumulative HI estimate. Inc n cumulative risk and hazard mg/kg ciated with petroleum mixtures mg/kd-d	n cumulative HI estimate.     Inc     Incomplet       n cumulative risk and hazard     mg/kg     Milligram       ciated with petroleum mixtures     mg/kd-d     Milligram	umulative HI estimate.     Inc     Incomplete pathway.       n cumulative risk and hazard     mg/kg     Milligrams per kilogram       ciated with petroleum mixtures     mg/kd-d     Milligrams per kilogram

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

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### NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathwa	y-Specific l	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 19 - Auto Maintenance and Storage Facilities - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathy	way-Specific H	lazard	Chemical-
	Concentration <sup>*</sup>	Dose	Dose	Dose	Refere	nce Dose (r	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
			1								
INORGANICS		( 15 00	0.15.10	1.9E-11	5.0E-04	5.0E-04	5.0E-04	1.2E-04	1.6E-06	3.8E-08	0.00012
Cadmium	2.2	6.1E-08 7.7E-07	8.1E-10 0.0E+00	1.9E-11 2.4E-10	1.5E+00	1.5E+00	1.5E+00	5.1E-07	0.0E+00	1.6E-10	0.00000051
Chromium	27			2.4E-10 na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>
Lead	86	na <sup>b</sup>	na <sup>b</sup>	na	па	па	па	na	na	nu	
VOLATILE ORGANIC COMPOUNDS										7 65 10	0.0000053
Benzene	0.74	2.1E-08	0.0E+00	6.5E-12	4.0E-03	4.0E-03	8.6E-03	5.3E-06	0.0E+00 0.0E+00	7.5E-10 9.1E-11	0.00000033
Ethylbenzene	3.0	8.6E-08	0.0E+00	2.6E-11	1.0E-01	1.0E-01	2.9E-01	8.6E-07		3.4E-11	0.00000001
m,p-xylene	0.11	3.1E-09	0.0E+00	9.7E-13	2.0E-01	2.0E-01	2.9E-02	1.6E-08	0.0E+00 0.0E+00	2.5E-10	0.00000044
Toluene	3.1	8.8E-08	0.0E+00	2.7E-11	2.0E-01	2.0E-01	1.1E-01	4.4E-07 1.2E-06	0.0E+00	2.5E-10 2.6E-09	0.0000012
Xylenes	8.6	2.5E-07	0.0E+00	7.6E-11	2.0E-01	2.0E-01	2.9E-02	1.2E-00	0.06+00	2.01-09	0.0000012
										HI	0.00013
PETROLEUM HYDROCARBONS <sup>c</sup>											4
Diesel Range Organics	13,300	nad	na <sup>d</sup>	na <sup>d</sup>	nad	naď	naď	nad	nad	nad	na <sup>d</sup>
Diesel Range Organics, Aliphatic	10,640	3.0E-04	Inc	9.3E-08	1.0E-01	na	2.9E-01	3.0E-03	Inc	3.2E-07	0.0030
Diesel Range Organics, Aromatic	5,320	1.5E-04	Inc	4.7E-08	4.0E-02	na	5.7E-01	3.8E-03	Inc	8.2E-08	0.0038
Gasoline Range Organics	6,650	na°	na®	na	na	na	na	na	na	na	na
Gasoline Range Organics, Aliphatic	4,655	1.3E-04	Inc	4.1E-08	5.0E+00	na	5.3E+00	2.7E-05	Inc	7.7E-09	0.000027
Gasoline Range Organics, Aromatic	3,325	9.5E-05	Inc	2.9E-08	2.0E-01	na	1.1E-01	4.7E-04	Inc	2.7E-07	0.00047
										HI	0.0073
lotes:											
" Based on the maximum or 95 percent upper con	fidence limit (95% U	JCL) on the r	nean					HI	Hazard index		
concentration detected at the site.								HQ	Hazard quoti		
<sup>b</sup> Consistent with EPA policy, lead is not evaluat	ed in the cumulative	HI estimate.						Inc	Incomplete p		
<ul> <li>Risks associated with indicator compounds are</li> </ul>	included in cumulati	ve risk and ha	azard					mg/kg	Milligrams p	er kilogram.	
estimates for each site. However, the health ha	zards associated with	petroleum m	ixtures					mg/kd-d	Milligrams p	er kilogram pe	er day.
								na	not available		
will be evaluated and reported separately.	autored for potrolour	hydrocarbor	s measured a	s DRO (meth	od 8100)						
<sup>d</sup> Exposure dose and noncancer hazards were cal	culated for peutoleun	Guntiens		aliphotic							
by segregating total DRO concentrations into a		c fractions, as	suming 80%	anphanc							

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

• Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

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# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 19 - Auto Maintenance and Storage Facilities - SOIL

# NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation			2	Pathw	ay-Specific I	Iazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Referer Oral	nce Dose (n Dermal	ng/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater Concentration <sup>a</sup>	Ingestion Dose	Dermal Dose	VOC Inhalation Dose	Cancer S	ope Factor	(mg/kg-d) <sup>-1</sup>	Pathway	-Specific Ca	nncer Risk VOC	Chemical- Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
VOLATILE ORGANIC COMPOUNDS Benzene	0.025	9.6E-05	2.7E-05	2.9E-04	5.5E-02	5.5E-02	2.7E-02	5.3E-06	1.5E-06	7.7E-06	1.4E-05
<ul> <li>Notes:</li> <li><sup>a</sup> Based on the maximum or 95 percent upper conconcentration detected at the site.</li> <li>1) Doses and cancer risks shown only for carcinog</li> <li>2) Absorbed doses were calculated for dermal concalculated for ingestion or inhalation of a media</li> <li>3) Cancer risks are unitless values which represent effect. They are calculated using the following</li> </ul>	genic chemicals with tact with the mediu tum. t the probability of	th available to im, and intak incurring an	oxicity values es were adverse healt	th	<sup>2</sup> actor.			ILCR Inc mg/L mg/kg-d VOC na	Incomplete Milligrams Milligrams	per liter. per kilogram ganic compou	per day.

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### CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater Concentration <sup>a</sup>	Ingestion Dose	Dermal Dose	VOC Inhalation Dose	Cancer Sl	ope Factor	(mg/kg-d) <sup>-1</sup>	Pathwa	y-Specific Ca	ncer Risk VOC	Chemical Specific	
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)		Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk	
VOLATILE ORGANIC COMPOUNDS Benzene	0.025	3.7E-04	1.1E-04	1.1E-03	5.5E-02	5.5E-02	2.7E-02	2.0E-05	5.8E-06	3.0E-05	5.6E-05 6E-05	
<ul> <li>Notes:</li> <li><sup>a</sup> Based on the maximum or 95 percent upper conconcentration detected at the site.</li> <li>1) Doses and cancer risks shown only for carcinog</li> <li>2) Absorbed doses were calculated for dermal concalculated for ingestion or inhalation of a media</li> <li>3) Cancer risks are unitless values which represent effect. They are calculated using the following</li> </ul>	enic chemicals with tact with the mediu um. t the probability of i	h available to m, and intake incurring an a	xicity values s were dverse healt	h	<sup>2</sup> actor.			ILCR Inc mg/L mg/kg-d VOC na	Incomplete p Milligrams p Milligrams p	er liter. er kilogram per nic compound.	r day.	

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# CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 19 - Auto Maintenance and Storage Facilities - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water Concentration <sup>a</sup>	Ingestion Dose	Dermal Dose	VOC Inhalation Dose		-	(mg/kg-d) <sup>-1</sup>	-	-Specific Ca	VOC	Chemical- Specific Risk
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	RISK
VOLATILE ORGANIC COMPOUNDS Benzene	0.025	9.8E-06	2.0E-06	2.9E-05	5.5E-02	5.5E-02	2.7E-02	5.4E-07	1.1E-07	7.9E-07	1.4E-06 1E-06
<ul> <li>Notes:</li> <li><sup>a</sup> Based on the maximum or 95 percent upper concentration detected at the site.</li> <li>1) Doses and cancer risks shown only for carcing 2) Absorbed doses were calculated for dermal concalculated for ingestion or inhalation of a mer</li> <li>3) Cancer risks are unitless values which represent effect. They are calculated using the following the followi</li></ul>	ogenic chemicals w ntact with the med dium. nt the probability o	ith available t ium, and intal f incurring an	toxicity value kes were 1 adverse hea	lth	Factor.			ILCR Inc mg/L mg/kg-d VOC na	Incomplete Milligrams Milligrams	per liter. per kilogram p ganic compour	ber day.

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	G. G. Water	Ingestion	Dermal	VOC Inhalation				Pathy	way-Specific I	lazard	Chemical-
	Surface Water Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose	(mg/kg-d)		, species	VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	НQ
INORGANICS			0.05.05		2 75 02	2 75 02	3.7E-02	4.6E-02	2.2E-03	Inc	0.0479
Copper	0.20	1.7E-03	8.0E-05	Inc	3.7E-02	3.7E-02	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab
Lead	0.42	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na	na	па	lla	Па
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.025	2.1E-04	2.1E-04	2.9E-04	4.0E-03	4.0E-03	8.6E-03	5.3E-02	5.2E-02	3.3E-02	0.14
Ethane	0.0017	1.4E-05	nc	nc	na	na	na	na	na	na	0
										HI	0.19
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	34	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>
Diesel Range Organics, Aliphatic	27	2.3E-01	Inc	1.5E-01	1.0E-01	na	2.9E-01	2.3E+00	Inc	5.3E-01	2.8
Diesel Range Organics, Aromatic	14	1.1E-01	Inc	7.7E-02	4.0E-02	na	5.7E-01	2.9E+00	Inc	1.3E-01	3.0
Gasoline Range Organics	6.1	na <sup>e</sup>	na®	na°	na°	na	na®	na®	na®	na°	na
Gasoline Range Organics, Aliphatic	4.3	3.6E-02	Inc	4.8E-01	5.0E+00	na	5.3E+00	7.2E-03	Inc	9.0E-02	0.097
Gasoline Range Organics, Aromatic	3.1	2.6E-02	Inc	3.4E-01	2.0E-01	na	1.1E-01	1.3E-01	Inc	3.1E+00	3.2
Residual Range Organics	1.3	naf	naf	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>
Residual Range Organics, Aliphatic	0.91	7.7E-03	Inc	5.3E-06	2.0E+00	na	na	3.8E-03	Inc	Inc	0.0038
Residual Range Organics, Aromatic	0.65	5.5E-03	Inc	3.8E-06	3.0E-02	na	na	1.8E-01	Inc	Inc	0.18
										HI	9.3
Notes:									1		
<sup>a</sup> Based on the maximum or 95 percent upper of	confidence limit (95	% UCL) on t	he mean					HI	Hazard index	κ.	
concentration detected at the site.								HQ	Hazard quot	ient.	
<sup>b</sup> Consistent with EPA policy, lead is not evalu	ated in the cumulat	ive HI estima	ite.					Inc	Incomplete p	athway.	
<ul> <li>Risks associated with indicator compounds a</li> </ul>	re included in cumu	lative risk an	d hazard					mg/L	Milligrams p	er liter.	
estimates for each site. However, the health								mg/kd-d	Milligrams p	er kilogram p	ber day.
will be evaluated and reported separately.								na	not available		
<sup>d</sup> Exposure does and noncancer hazards were c	alculated for petrol	eum hydrocar	rbons measur	ed as DRO (1	method 810	)0)		VOC	Volatile orga	anic compoun	d.
by segregating total DRO concentrations inter	a aliphatic and aron	atic fractions	s assuming 8	0% aliphatic					U		
by segregating total DRO concentrations into	o anphatic and alon	alle fractiona	, accurring o	FF							

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				VOC							
Surfa	ce Water In	Ingestion	Dermal	Inhalation				Pathw	ay-Specific l	lazard	Chemical-
	entration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
			(mg/kg-d)	(mg/kg-d)	Oral	-	00	Ingestion	Dermal	Inhalation	HQ
Constituent	(III) (III)										

\* Exposure does and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure does and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Path	way-Specific	Hazard	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	Defere	nce Dose (	ma/ka.d)	I atil	ay-opeenie	VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Copper	0.20	6.6E-03	3.1E-04	Inc	3.7E-02	3.7E-02	3.7E-02	1.8E-01	8.4E-03	Inc	0.1861
Lead	0.42	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.025	8.2E-04	8.0E-04	1.1E-03	4.0E-03	4.0E-03	8.6E-03	2.1E-01	2.0E-01	1.3E-01	0.54
Ethane	0.0017	5.6E-05	nc	nc	na	na	na	na	na	na	0
										HI	0.72
PETROLEUM HYDROCARBONS <sup>c</sup>									85.7		
Diesel Range Organics	34	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	27	8.9E-01	Inc	6.0E-01	1.0E-01	na	2.9E-01	8.9E+00	Inc	2.1E+00	11
Diesel Range Organics, Aromatic	14	4.5E-01	Inc	3.0E-01	4.0E-02	na	5.7E-01	1.1E+01	Inc	5.2E-01	12
Gasoline Range Organics	6.1	na	na <sup>e</sup>	na	na	nae	na <sup>e</sup>	na	na <sup>e</sup>	na°	na
Gasoline Range Organics, Aliphatic	4.3	1.4E-01	Inc	1.9E+00	5.0E+00	na	5.3E+00	2.8E-02	Inc	3.5E-01	0.38
Gasoline Range Organics, Aromatic	3.1	1.0E-01	Inc	1.3E+00	2.0E-01	na	1.1E-01	5.0E-01	Inc	1.2E+01	13
Residual Range Organics	1.3	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>
Residual Range Organics, Aliphatic	0.91	3.0E-02	Inc	2.1E-05	2.0E+00	na	na	1.5E-02	Inc	Inc	0.015
Residual Range Organics, Aromatic	0.65	2.1E-02	Inc	1.5E-05	3.0E-02	na	na	7.1E-01	Inc	Inc	0.71
										HI	36
Nutria										HI	30
<sup>a</sup> Based on the maximum or 95 percent upper of	confidence limit (95%	UCL) on th	e mean					HI	Hazard index	x.	
concentration detected at the site.								HQ	Hazard quoti	ient.	
<sup>b</sup> Consistent with EPA policy, lead is not evalu	nated in the cumulativ	e HI estimat	e.					Inc	Incomplete p	bathway.	
<sup>c</sup> Risks associated with indicator compounds a								mg/L	Milligrams p		
estimates for each site. However, the health								mg/kd-d	• •	er kilogram p	er day.
will be evaluated and reported separately.								na	not available		
<sup>d</sup> Exposure does and noncancer hazards were c	alculated for petroleu	ım hydrocart	oons measured	i as DRO (m	ethod 8100	)		VOC	Volatile orga	anic compound	1.
by segregating total DRO concentrations into											

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 19 - Auto Maintenance and Storage Facilities - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation	-	Pathway-Spec	fic Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Ingestion Derm	VOC al Inhalation	Specific HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure does and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure does and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

### TAB 109

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 19 - Auto Maintenance and Storage Facilities - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	Inhalation				Pathy	vay-Specific	Hazard	Chemica
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Copper	0.20	2.3E-04	4.6E-06	Inc	1.5E+00	1.5E+00	1.5E+00	1.5E-04	3.0E-06	Inc	0.0001
Lead	0.42	na <sup>b</sup>									
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.025	2.9E-05	5.9E-06	2.9E-05	4.0E-03	4.0E-03	8.6E-03	7.1E-03	1.5E-03	3.4E-03	0.012
Ethane	0.0017	1.9E-06	nc	nc	na	na	na	na	na	na	0.0
										HI	0.012
PETROLEUM HYDROCARBONS <sup>c</sup>											· .
Diesel Range Organics	34	na <sup>d</sup>									
Diesel Range Organics, Aliphatic	27	3.1E-02	Inc	7.5E-03	1.0E-01	na	2.9E-01	3.1E-01	Inc	2.6E-02	0.34
Diesel Range Organics, Aromatic	14	1.6E-02	Inc	3.7E-03	4.0E-02	na	5.7E-01	3.9E-01	Inc	6.5E-03	0.39
Gasoline Range Organics	6.1	na <sup>e</sup>	na®	na	na°	na®	na®	na°	na <sup>e</sup>	na	na°
Gasoline Range Organics, Aliphatic	4.3	4.9E-03	Inc	2.3E-02	5.0E+00	na	5.3E+00	9.7E-04	Inc	4.4E-03	0.0053
Gasoline Range Organics, Aromatic	3.1	3.5E-03	Inc	1.7E-02	2.0E-01	na	1.1E-01	1.7E-02	Inc	1.5E-01	0.17
Residual Range Organics	1.3	na <sup>f</sup>	naf	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>					
Residual Range Organics, Aliphatic	0.91	1.0E-03	Inc	2.6E-07	2.0E+00	na	na	5.2E-04	Inc	Inc	0.0005
Residual Range Organics, Aromatic	0.65	7.4E-04	Inc	1.9E-07	3.0E-02	na	na	2.5E-02	Inc	Inc	0.025
										HI	0.93
										HI	0.95
tes: Based on the maximum or 95 percent upper c	onfidence limit (95	% UCL) on t	he mean					HI	Hazard inde	x.	
concentration detected at the site.								HQ	Hazard quot		
Consistent with EPA policy, lead is not evalu	ated in the cumulati	ve HI estima	te.					Inc	Incomplete	oathway.	
Risks associated with indicator compounds an	e included in cumu	lative risk an	d hazard					mg/L	Milligrams p	ber liter.	
estimates for each site. However, the health h								mg/kd-d	Milligrams p	ber kilogram p	er day.
		F						na	not available		
will be evaluated and reported separately. Exposure does and noncancer hazards were c								VOC	Volatile org		

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 19 - Auto Maintenance and Storage Facilities - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation	_	Pathway-Specific	Hazard Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Ingestion Dermal	VOC Specific Inhalation HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure does and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure does and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 21 - Wastewater Treatment Facility - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-	Specific Ca	ncer Risk	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer SI	ope Factor	(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS											
Arsenic	28	1.1E-05	1.3E-06	8.2E-10	1.5E+00	1.5E+00	1.5E+01	1.7E-05	2.0E-06	1.2E-08	1.9E-05
Cadmium	5.2	2.1E-06	8.2E-09	1.5E-10	na	na	6.3E+00	na	na	9.6E-10	9.6E-10
Cobalt	12	4.8E-06	0.0E+00	3.5E-10	na	na	9.8E+00	na	na	3.5E-09	3.5E-09
VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.006	2.4E-09	0.0E+00	1.8E-13	7.5E-03	7.5E-03	1.6E-03	1.8E-11	0.0E+00	2.9E-16	1.8E-11
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	2.4	9.7E-07	5.3E-07	7.1E-11	2.0E+00	2.0E+00	2.0E+00	1.9E-06	1.1E-06	1.4E-10	3.0E-06
										ILCR	2E-05
otes:											
Based on the maximum or 95 percent upper cor	nfidence limit (95% U	CL) on the m	ean concentra	ation detected	at the site.			ILCR		al lifetime can	cer risk.
Doses and cancer risks shown only for carcinog	genic chemicals with a	vailable toxic	ity values.					Inc		e pathway.	
Based on the maximum or 95 percent upper cor	nfidence limit (95% U	CL) on the m	ean concentra	ation detected	at the site.			mg/kg	-	s per kilogram	
Doses and cancer risks shown only for carcinog	genic chemicals with a	vailable toxic	ity values.					mg/kg-d	-	s per kilogram	per day.
Absorbed doses were calculated for dermal con	tact with the medium,	and intakes v	vere calculate	ed for ingestio	n or inhalation	on		na	Not availa	ibie.	
of a medium											
Cancer risks are unitless values which represent	t the probability of inc	urring an adv	erse health								
effect. They are calculated using the following	formula: Cancer Ris	k = Exposure	Dose x Cano	er Slope Fact	or.						

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

<sup>b</sup> Total polychlorinated biphenyls were not included in the cummulative ILCR because measurements of individual Aroclors are available.

### CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 21 - Wastewater Treatment Facility - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway	-Specific C	ancer Risk	Chemical-
Constituent	Concentration <sup>®</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Slo Oral			Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
INORGANICS Arsenic	28	3.4E-05	4.0E-06	2.5E-09	1.5E+00	1.5E+00	1.5E+01	5.1E-05	6.0E-06	3.7E-08	5.7E-05
Cadmium	5.2	6.3E-06	2.5E-08	4.6E-10	na	na	6.3E+00	na	na	2.9E-09	2.9E-09
Cobalt	12	1.4E-05	0.0E+00	1.1E-09	na	na	9.8E+00	na	na	1.0E-08	1.0E-08
VOLATILE ORGANIC COMPOUNDS Methylene chloride	0.0060	7.2E-09	0.0E+00	5.3E-13	7.5E-03	7.5E-03	1.6E-03	5.4E-11	0.0E+00	8.7E-16	5.4E-11
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	2.4	2.9E-06	1.6E-06	2.1E-10	2.0E+00	2.0E+00	2.0E+00	5.8E-06	3.2E-06	4.2E-10	9.0E-06
										ILCR	7E-05

Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected in soil tundra

and soil gravel at the site. 1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

<sup>b</sup> Total polychlorinated biphenyls were not included in the cummulative ILCR because measurements of individual Aroclors are available.

Incremental lifetime cancer risk. ILCR Incomplete pathway. Inc Milligrams per kilogram. mg/kg Milligrams per kilogram per day. mg/kg-d Not available. na

#### TABI 2

### CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 21 - Wastewater Treatment Facility - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical
Constituent	Concentration <sup>a</sup> (mg/kg)	8	Dose	Dose (mg/kg-d)	Cancer Slope Factor (mg/kg-d) <sup>-1</sup>			Soil		Dust	Specific
					Oral	Dermal	Inhalation	Ingestion	Dermal In	Inhalation	Risk
INORGANICS											
Arsenic	28	2.7E-07	1.1E-07	8.4E-11	1.5E+00	1.5E+00	1.5E+01	4.1E-07	1.6E-07	1.3E-09	5.7E-07
Cadmium	5.2	5.1E-08	6.7E-10	1.6E-11	na	na	6.3E+00	na	na	9.9E-11	9.9E-11
Cobalt	12	1.2E-07	0.0E+00	3.6E-11	na	na	9.8E+00	na	na	3.5E-10	3.5E-10
VOLATILE ORGANIC COMPOUNDS											
Methylene chloride	0.006	5.9E-11	0.0E+00	1.8E-14	7.5E-03	7.5E-03	1.6E-03	4.4E-13	0.0E+00	3.0E-17	4.4E-13
POLYCHLORINA TED BIPHENYLS											1 35 07
PCB-1260 (Aroclor 1260)	2.4	2.3E-08	4.3E-08	7.2E-12	2.0E+00	2.0E+00	2.0E+00	4.7E-08	8.7E-08	1.4E-11	1.3E-07
										ILCR	7E-07
es:											
Based on the maximum or 95 percent upper conf	idence limit (95% UG	CL) on the me	ean concentra	ation detected	at the site.			ILCR		I lifetime cance	r risk.
Doses and cancer risks shown only for carcinoge	nic chemicals with a	vailable toxic	ity values.					Inc	Incomplete		
c) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium								mg/kg Milligrams per kilogram. mg/kg-d Milligrams per kilogram per day.			er day.

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

<sup>b</sup> Total polychlorinated biphenyls were not included in the cummulative ILCR because measurements of individual Aroclors are available.

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 21 - Wastewater Treatment Facility - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	ay-Specific	Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)			Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(			00							
INORGANICS									0.05.00	2 05 02	0.082
Aluminum	21,708	7.9E-02	0.0E+00	3.9E-06	1.0E+00	1.0E+00	1.4E-03	7.9E-02	0.0E+00	2.8E-03	0.082
Antimony	9.7	3.5E-05	0.0E+00	1.7E-09	4.0E-04	4.0E-04	4.0E-04	8.8E-02	0.0E+00	4.4E-06	0.088
Arsenic	28	1.0E-04	9.7E-06	5.1E-09	3.0E-04	3.0E-04	3.0E-04	3.4E-01	3.2E-02	1.7E-05	0.0075
Barium	141	5.1E-04	0.0E+00	2.5E-08	7.0E-02	7.0E-02	1.4E-04	7.3E-03	0.0E+00	1.8E-04	0.04
Cadmium	5.2	1.9E-05	6.0E-08	9.4E-10	5.0E-04	5.0E-04	5.0E-04	3.8E-02	1.2E-04	1.9E-06	0.00011
Chromium	44	1.6E-04	0.0E+00	7.9E-09	1.5E+00	1.5E+00	1.5E+00	1.1E-04	0.0E+00	5.3E-09	0.0025
Cobalt	12	4.3E-05	0.0E+00	2.1E-09	2.0E-02	2.0E-02	5.7E-06	2.1E-03	0.0E+00	3.7E-04 7.2E-03	0.022
Manganese	561	2.0E-03	0.0E+00	1.0E-07	1.4E-01	1.4E-01	1.4E-05	1.5E-02	0.0E+00	4.6E-07	0.009
Mercury	0.76	2.8E-06	0.0E+00	1.4E-10	3.0E-04	3.0E-04	3.0E-04	9.2E-03	0.0E+00		0.0015
Selenium	2.0	7.3E-06	0.0E+00	3.6E-10	5.0E-03	5.0E-03	5.0E-03	1.5E-03	0.0E+00	7.2E-08	0.0015
Silver	2.1	7.6E-06	0.0E+00	3.8E-10	5.0E-03	5.0E-03	5.0E-03	1.5E-03	0.0E+00	7.6E-08	0.028
Thallium	0.53	1.9E-06	0.0E+00	9.6E-11	7.0E-05	7.0E-05	7.0E-05	2.8E-02	0.0E+00	1.4E-06	0.028
Vanadium	56	2.0E-04	0.0E+00	1.0E-08	7.0E-03	7.0E-03	7.0E-03	2.9E-02	0.0E+00	1.4E-06	0.0058
Zinc	480	1.7E-03	0.0E+00	8.7E-08	3.0E-01	3.0E-01	3.0E-01	5.8E-03	0.0E+00	2.9E-07	0.0038
Line											
VOLATILE ORGANIC COMPOUNDS									0.017 00	2 05 00	0.000014
1,2,4-Trimethylbenzene	0.19	6.9E-07	0.0E+00	3.4E-11	5.0E-02	5.0E-02	1.7E-03	1.4E-05	0.0E+00	2.0E-08	0.000014
m,p-Xylene	0.048	1.7E-07	0.0E+00	8.6E-12	2.0E-01	2.0E-01	2.9E-02	8.7E-07	0.0E+00	3.0E-10	0.0000087
Methylene chloride	0.006	2.2E-08	0.0E+00	1.1E-12	6.0E-02	6.0E-02	8.6E-01	3.6E-07	0.0E+00	1.3E-12	0.0000036
n-Butylbenzene	0.062	2.3E-07	0.0E+00	1.1E-11	4.0E-02	4.0E-02	4.0E-02	5.6E-06	0.0E+00	2.8E-10	0.0000056
n-Propylbenzene	0.04	1.5E-07	0.0E+00	7.2E-12	4.0E-02	4.0E-02	4.0E-02	3.6E-06	0.0E+00	1.8E-10	0.000036
	0.006	2.2E-08	0.0E+00	1.1E-12	2.0E-01	2.0E-01	2.9E-02	1.1E-07	0.0E+00	3.7E-11	0.00000022
o-Xylene	0.036	1.3E-07	0.0E+00	6.5E-12	4.0E-02	4.0E-02	4.0E-02	3.3E-06	0.0E+00	1.6E-10	0.00000013
sec-Butylbenzene	0.050	1.51	0.02								
SEMIVOLATILE ORGANIC COMPOUNDS									1 (5 02	2.5E-07	0.0066
4-Chloroaniline	5.5	2.0E-05	6.3E-06	9.9E-10	4.0E-03	4.0E-03	4.0E-03	5.0E-03	1.6E-03	2.56-07	0.0000
POLYCHLORINATED BIPHENYLS							2 05 05	4 45 01	1.9E-01	2.2E-05	0.63
PCB-1260 (Aroclor 1260)	2.4	8.7E-06	3.9E-06	4.3E-10	2.0E-05	2.0E-05	2.0E-05	4.4E-01	1.96-01	2.26-05	0.05
100 100 (										н	1.3
										m	1.0
PETROLEUM HYDROCARBONS <sup>c</sup>					d	d	đ	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	3,800	nad	nad	na <sup>d</sup>	nad	na <sup>d</sup>	nad		Inc	1.9E-06	0.11
Diesel Range Organics, Aliphatic	3,040	1.1E-02	Inc	5.5E-07	1.0E-01	na	2.9E-01	1.1E-01		4.8E-07	0.14
Diesel Range Organics, Aromatic	1,520	5.5E-03	Inc	2.7E-07	4.0E-02	na	5.7E-01	1.4E-01	Inc		
Residual Range Organics	2,384	na	na	na	na <sup>f</sup>	na	na <sup>f</sup>	na <sup>r</sup>	na'	na	na <sup>r</sup>
Residual Range Organics, Aliphatic	2,146	7.8E-03	Inc	3.9E-07	2.0E+00	na	na	3.9E-03	Inc	Inc	0.0039
Residual Range Organics, Anphane	2,140	1102 00									

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### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 21 - Wastewater Treatment Facility - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	way-Specific Hazard		Chemical-	
	Concentration <sup>a</sup>	Dose	Dose	Dose		nce Dose (n	0 0	Soil	D	Dust	Specific	
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ	
Residual Range Organics, Aromatic	715	2.6E-03	Inc	1.3E-07	3.0E-02	na	na	8.7E-02	Inc	Inc	0.087	
				3						HI	0.34	
otes:												
<sup>a</sup> Based on the maximum or 95 percent up	pper confidence limit (95% UC	CL) on the me	an					HI	Hazard ind			
concentration detected at the site.								HQ	Hazard quo			
<sup>b</sup> Consistent with EPA policy, lead is not								Inc	Incomplete			
e Risks associated with indicator compound								mg/kg	-	per kilogram.		
estimates for each site. However, the he		etroleum mix	tures					mg/kd-d		per kilogram p	ber day.	
will be evaluated and reported separately	5							na	not availab	e		
d Exposure dose and noncancer hazards w					(100)							
by segregating total DRO concentration	ns into aliphatic and aromatic f	fractions, assu	iming 80% ali	iphatic								
hydrocarbons and 40% aromatic hydroc												
e Exposure dose and noncancer hazards w					3015)							
by segregating total GRO concentration	ns into aliphatic and aromatic f	ractions, assu	iming 70% ali	iphatic								
hydrocarbons and 50% aromatic hydroc												
f Exposure dose and noncancer hazards w												
by segregating total RRO concentration		ractions, assu	ming 90% ali	phatic								
hydrocarbons and 30% aromatic hydroc												
) Doses and noncancer hazards shown on	ly for noncarcinogenic chemic	als with avail	able toxicity	values.	r inholation							
Absorbed doses were calculated for der	mal contact with the medium,	and intakes w	ere calculated	1 for ingestion of	or minaration							
of a medium. ) Noncancer hazards are unitless values w	which represent the probability	of incurring	an adverse hea	alth								
effect. They are calculated using the fol	llowing formula: Noncancer	HI = Exposur	e Dose/Refere	ence dose.								
	and) (1 )). (1											
# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 21 - Wastewater Treatment Facility - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	y-Specific	Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Defere	nce Dose	(mg/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(116/116)	(	(								
INORGANICS											
Aluminum	21,708	2.4E-01	0.0E+00	1.2E-05		1.0E+00	1.4E-03	2.4E-01	0.0E+00	8.4E-03	0.25
Antimony	9.7	1.1E-04	0.0E+00	5.2E-09	4.0E-04		4.0E-04	2.6E-01	0.0E+00	1.3E-05	0.26
Arsenic	28	3.1E-04	2.9E-05	1.5E-08		3.0E-04	3.0E-04	1.0E+00	9.7E-02	5.1E-05	1.1
Barium	141	1.5E-03	0.0E+00	7.6E-08		7.0E-02	1.4E-04	2.2E-02	0.0E+00	5.5E-04	0.023
Cadmium	5.2	5.7E-05	1.8E-07	2.8E-09		5.0E-04	5.0E-04	1.1E-01	3.6E-04	5.6E-06	0.11
Chromium	44	4.8E-04	0.0E+00	2.4E-08		1.5E+00	1.5E+00	3.2E-04	0.0E+00	1.6E-08	0.00032
Cobalt	12	1.3E-04	0.0E+00	6.3E-09		6.0E-02	6.0E-02	2.1E-03	0.0E+00	1.1E-07	0.0021
Manganese	561	6.1E-03	0.0E+00	3.0E-07		1.4E-01	1.4E-05	4.4E-02	0.0E+00	2.2E-02	0.065
Mercury	0.76	8.3E-06	0.0E+00	4.1E-10		3.0E-04	3.0E-04	2.8E-02	0.0E+00	1.4E-06	0.028
Selenium	2.0	2.2E-05	0.0E+00	1.1E-09	5.0E-03	5.0E-03	5.0E-03	4.4E-03	0.0E+00	2.2E-07	0.0044
Silver	2.1	2.3E-05	0.0E+00	1.1E-09	5.0E-03	5.0E-03	5.0E-03	4.6E-03	0.0E+00	2.3E-07	0.0046
Thallium	0.53	5.8E-06	0.0E+00	2.9E-10	6.6E-05	6.6E-05	6.6E-05	8.8E-02	0.0E+00	4.4E-06	0.088
Vanadium	56	6.1E-04	0.0E+00	3.0E-08		7.0E-03	7.0E-03	8.7E-02	0.0E+00	4.3E-06	0.087
Zinc	480	5.2E-03	0.0E+00	2.6E-07	3.0E-01	3.0E-01	3.0E-01	1.7E-02	0.0E+00	8.7E-07	0.017
Line											
VOLATILE ORGANIC COMPOUNDS									0.05.00	6.1E-08	0.000042
1.2.4-Trimethylbenzene	0.19	2.1E-06	0.0E+00	1.0E-10		5.0E-02	1.7E-03	4.1E-05	0.0E+00 0.0E+00	8.9E-10	0.0000042
m,p-Xylene	0.048	5.2E-07	0.0E+00	2.6E-11		2.0E-01	2.9E-02	2.6E-06		3.8E-12	0.000002
Methylene chloride	0.006	6.6E-08	0.0E+00	3.3E-12		6.0E-02	8.6E-01	1.1E-06	0.0E+00	6.8E-07	0.000000
n-Butylbenzene	0.062	6.8E-07	0.0E+00	3.4E-11			4.0E-02	6.8E-07	6.8E-07	6.8E-07 4.4E-07	0.0000004
n-Propylbenzene	0.04	4.4E-07	0.0E+00	2.2E-11		4.0E-02	4.0E-02	4.4E-07	4.4E-07		0.0000000
o-Xylene	0.006	6.6E-08	0.0E+00	3.3E-12		2.0E-01	2.9E-02	6.6E-08	6.6E-08	6.6E-08	0.0000000
sec-Butylbenzene	0.036	3.9E-07	0.0E+00	2.0E-11	4.0E-02	4.0E-02	4.0E-02	3.9E-07	3.9E-07	3.9E-07	0.000000
see-Burytoenzene											
SEMIVOLATILE ORGANIC COMPOUNDS									4 75 02	7.4E-07	0.020
4-Chloroaniline	5.5	6.0E-05	1.9E-05	3.0E-09	4.0E-03	4.0E-03	4.0E-03	1.5E-02	4.7E-03	7.4E-07	0.020
POLYCHLORINATED BIPHENYLS							0.017.05	1 25.00	5.8E-01	6.5E-05	1.9
PCB-1260 (Aroclor 1260)	2.4	2.6E-05	1.2E-05	1.3E-09	2.0E-05	2.0E-05	2.0E-05	1.3E+00	5.8E-01	0.5E-05	1.7
										HI	4.0
PETROLEUM HYDROCARBONS <sup>c</sup>				d	đ	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	3,800	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na	na	na	na	па	

#### TA '-114

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 21 - Wastewater Treatment Facility - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	y-Specific	Hazard	Chemical
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose	(mg/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
										5 75 04	0.2
Diesel Range Organics, Aliphatic	3,040	3.3E-02	Inc	1.6E-06	1.0E-01	na	2.9E-01	3.3E-01	Inc	5.7E-06	0.3
Diesel Range Organics, Aromatic	1,520	1.7E-02	Inc	8.2E-07	4.0E-02	na	5.7E-01	4.1E-01	Inc	1.4E-06	0.4
Residual Range Organics	2,384	na <sup>f</sup>	naf	na <sup>f</sup>	na <sup>f</sup>	naf	naf	na <sup>f</sup>	naf	na <sup>f</sup>	naf
Residual Range Organics, Aliphatic	2,146	2.3E-02	Inc	1.2E-06	2.0E+00	na	na	1.2E-02	Inc	Inc	0.012
Residual Range Organics, Aromatic	715	7.8E-03	Inc	3.9E-07	3.0E-02	na	na	2.6E-01	Inc	Inc	0.26
										HI	1.0

HI

HQ

Inc

na

mg/kg

mg/kd-d

Hazard index.

not available

Hazard quotient.

Incomplete pathway.

Milligrams per kilogram.

Milligrams per kilogram per day.

2	<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean
	concentration detected at the site.

<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.

<sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazard

- estimates for each site. However, the health hazards associated with petroleum mixtures
- will be evaluated and reported separately.

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

<sup>e</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

- <sup>f</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method ) by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).
- 1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.
- 2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.
- Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 21 - Wastewater Treatment Facility - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific H	lazard	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	Referen	nce Dose (m	- nø/kø-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation		Dermal	Inhalation	HQ
INORGANICS											
Aluminum	21,708	6.2E-04	0.0E+00	1.9E-07	1.0E+00	1.0E+00	1.4E-03	6.2E-04	0.0E+00	1.4E-04	0.00076
Antimony	9.7	2.8E-07	0.0E+00	8.5E-11	4.0E-04	4.0E-04	4.0E-04	6.9E-04	0.0E+00	2.1E-07	0.00069
Arsenic	28	8.0E-07	3.2E-07	2.5E-10	3.0E-04	3.0E-04	3.0E-04	2.7E-03	1.1E-03	8.2E-07	0.0037
Barium	141	4.0E-06	0.0E+00	1.2E-09	7.0E-02	7.0E-02	1.4E-04	5.7E-05	0.0E+00	8.8E-06	0.000066
Cadmium	5.2	1.5E-07	2.0E-09	4.6E-11	5.0E-04	5.0E-04	5.0E-04	3.0E-04	3.9E-06	9.1E-08	0.00030
Chromium	44	1.3E-06	0.0E+00	3.9E-10	1.5E+00	1.5E+00	1.5E+00	8.4E-07	0.0E+00	2.6E-10	0.000008
Cobalt	12	3.3E-07	0.0E+00	1.0E-10	6.0E-02	6.0E-02	6.0E-02	5.6E-06	0.0E+00	1.7E-09	0.000050
Manganese	561	1.6E-05	0.0E+00	4.9E-09	1.4E-01	1.4E-01	1.4E-05	1.1E-04	0.0E+00	3.5E-04	0.00047
Mercury	0.76	2.2E-08	0.0E+00	6.7E-12	3.0E-04	3.0E-04	3.0E-04	7.2E-05	0.0E+00	2.2E-08	0.000072
Selenium	2.0	5.7E-08	0.0E+00	1.8E-11	5.0E-03	5.0E-03	5.0E-03	1.1E-05	0.0E+00	3.5E-09	0.000011
Silver	2.1	6.0E-08	0.0E+00	1.8E-11	5.0E-03	5.0E-03	5.0E-03	1.2E-05	0.0E+00	3.7E-09	0.000012
	0.53	1.5E-08	0.0E+00	4.7E-12	6.6E-05	6.6E-05	6.6E-05	2.3E-04	0.0E+00	7.1E-08	0.00023
Thallium	56	1.6E-06	0.0E+00	4.9E-10	7.0E-03	7.0E-03	7.0E-03	2.3E-04	0.0E+00	7.0E-08	0.00023
Vanadium	480	1.4E-05	0.0E+00	4.2E-09	3.0E-01	3.0E-01	3.0E-01	4.6E-05	0.0E+00	1.4E-08	0.000046
Zinc	480	1.46-05	0.01100								
VOLATILE ORGANIC COMPOUNDS	0.10	5 45 00	0.0E+00	1.7E-12	5.0E-02	5.0E-02	1.7E-03	1.1E-07	0.0E+00	9.8E-10	0.0000001
1,2,4-Trimethylbenzene	0.19	5.4E-09		4.2E-13	2.0E-02	2.0E-01	2.9E-02	6.8E-09	0.0E+00	1.4E-11	0.0000000
m,p-Xylene	0.048	1.4E-09	0.0E+00	4.2E-13 5.3E-14	6.0E-01	6.0E-02	8.6E-01	2.9E-09	0.0E+00	6.1E-14	0.00000000
Methylene chloride	0.006	1.7E-10	0.0E+00	5.4E-13	4.0E-02	4.0E-02	4.0E-02	4.4E-08	0.0E+00	1.4E-11	0.0000000
n-Butylbenzene	0.062	1.8E-09	0.0E+00	3.5E-13	4.0E-02	4.0E-02	4.0E-02	2.9E-08	0.0E+00	8.8E-12	0.0000000
n-Propylbenzene	0.04	1.1E-09	0.0E+00	5.3E-13	2.0E-02	2.0E-01	2.9E-02	8.6E-10	0.0E+00	1.8E-12	0.00000000
o-Xylene	0.006	1.7E-10	0.0E+00	3.2E-14	4.0E-01	4.0E-02	4.0E-02	2.6E-08	0.0E+00	7.9E-12	0.0000000
sec-Butylbenzene	0.036	1.0E-09	0.0E+00	3.26-13	4.012-02	4.06-02	4.00 02				
SEMIVOLATILE ORGANIC COMPOUNDS	5.5	1.6E-07	2.1E-07	4.8E-11	4.0E-03	4.0E-03	4.0E-03	3.9E-05	5.2E-05	1.2E-08	0.00009
4-Chloroaniline	5.5	1.02 07									
POLYCHLORINATED BIPHENYLS	2.4	6.8E-08	1.3E-07	2.1E-11	2.0E-05	2.0E-05	2.0E-05	3.4E-03	6.3E-03	1.1E-06	0.010
PCB-1260 (Aroclor 1260)	2.4	0.86-08	1.56-07	2.10-11	2.00 00	2102 00					0.016
										НІ	0.016
PETROLEUM HYDROCARBONS <sup>e</sup>				4	đ	d	na <sup>d</sup>				
Diesel Range Organics	3,800	na <sup>d</sup>	na <sup>d</sup>	naď	na <sup>d</sup>	na <sup>d</sup>		na 8.7E-04	Inc	9.2E-08	0.00087
Diesel Range Organics, Aliphatic	3,040	8.7E-05	Inc	2.7E-08	1.0E-01	na	2.9E-01		Inc	2.3E-08	0.0011
Diesel Range Organics, Aromatic	1,520	4.3E-05	Inc	1.3E-08	4.0E-02	na	5.7E-01	1.1E-03			naf
Residual Range Organics	2,384	naf	naf	na <sup>r</sup>	na <sup>r</sup>	na <sup>r</sup>	naf	na <sup>f</sup>	na <sup>f</sup>	na	
Residual Range Organics Residual Range Organics, Aliphatic	2,146	6.1E-05	Inc	1.9E-08	2.0E+00	na	na	3.1E-05	Inc	Inc	0.00003

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### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 21 - Wastewater Treatment Facility - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathy	way-Specific I	lazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral	nce Dose (r Dermal	ng/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ
Residual Range Organics, Aromatic	715	2.0E-05	Inc	6.3E-09	3.0E-02	na	na	6.8E-04	Inc	Inc	0.00068
										HI	0.0027
lotes:								-	in a second s		
<ul> <li>Based on the maximum or 95 percent upper cor concentration detected at the site.</li> <li><sup>b</sup> Consistent with EPA policy, lead is not evaluate</li> </ul>			nean					HI HQ Inc	Hazard index Hazard quoti Incomplete p	ent.	
<sup>c</sup> Risks associated with indicator compounds are estimates for each site. However, the health has								mg/kg mg/kd-d	Milligrams p Milligrams p	er kilogram. er kilogram per	day.
will be evaluated and reported separately.								na	not available		
<ul> <li><sup>d</sup> Exposure dose and noncancer hazards were cald by segregating total DRO concentrations into a hydrocarbons and 40% aromatic hydrocarbons (</li> <li><sup>e</sup> Exposure dose and noncancer hazards were cald by segregating total GRO concentrations into a hydrocarbons and 50% aromatic hydrocarbons (</li> <li><sup>f</sup> Exposure dose and noncancer hazards were cald by segregating total RRO concentrations into a hydrocarbons and 30% aromatic hydrocarbons (</li> </ul>	liphatic and aromatic (ADEC, 2000c). sulated for petroleum liphatic and aromatic (ADEC, 2000c). sulated for petroleum liphatic and aromatic (ADEC, 2000c).	fractions, ass hydrocarbon fractions, ass hydrocarbon fractions, ass	suming 80% s measured a suming 70% s measured a suming 90% ;	aliphatic s GRO (metho aliphatic s RRO (metho aliphatic	od 8015)						
<ol> <li>Doses and noncancer hazards shown only for no.</li> <li>Absorbed doses were calculated for dermal control of a medium</li> <li>Noncancer hazards are unitless values which reperfect. They are calculated using the following</li> </ol>	tact with the medium,	, and intakes	were calculat	ted for ingestion	on or inhalat	tion					

# CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 21 - Wastewater Treatment Facility - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca	ancer Risk	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Cancer S	lope Factor	(mg/kg-d) <sup>-1</sup>	_		VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS Arsenic	0.072	2.8E-04	3.8E-06	Inc	1.5E+00	1.5E+00	1.5E+01	4.1E-04	5.7E-06	Inc ILCR	4.2E-04 <b>4E-04</b>
Notes: <sup>a</sup> Based on the maximum or 95 percent up	per confidence limit (95	% UCL) on 1	the mean	9 E 19		a		ILCR	Incrementa	l lifetime can	cer risk.
<ul> <li>concentration detected at the site.</li> <li>1) Doses and cancer risks shown only for ca</li> <li>2) Absorbed doses were calculated for derm calculated for ingestion or inhalation of</li> <li>3) Cancer risks are unitless values which re effect. They are calculated using the following th</li></ul>	nal contact with the med a medium. present the probability of	lium, and inta	akes were n adverse he	alth	e Factor.			Inc mg/L mg/kg-d VOC	0		

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## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 21 - Wastewater Treatment Facility - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater	Ingestion	Dermal	VOC Inhalation				Pathwa	y-Specific Ca	ncer Risk	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Cancer SI	ope Factor	(mg/kg-d) <sup>-1</sup>			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS Arsenic	0.072	1.1E-03	1.5E-05	Inc	1.5E+00	1.5E+00	1.5E+01	1.6E-03	2.2E-05	Inc	1.6E-03
										ILCR	2E-03
Notes:						1					
<sup>a</sup> Based on the maximum or 95 percent upper c	confidence limit (95%	UCL) on the	e mean					ILCR	Incremental	lifetime cancer	risk.
concentration detected at the site.								Inc	Incomplete p	athway.	
1) Doses and cancer risks shown only for carcin	ogenic chemicals wit	h available to	xicity value	5.				mg/L	Milligrams p	er liter.	
<ol> <li>Absorbed doses were calculated for dermal co calculated for ingestion or inhalation of a me</li> </ol>		m, and intake	es were					mg/kg-d VOC	0 1	er kilogram per nic compound.	
<ol> <li>Cancer risks are unitless values which represe effect. They are calculated using the followir</li> </ol>					Factor.						

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# CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 21 - Wastewater Treatment Facility - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water Concentration <sup>a</sup>	Ingestion Dose	Dermal Dose	VOC Inhalation Dose	Cancer S	lope Factor	(mg/kg-d) <sup>-1</sup>	Pathway	-Specific Ca	VOC	Chemical- Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS Arsenic	0.072	2.8E-05	2.8E-07	Inc	1.5E+00	1.5E+00	1.5E+01	4.2E-05	4.2E-07	Inc	4.3E-05
										ILCR	4E-05
Notes:						15					
" Based on the maximum or 95 percent	upper confidence limit (959	% UCL) on the	ne mean					ILCR		I lifetime canc	er risk.
concentration detected at the site.								Inc	Incomplete		
1) Doses and cancer risks shown only for 2) Absorbed doses were calculated for de				es.				mg/L mg/kg-d	Milligrams	per kilogram	per dav.

VOC

Volatile organic compound.

 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 21 - Wastewater Treatment Facility - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific	Hazard	Chemica
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Arsenic	0.072	6.1E-04	2.9E-05	Inc	3.0E-04	3.0E-04	3.0E-04	2.0E+00	9.6E-02	Inc	2.1
Copper	0.26	2.2E-03	1.0E-04	Inc	3.7E-02	3.7E-02	3.7E-02	5.9E-02	2.8E-03	Inc	0.062
Lead	0.26	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Mercury	0.0006	5.1E-06	2.4E-07	Inc	3.0E-04	3.0E-04	8.0E-06	1.7E-02	8.0E-04	Inc	0.018
Nickel	0.18	1.5E-03	1.4E-05	Inc	2.0E-02	2.0E-02	2.0E-02	7.6E-02	7.2E-04	Inc	0.077
Zinc	5.1	4.3E-02	2.0E-03	Inc	3.0E-01	3.0E-01	3.0E-01	1.4E-01	6.8E-03	Inc	0.15
VOLATILE ORGANIC COMPOUNDS											
n-Propylbenzene	0.0011	9.3E-06	1.4E-04	1.9E-04	4.0E-02	4.0E-02	4.0E-02	2.3E-04	3.4E-03	4.7E-03	0.0083
										HI	2.4
PETROLEUM HYDROCARBONS <sup>e</sup>									4	d	na <sup>d</sup>
Diesel Range Organics	1.0	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na 0.083
Diesel Range Organics, Aliphatic	0.80	6.8E-03	Inc	4.5E-03	1.0E-01	na	2.9E-01	6.8E-02	Inc	1.6E-02 4.0E-03	0.083
Diesel Range Organics, Aromatic	0.40	3.4E-03	Inc	2.3E-03	4.0E-02	na	5.7E-01	8.5E-02	Inc	4.0E-03	0.088
										HI	0.17
tes:								HI	Hazard inde	x	
Based on the maximum or 95 percent upper of	confidence limit (95	% UCL) on t	he mean					HQ	Hazard quot		
concentration detected at the site.								Inc	Incomplete		
Consistent with EPA policy, lead is not evaluated	uated in the cumulat	ive HI estima	ite.						Milligrams		
Risks associated with indicator compounds a	are included in cumu	ilative risk an	d hazard					mg/L			or day
estimates for each site. However, the health	hazards associated	with petroleur	m mixtures					mg/kd-d	-	per kilogram p	ber day.
will be evaluated and reported separately.								na	not available		
Exposure dose and noncancer hazards were of	calculated for petrol	eum hydrocai	rbons measur	red as DRO (r	nethod 810	0)		VOC	Volatile org	anic compour	d.
by segregating total DRO concentrations int	o aliphatic and aron	natic fractions	s, assuming 8	0% aliphatic							
hydrocarbons and 40% aromatic hydrocarbon	ns (ADEC, 2000c).										

of a medium 3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 21 - Wastewater Treatment Facility - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation		Pathway-Specific	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Ingestion Dermal	VOC Inhalation	Specific HQ

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 21 - Wastewater Treatment Facility - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific I	Hazard	Chemica
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specifi
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Arsenic	0.072	2.4E-03	1.1E-04	Inc	3.0E-04	3.0E-04	3.0E-04	7.9E+00	3.7E-01	Inc	8.3
Copper	0.26	8.5E-03	4.0E-04	Inc	3.7E-02	3.7E-02	3.7E-02	2.3E-01	1.1E-02	Inc	0.24
Lead	0.26	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	na <sup>b</sup>					
Mercury	0.00060	2.0E-05	9.3E-07	Inc	3.0E-04	3.0E-04	8.0E-06	6.6E-02	3.1E-03	Inc	0.069
Nickel	0.18	5.9E-03	5.6E-05	Inc	2.0E-02	2.0E-02	2.0E-02	3.0E-01	2.8E-03	Inc	0.30
Zinc	5.1	1.7E-01	7.9E-03	Inc	3.0E-01	3.0E-01	3.0E-01	5.6E-01	2.6E-02	Inc	0.59
VOLATILE ORGANIC COMPOUNDS											
n-Propylbenzene	0.0011	3.6E-05	5.3E-04	7.3E-04	4.0E-02	4.0E-02	4.0E-02	9.0E-04	1.3E-02	1.8E-02	0.032
										HI	9.5
PETROLEUM HYDROCARBONS								,	4	d	d
Diesel Range Organics	1.0	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	nad
Diesel Range Organics, Aliphatic	0.80	2.6E-02	Inc	1.8E-02	1.0E-01	na	2.9E-01	2.6E-01	Inc	6.0E-02 1.5E-02	0.32 0.34
Diesel Range Organics, Aromatic	0.40	1.3E-02	Inc	8.8E-03	4.0E-02	na	5.7E-01	3.3E-01	Inc	1.5E-02	0.54
										HI	0.67
tes:									Hazard index		
Based on the maximum or 95 percent upper of	confidence limit (95	5% UCL) on t	the mean					HI			
concentration detected at the site.								HQ	Hazard quot		
Consistent with EPA policy, lead is not evalu	ated in the cumula	tive HI estima	ate.					Inc	Incomplete p	bathway.	
Risks associated with indicator compounds a	re included in cum	ulative risk an	d hazard					mg/L	Milligrams p	ber liter.	
estimates for each site. However, the health								mg/kd-d	Milligrams p	er kilogram p	er day.
will be evaluated and reported separately.								na	not available		
Exposure dose and noncancer hazards were of	algulated for natrol	eum hydroca	rhons measur	red as DRO (n	nethod 810	0)		VOC		anic compoun	d.
Exposure dose and noncancer nazards were of by segregating total DRO concentrations into	alculated for perior	cull hyuloca	i oono measur							•	

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 21 - Wastewater Treatment Facility - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Surface W	ater Ingestion	Dermal	Inhalation		Pathway-Specif	t Hazaru	Chemical-
Concentra Constituent (mg/L	tion <sup>a</sup> Dose	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Ingestion Derma	VOC I Inhalation	Specific HQ

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 21 - Wastewater Treatment Facility - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	way-Specific	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral	nce Dose ( Dermal	mg/kg-d) Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ
<u>, , , , , , , , , , , , , , , , , , , </u>								22			
INORGANICS									0.75.00		0.28
Arsenic	0.072	8.2E-05	8.2E-07	Inc	3.0E-04	3.0E-04	3.0E-04	2.7E-01	2.7E-03 8.0E-05	Inc Inc	0.28
Copper	0.26	3.0E-04	3.0E-06	Inc	3.7E-02	3.7E-02	3.7E-02	8.0E-03			na <sup>b</sup>
Lead	0.26	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>	
Mercury	0.0006	6.8E-07	6.8E-09	Inc	3.0E-04	3.0E-04	8.0E-06	2.3E-03	2.3E-05	Inc Inc	0.0023 0.010
Nickel	0.18	2.1E-04	4.1E-07	Inc	2.0E-02	2.0E-02	2.0E-02	1.0E-02 1.9E-02	2.1E-05 1.9E-04	Inc	0.010
Zinc	5.1	5.8E-03	5.8E-05	Inc	3.0E-01	3.0E-01	3.0E-01	1.9E-02	1.9E-04	inc	0.020
VOLATILE ORGANIC COMPOUNDS											
n-Propylbenzene	0.0011	1.3E-06	3.9E-06	9.1E-06	4.0E-02	4.0E-02	4.0E-02	3.1E-05	9.7E-05	2.3E-04	0.00036
										HI	0.32
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	1.0	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	0.80	9.1E-04	Inc	2.2E-04	1.0E-01	na	2.9E-01	9.1E-03	Inc	7.6E-04	0.0099
Diesel Range Organics, Aromatic	0.40	4.6E-04	Inc	1.1E-04	4.0E-02	na	5.7E-01	1.1E-02	Inc	1.9E-04	0.012
										HI	0.021
Notes:									TT		
<sup>a</sup> Based on the maximum or 95 percent upper of	confidence limit (95	% UCL) on the	ne mean					HI	Hazard inde		
concentration detected at the site.								HQ	Hazard quot		
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	ated in the cumulat	ive HI estima	te.					Inc	Incomplete	pathway.	
<sup>c</sup> Risks associated with indicator compounds a	re included in cumu	lative risk and	d hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the health								mg/kd-d	Milligrams	per kilogram p	ber day.
will be evaluated and reported separately.								na	not available	e	
<sup>d</sup> Exposure dose and noncancer hazards were of	calculated for petrol	eum hydrocar	bons measure	ed as DRO (m	nethod 810	))		VOC	Volatile org	anic compoun	d.
by segregating total DRO concentrations into	o aliphatic and aron	natic fractions	, assuming 80	0% aliphatic							
hydrocarbons and 40% aromatic hydrocarbon											
nyulocal bolis and 40% alonatic nyulocal bol											

- 1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.
- 2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium
- 3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 21 - Wastewater Treatment Facility - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation		Pathway-Specific	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Ingestion Dermal	VOC Inhalation	Specific HQ

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 22 - Water Wells and Water Supply Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation					Specific Ca		Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	ope Factor	mg/kg-d)	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
Constructit	(IIIg/Kg)	(ing/kg-u)	(ing/kg/u)	(ing/kg-u)	0141	Derman					
POLYNUCLEAR AROMATIC HYDROCARBONS Benzo(a)pyrene	0.079	3.2E-08	1.6E-08	2.3E-12	7.3E+00	7.3E+00	7.3E+00	2.3E-07	1.2E-07	1.7E-11	3.5E-07
										ILCR	3E-07
Notes:											
<ul> <li>Based on the maximum or 95 percent upper confidence li</li> <li>Doses and cancer risks shown only for carcinogenic chem</li> <li>Based on the maximum or 95 percent upper confidence li</li> <li>Doses and cancer risks shown only for carcinogenic chem</li> </ul>	nicals with availabl mit (95% UCL) on nicals with availabl	e toxicity val the mean con e toxicity val	ues. ncentration d ues.	etected at the	site.			ILCR Inc mg/kg mg/kg-d	Incomplet Milligram	al lifetime can e pathway. s per kilogram s per kilogram	n.
<ol> <li>Absorbed doses were calculated for dermal contact with t of a medium Cancer risks are unitless values which represent the proba effect. They are calculated using the following formula:</li> </ol>	he medium, and in bility of incurring	takes were ca an adverse he	lculated for i		halation						

## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 22 - Water Wells and Water Supply Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathwa	y-Specific C	ancer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Slo Oral	pe Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
POLYNUCLEAR AROMATIC HYDROCARBONS Benzo(a)pyrene	0.079	9.5E-08	4.9E-08	6.9E-12	7.3E+00	7.3E+00	7.3E+00	6.9E-07	3.6E-07	5.1E-11	1.0E-06
			м.				-			ILCR	1E-06
<ul> <li>otes:</li> <li>Based on the maximum or 95 percent upper confidence limit and soil gravel at the site.</li> <li>) Doses and cancer risks shown only for carcinogenic chemica</li> <li>) Absorbed doses were calculated for dermal contact with the roof a medium.</li> </ul>	ls with available toxi	city values.						ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	l lifetime cancer pathway. per kilogram. per kilogram pe	

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

#### TABL 4

### CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 22 - Water Wells and Water Supply Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Generalitation	Soil Concentration <sup>a</sup> (mg/kg)	Soil Ingestion Dose (mg/kg-d)	Soil Dermal Dose (mg/kg-d)	Dust Inhalation Dose (mg/kg-d)	Cancer SI Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil	-Specific Ca Dermal	nncer Risk Dust Inhalation	Chemical- Specific Risk
Constituent	(ing/kg)	(ing/kg-d)	(ing/ing d)								
POLYNUCLEAR AROMATIC HYDROCARBONS Benzo(a)pyrene	0.079	7.7E-10	1.3E-09	2.4E-13	7.3E+00	7.3E+00	7.3E+00	5.6E-09	9.6E-09	1.7E-12	1.5E-08
										ILCR	2E-08
Notes: <sup>a</sup> Based on the maximum or 95 percent upper confidence limit 1) Doses and cancer risks shown only for carcinogenic chemica 2) Absorbed doses were calculated for dermal contact with the of a medium	ls with available tox	cicity values.						ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	l lifetime cance pathway. per kilogram. per kilogram p	
3) Cancer risks are unitless values which represent the probabil	ty of incurring an a	dverse health	_								

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 22 - Water Wells and Water Supply Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					ay-Specific		Chemica
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (n	0 0	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Lead	497	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
VOLATILE ORGANIC COMPOUNDS					2.05.01	2.05.01	2.9E-02	6.8E-06	0.0E+00	2.3E-09	0.00000
o-Xylene	0.37	1.4E-06	0.0E+00	6.7E-11	2.0E-01	2.0E-01	2.9E-02	0.8E-00	0.06+00	2.56-07	0.00000
										HI	0.00000
PETROLEUM HYDROCARBONS <sup>e</sup>											
Diesel Range Organics	4,070	nad	nad	naď	nad	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	naď	na <sup>d</sup>
Diesel Range Organics, Aliphatic	3,256	1.2E-02	Inc	5.9E-07	1.0E-01	na	2.9E-01	1.2E-01	Inc	2.0E-06	0.12
Diesel Range Organics, Aromatic	1,628	5.9E-03	Inc	2.9E-07	4.0E-02	na	5.7E-01	1.5E-01	Inc	5.2E-07	0.15
Gasoline Range Organics	38	na <sup>e</sup>	na	na	na°	na	na°	na"	na	na°	na
Gasoline Range Organics, Aliphatic	27	9.8E-05	Inc	4.9E-09	5.0E+00	na	5.3E+00	2.0E-05	Inc	9.2E-10	2.0E-0
Gasoline Range Organics, Aromatic	19	7.0E-05	Inc	3.5E-09	2.0E-01	na	1.1E-01	3.5E-04	Inc	3.2E-08	0.00034
Residual Range Organics	3,815	na	na <sup>f</sup>	nať	naf	na <sup>f</sup>	naf				
Residual Range Organics, Aliphatic	3,434	1.2E-02	Inc	6.2E-07	2.0E+00	na	na	6.2E-03	Inc	Inc	0.006
Residual Range Organics, Aromatic	1,145	4.2E-03	Inc	2.1E-07	3.0E-02	na	na	1.4E-01	Inc	Inc	0.14
										HI	0.41
es:											
Based on the maximum or 95 percent upper con-	fidence limit (95% U	CL) on the me	ean					HI	Hazard ind		
concentration detected at the site.								HQ	Hazard quo		
Consistent with EPA policy, lead is not evaluate	d in the cumulative H	I estimate.						Inc	Incomplete	pathway.	
Risks associated with indicator compounds are i	ncluded in cumulative	e risk and haz	ard					mg/kg	Milligrams	per kilogram	
estimates for each site. However, the health haz	ards associated with p	petroleum mix	tures					mg/kd-d	Milligrams	per kilogram	per day.
will be evaluated and reported separately.								na	not availab	le	
Exposure dose and noncancer hazards were calc	ulated for petroleum l	hydrocarbons	measured as I	DRO (method 8	100)						
by segregating total DRO concentrations into al	iphatic and aromatic	fractions, assu	iming 80% ali	phatic							
hydrocarbons and 40% aromatic hydrocarbons (											
Exposure dose and noncancer hazards were calc	lated for notroloum	udrocarbons	measured as (	GRO (method 8	015)						

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

<sup>r</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 22 - Water Wells and Water Supply Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathway	-Specific Hazard	Chemical-
Constituent	Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)	Soil	Dust	Specific
	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion	Dermal Inhalation	HQ

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 22 - Water Wells and Water Supply Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil Concentration <sup>a</sup>	Soil Ingestion Dose	Dermal Dose	Dust Inhalation Dose	Refere	ence Dose	(mg/kg-d)	Pathwa	ay-Specific	Dust	Chemical- Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
NORCANICS											
INORGANICS	497	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	nab	na <sup>b</sup>
Lead	497	па	па	па	па	na	na	nu			
VOLATILE ORGANIC COMPOUNDS											
o-Xylene	0.37	4.1E-06	0.0E+00	2.0E-10	2.0E-01	2.0E-01	2.9E-02	2.0E-05	0.0E+00	6.9E-09	0.000020
										HI	0.000020
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	4,070	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	3,256	3.6E-02	Inc	1.8E-06	1.0E-01	na	2.9E-01	3.6E-01	Inc	6.1E-06	0.4
Diesel Range Organics, Aromatic	1,628	1.8E-02	Inc	8.8E-07	4.0E-02	na	5.7E-01	4.4E-01	Inc	1.5E-06	0.4
Gasoline Range Organics	38	na	na	na	na	na	na°	na	na®	na <sup>e</sup>	na
Gasoline Range Organics, Aliphatic	26.915	2.9E-04	Inc	1.5E-08	5.0E+00	na	5.3E+00	5.9E-05	Inc	2.8E-09	0.000059
Gasoline Range Organics, Aromatic	19.225	2.1E-04	Inc	1.0E-08	2.0E-01	na	1.1E-01	1.0E-03	Inc	9.5E-08	0.0010
Residual Range Organics	3,815	naf	na <sup>f</sup>	naf	na <sup>f</sup>						
Residual Range Organics, Aliphatic	3,434	3.7E-02	Inc	1.9E-06	2.0E+00		na	1.9E-02	Inc	Inc	0.019
Residual Range Organics, Aromatic	1,145	1.2E-02	Inc	6.2E-07	3.0E-02	na	na	4.2E-01	Inc	Inc	0.42
										HI	1.2
Notes:									TTdim	dan	
<sup>a</sup> Based on the maximum or 95 percent upper con	fidence limit (95% UC	CL) on the me	an					HI	Hazard in		
concentration detected at the site.								HQ	Hazard qu		
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	ed in the cumulative H	I estimate.						Inc		e pathway.	
° Risks associated with indicator compounds are	included in cumulative	risk and haz	ard					mg/kg	Milligram	s per kilograr	n.
estimates for each site. However, the health haz								mg/kd-d	Milligram	s per kilograr	n per day.
will be evaluated and reported separately.								na	not availa	ble	
<sup>d</sup> Exposure dose and noncancer hazards were cald	ulated for petroleum h	ydrocarbons	measured as	DRO (method	d 8100)						
by segregating total DRO concentrations into a	liphatic and aromatic f	ractions, assu	ming 80% al	iphatic							

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

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### NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 22 - Water Wells and Water Supply Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust				
	Soil	Ingestion	Dermal	Inhalation	_	Pathway-Spee	ific Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)	Soil	Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion Derr	nal Inhalation	HQ

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 22 - Water Wells and Water Supply Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					way-Specific H		Chemica
	Concentration"	Dose	Dose	Dose		nce Dose (n		Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
NORGANICS										5	
Lead	497	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
VOLATILE ORGANIC COMPOUNDS											
p-Xylene	0.37	1.1E-08	0.0E+00	3.3E-12	2.0E-01	2.0E-01	2.9E-02	5.3E-08	0.0E+00	1.1E-10	0.000000
										HI	0.000000
PETROLEUM HYDROCARBONS <sup>e</sup>					8.2						4
Diesel Range Organics	4,070	nad	na <sup>d</sup>	nad	naď	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na <sup>d</sup> 9.9E-08	na <sup>d</sup> 0.0009
Diesel Range Organics, Aliphatic	3,256	9.3E-05	Inc Inc	2.9E-08 1.4E-08	1.0E-01 4.0E-02	na na	2.9E-01 5.7E-01	9.3E-04 1.2E-03	Inc Inc	2.5E-08	0.0003
Diesel Range Organics, Aromatic	1,628	4.6E-05 na <sup>°</sup>	na	na <sup>6</sup>	4.0E-02	na	na	na	na	na	na
Gasoline Range Organics	38 27	na 7.7E-07	Inc	2.4E-10	5.0E+00	na	5.3E+00	1.5E-07	Inc	4.5E-11	0.000000
Gasoline Range Organics, Aliphatic Gasoline Range Organics, Aromatic	19	5.5E-07	Inc	1.7E-10	2.0E-01	na	1.1E-01	2.7E-06	Inc	1.5E-09	0.00000
Residual Range Organics	3,815	na <sup>f</sup>	naf	na	na <sup>f</sup>	na <sup>ſ</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>
Residual Range Organics, Aliphatic	3,434	9.8E-05	Inc	3.0E-08	2.0E+00	na	na	4.9E-05	Inc	Inc	0.0004
Residual Range Organics, Aromatic	1,145	3.3E-05	Inc	1.0E-08	3.0E-02	na	na	1.1E-03	Inc	Inc	0.001
										HI	0.0032
es:	-							ні	Hazard index	r.	
Based on the maximum or 95 percent upper con	nfidence limit (95% U	JCL) on the n	nean					HQ	Hazard quoti		
concentration detected at the site.								Inc	Incomplete p		
Consistent with EPA policy, lead is not evaluat	ed in the cumulative	HI estimate.	zard					mg/kg	Milligrams p		
Risks associated with indicator compounds are								mg/kd-d		er kilogram pe	r day.
estimates for each site. However, the health ha	zards associated with	petroleum m	ixtures					na	not available		
will be evaluated and reported separately.		huduseehee	a manurad a	c DPO (meth	od 8100)			lla	not available		
Exposure dose and noncancer hazards were cal	culated for petroleum	nydrocardon	s measured a	aliphatic	Ju 8100)						
	aliphatic and aromatic	e fractions, as	suming 80%	anphatic							
by segregating total DRO concentrations into a	(1 DEC 2000-)										
hydrocarbons and 40% aromatic hydrocarbons		h	a management -	CPO (moth	od 8015)						
	culated for petroleum	hydrocarbon	s measured a	s GRO (metho	od 8015)						

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

#### TAB 27

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 22 - Water Wells and Water Supply Building - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	ay-Specific H	Iazard	Chemical-
Constituent	Concentration <sup>®</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral	nce Dose (m Dermal	ng/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

 Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 22 - Water Wells and Water Supply Building - DEEP SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	Inhalation				Pathy	way-Specific	Hazard VOC	Chemica Specific
	Concentration <sup>*</sup>	Dose	Dose	Dose			(mg/kg-d)	Ingestion	Dermal	Inhalation	HQ
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	ingestion	Dermai	malation	nų
INORGANICS											
Manganese	0.20	1.7E-03	8.1E-05	Inc	1.4E-01	1.4E-01	1.4E-05	1.2E-02	5.8E-04	Inc	0.013
Manganese, Dissolved	0.17	1.4E-03	6.6E-05	Inc	1.4E-01	1.4E-01	1.4E-05	1.0E-02	4.7E-04	Inc	0.010
										HI	0.023
PETROLEUM HYDROCARBONS <sup>e</sup>											
	1.4	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics Diesel Range Organics, Aliphatic	1.4	9.5E-03	Inc	6.3E-03	1.0E-01	na	2.9E-01	9.5E-02	Inc	2.2E-02	0.12
Diesel Range Organics, Aromatic	0.56	4.7E-03	Inc	3.2E-03	4.0E-02	na	5.7E-01	1.2E-01	Inc	5.5E-03	0.12
Residual Range Organics	2.8	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	naf	naf	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>
Residual Range Organics, Aliphatic	2.5	2.1E-02	Inc	1.5E-05	2.0E+00	na	na	1.1E-02	Inc	Inc	0.011
Residual Range Organics, Ariphatic	0.8	7.1E-03	Inc	4.9E-06	3.0E-02	na	na	2.4E-01	Inc	Inc	0.24
Residual Range Organies, Freehouse										ні	0.49
ites:											
Based on the maximum or 95 percent upper	er confidence limit (95	% UCL) on t	he mean					HI	Hazard inde	ex.	
concentration detected at the site.	ci confidence milit (>e	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						HQ	Hazard quot	tient.	
Consistent with EPA policy, lead is not ev	alusted in the cumulat	ive HI estima	ate					Inc	Incomplete	pathway.	
Risks associated with indicator compound	s are included in cum	lative risk an	d hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the heal								mg/kd-d	Milligrams	per kilogram p	ber day.
	ui nazarus associated	while periode						na	not available		
will be evaluated and reported separately.	1 1 1 6	aum hudroon	rhone moseur	red as DRO (	method 810	0)		VOC		anic compour	d.
Exposure dose and noncancer hazards wer	e calculated for petrol	eum nydroca	roons measur	of alimbatic	neurou oro	.0)		VOC	volatile org	and compound	
by segregating total DRO concentrations		natic fraction	s, assuming a	30% aliphatic							
hydrocarbons and 40% aromatic hydrocarb	bons (ADEC, 2000c).										
Exposure dose and noncancer hazards wer	e calculated for petrol	eum hydroca	rbons measur	red as GRO (1	method 801	5)					
by segregating total GRO concentrations	into aliphatic and aron	natic fraction	s, assuming 7	70% aliphatic							
hydrocarbons and 50% aromatic hydrocarb	bons (ADEC, 2000c).										
Exposure dose and noncancer hazards wer	e calculated for petrol	eum hydroca	rbons measur	red as RRO (1	method)						
by segregating total RRO concentrations	into aliphatic and aron	natic fraction	s, assuming 9	0% aliphatic							
hydrocarbons and 30% aromatic hydrocar											

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 22 - Water Wells and Water Supply Building - DEEP SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation			Pathw	ay-Specific	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral	 (mg/kg-d) Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 22 - Water Wells and Water Supply Building - DEEP SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	way-Specific	Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Manganese	0.20	6.7E-03	3.2E-04	Inc	1.4E-01	1.4E-01	1.4E-05	4.8E-02	2.3E-03	Inc	0.050
Manganese, Dissolved	0.17	5.4E-03	2.6E-04	Inc	1.4E-01	1.4E-01	1.4E-05	3.9E-02	1.8E-03	Inc	0.041
										HI	0.091
PETROLEUM HYDROCARBONS								,	4	d	na <sup>d</sup>
Diesel Range Organics	1.4	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na 0.45
Diesel Range Organics, Aliphatic	1.1	3.7E-02	Inc	2.5E-02	1.0E-01	na	2.9E-01	3.7E-01	Inc	8.5E-02 2.2E-02	0.43
Diesel Range Organics, Aromatic	0.56	1.8E-02	Inc	1.2E-02	4.0E-02	na	5.7E-01	4.6E-01	Inc		na <sup>f</sup>
Residual Range Organics	2.8	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na'	na <sup>f</sup>	naf	na <sup>f</sup>	na <sup>f</sup>	na 0.041
Residual Range Organics, Aliphatic	2.5	8.3E-02	Inc	5.8E-05	2.0E+00	na	na	4.1E-02	Inc	na	0.041
Residual Range Organics, Aromatic	0.8	2.8E-02	Inc	1.9E-05	3.0E-02	na	na	9.2E-01	Inc	na	0.92
										HI	1.9
Notes:								ні	Hazard inde	x	
<sup>a</sup> Based on the maximum or 95 percent upp concentration detected at the site.	per confidence limit (9	5% UCL) on	the mean					HQ	Hazard quot	tient.	
<sup>b</sup> Consistent with EPA policy, lead is not en	valuated in the cumula	tive HI estim	ate.					Inc	Incomplete	pathway.	
<ul> <li>Risks associated with indicator compound</li> </ul>	ds are included in cum	ulative risk an	nd hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the hea	Ith hazards associated	with petroleu	im mixtures					mg/kd-d	Milligrams	per kilogram	per day.
will be evaluated and reported separately.								na	not available	e	
<sup>d</sup> Exposure dose and noncancer hazards we		leum hydroca	rbons measur	red as DRO (r	nethod 810	0)		VOC	Volatile org	anic compour	ıd.
by segregating total DRO concentrations	into alighatic and arou	matic fraction	s, assuming 8	30% aliphatic							
hydrocarbons and 40% aromatic hydrocar	rbons (ADEC, 2000).		shone money	red as GRO (r	nethod 801	5)					
e Exposure dose and noncancer hazards we	ere calculated for perio	ieum nyuroca	uoons measur	1007 alighatic	nethod oor	.,					
by segregating total GRO concentrations			is, assuming	0% anphatic							
hydrocarbons and 50% aromatic hydrocar	rbons (ADEC, 2000c).										
f Exposure dose and noncancer hazards we	ere calculated for petro	leum hydroca	arbons measur	red as RRO (r	nethod)						
				of alishatia							
by segregating total RRO concentrations	into aliphatic and arou	matic fraction	is, assuming 9	0% anphatic							
by segregating total RRO concentrations hydrocarbons and 30% aromatic hydroca			is, assuming 9	0% anphaue							

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 22 - Water Wells and Water Supply Building - DEEP SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation		Pathway	y-Specific H	lazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion	Dermal	Inhalation	HQ

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 22 - Water Wells and Water Supply Building - DEEP SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	Inhalation				Pathy	vay-Specific	Hazard VOC	Chemica Specific
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Oral	nce Dose ( Dermal	mg/kg-d) Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Manganese	0.20	2.3E-04	2.3E-06	Inc	1.4E-01	1.4E-01	1.4E-05	1.7E-03	1.7E-05	Inc	0.0017
Manganese, Dissolved	0.17	1.9E-04	1.9E-06	Inc	1.4E-01	1.4E-01	1.4E-05	1.3E-03	1.3E-05	Inc	0.0014
										HI	0.0030
PETROLEUM HYDROCARBONS <sup>e</sup>								,	,	4	d
Diesel Range Organics	1.4	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup> 0.014
Diesel Range Organics, Aliphatic	1.12	1.3E-03	Inc	3.1E-04	1.0E-01	na	2.9E-01	1.3E-02	Inc	1.1E-03 2.7E-04	0.014
Diesel Range Organics, Aromatic	0.56	6.4E-04	Inc	1.5E-04	4.0E-02	na	5.7E-01	1.6E-02	Inc		
Residual Range Organics	2.8	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	naf
Residual Range Organics, Aliphatic	2.5	2.9E-03	Inc	7.2E-07	2.0E+00	na	na	1.4E-03	Inc	Inc	0.0014
Residual Range Organics, Aromatic	0.8	9.6E-04	Inc	2.4E-07	3.0E-02	na	na	3.2E-02	Inc	Inc	0.032
										HI	0.063
otes:								н	Hazard inde	v	
<sup>a</sup> Based on the maximum or 95 percent upper concentration detected at the site.	er confidence limit (95	% UCL) on t	he mean					HQ	Hazard quot		
Consistent with EPA policy, lead is not ev	aluated in the cumulati	ive HI estima	te.					Inc	Incomplete	pathway.	
Risks associated with indicator compound	s are included in cumu	lative risk an	d hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the heal								mg/kd-d	Milligrams	per kilogram p	er day.
will be evaluated and reported separately.								na	not available	e	
		wm hydrocar	hone measure	d as DRO (m	ethod 8100	))		VOC	Volatile org	anic compoun	d.
Exposure dose and noncancer hazards wer	e calculated for peulon			aliphatic	culou or oc	<i>,</i> ,		VOC	volatile org	une compour	
by segregating total DRO concentrations		atic fractions	, assuming a	1% anphatic							
hydrocarbons and 40% aromatic hydrocar	bons (ADEC, 2000c).										
Exposure dose and noncancer hazards wer	e calculated for petrole	eum hydrocar	bons measure	ed as GRO (m	ethod 8015	5)					
by segregating total GRO concentrations	into aliphatic and arom	natic fractions	, assuming 70	)% aliphatic							
hydrocarbons and 50% aromatic hydrocarb											
f Exposure dose and noncancer hazards wer		eum hydrocar	bons measure	d as RRO (m	ethod)						
by segregating total RRO concentrations	into alinhatic and arom	atic fractions	assuming 90	% aliphatic							
hydrocarbons and 30% aromatic hydrocarb		and machons	, abbanning /								

#### TAB\_\_\_\_\_30

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 22 - Water Wells and Water Supply Building - DEEP SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				voc				Chamical
	Surface Water	Ingestion	Dermal	Inhalation	-	Pathway-Spee	ific Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)		VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion Derr	nal Inhalation	HQ

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 27 - Diesel Fule Pump Island - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-	Specific Car	ncer Risk	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer Sl	ope Factor	(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.28	1.1E-07	0.0E+00	8.3E-12	5.5E-02	5.5E-02	2.7E-02	6.3E-09	0.0E+00	2.2E-13	6.3E-09
Ethylbenzene	8.1	3.3E-06	0.0E+00	2.4E-10	3.9E-03	3.9E-03	3.9E-03	1.3E-08	0.0E+00	9.3E-13	1.3E-08
×										ILCR	2E-08
tes: Based on the maximum or 95 percent upper c	onfidence limit (959	6 UCL) on th	e mean conc	entration dete	cted at the si	te.		ILCR		al lifetime can	cer risk.
Doses and cancer risks shown only for carcine Based on the maximum or 95 percent upper or Doses and cancer risks shown only for carcine	ogenic chemicals wi onfidence limit (959	th available t 6 UCL) on th	oxicity value e mean conc	s. entration dete				Inc mg/kg mg/kg-d	Milligram	e pathway. s per kilogram s per kilogram	
Absorbed doses were calculated for dermal co of a medium Cancer risks are unitless values which represe	ontact with the medi	um, and intak	es were calc	ulated for ing	estion or inha	alation					

Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 27 - Diesel Fuel Pump Island - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathwa	y-Specific C	ancer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Slo Oral	ope Factor ( Dermal	the second se	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
VOLATILE ORGANIC COMPOUNDS Benzene Ethylbenzene	0.28 8.1	3.4E-07 9.8E-06	0.0E+00 0.0E+00	2.5E-11 7.1E-10	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.7E-02 3.9E-03	1.9E-08 3.8E-08	0.0E+00 0.0E+00	6.7E-13 2.8E-12	1.9E-08 3.8E-08
			a 1							ILCR	6E-08
<ul> <li>Notes:</li> <li>Based on the maximum or 95 percent upper co and soil gravel at the site.</li> <li>Doses and cancer risks shown only for carcino.</li> <li>Absorbed doses were calculated for dermal con of a medium.</li> </ul>	genic chemicals with a	available toxic	ity values.					ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	lifetime cancer pathway. per kilogram. per kilogram pe	

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

# CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 27 - Diesel Fuel Pump Island - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Soil Concentration <sup>a</sup>	Ingestion Dose	Deer								
(mg/kg)	(mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	ope Factor ( Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
0.28 8.1	2.8E-09 7.9E-08	0.0E+00 0.0E+00	8.5E-13 2.4E-11	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.7E-02 3.9E-03	1.5E-10 3.1E-10	0.0E+00 0.0E+00	2.3E-14 9.5E-14	1.5E-10 3.1E-10
									ILCR	5E-10
	8.1	8.1 7.9E-08	8.1 7.9E-08 0.0E+00		8.1 7.9E-08 0.0E+00 2.4E-11 3.9E-03	8.1 7.9E-08 0.0E+00 2.4E-11 3.9E-03 3.9E-03	8.1 7.9E-08 0.0E+00 2.4E-11 3.9E-03 3.9E-03 3.9E-03	8.1 7.9E-08 0.0E+00 2.4E-11 3.9E-03 3.9E-03 3.9E-03 3.1E-10	0.28         2.8E-09         0.0E+00         6.5E+15         5.5E+02         5	0.28       2.8E-09       0.0E+00       8.3E-13       3.3E-02       3.3E-02       2.7E-02       1.0E-10       5.0E-03         8.1       7.9E-08       0.0E+00       2.4E-11       3.9E-03       3.9E-03       3.1E-10       0.0E+00       9.5E-14

Milligrams per kilogram per day.

mg/kg-d

 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

#### TABLE .....4

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 27 - Diesel Fuel Pump Island - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific	Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal			Dermal	Inhalation	HQ
VOLATILE ORGANIC COMPOUNDS										5 0 5 00	0.00000
Benzene	0.28	1.0E-06	0.0E+00	5.1E-11	4.0E-03	4.0E-03	8.6E-03	2.6E-04	0.0E+00	5.9E-09	0.00026
Ethylbenzene	8.1	2.9E-05	0.0E+00	1.5E-09	1.0E-01	1.0E-01	2.9E-01	2.9E-04	0.0E+00	5.0E-09	0.00029
m,p-Xylene	25	9.2E-05	0.0E+00	4.6E-09	2.0E-01	2.0E-01	2.9E-02	4.6E-04	0.0E+00	1.6E-07	0.00046
o-Xylene	16	5.9E-05	0.0E+00	2.9E-09	2.0E-01	2.0E-01	2.9E-02	5.9E-05	5.9E-05	5.9E-05	0.000059
Toluene	7.6	2.7E-05	0.0E+00	1.4E-09	2.0E-01	2.0E-01	1.1E-01	1.4E-04	0.0E+00	1.2E-08	0.00014
POLYNUCLEAR AROMATIC HYDROCAL	RBONS										
Naphthalene	191	7.0E-04	0.0E+00	3.5E-08	2.0E-02	2.0E-02	8.6E-04	3.5E-02	0.0E+00	4.0E-05	0.035
										HI	0.036
PETROLEUM HYDROCARBONS <sup>e</sup>											
Diesel Range Organics	51,000	nad	na <sup>d</sup>	nad	nad	nad	nad	nad	nad	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	40,800	1.5E-01	Inc	7.4E-06	1.0E-01	na	2.9E-01	1.5E+00	Inc	2.5E-05	1.5
Diesel Range Organics, Aromatic	20,400	7.4E-02	Inc	3.7E-06	4.0E-02	na	5.7E-01	1.9E+00	Inc	6.5E-06	1.9
Gasoline Range Organics	491	na	na <sup>e</sup>	na <sup>e</sup>	na®	na	na <sup>e</sup>	na	na	na	na°
Gasoline Range Organics, Aliphatic	344	1.3E-03	Inc	6.2E-08	5.0E+00	na	5.3E+00	2.5E-04	Inc	1.2E-08	0.0002502
Gasoline Range Organics, Aromatic	246	8.9E-04	Inc	4.4E-08	2.0E-01	na	1.1E-01	4.5E-03	Inc	4.0E-07	0.0045
	3,459	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na	na <sup>f</sup>	naf	na <sup>r</sup>	na <sup>r</sup>	naf
Residual Range Organics	3,113	1.1E-02	Inc	5.6E-07	2.0E+00	na	na	5.7E-03	Inc	Inc	0.0057
Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	1,038	3.8E-03	Inc	1.9E-07	3.0E-02	na	na	1.3E-01	Inc	Inc	0.13
Residual Range Organics, Afoniauc	1,000	5.00 05								ні	3.5
										HI	3.5
Notes:								н	Hazard ind	ex	
" Based on the maximum or 95 percent upper con-	fidence limit (95% U	CL) on the me	ean						Hazard que		
concentration detected at the site.								HQ			
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	d in the cumulative H	I estimate.						Inc	Incomplete	-	
° Risks associated with indicator compounds are i	ncluded in cumulative	risk and haz	ard					mg/kg	Milligrams	per kilogram	
estimates for each site. However, the health haz								mg/kd-d	Milligrams	per kilogram	per day.
	and about the firm							na	not availab	le	
will be evaluated and reported separately.			managered on 1	DPO (method 9	100)					1910-02	

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 27 - Diesel Fuel Pump Island - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathway-Specific	Hazard Chemic	cal-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Soil Ingestion Dermal	Dust Specifi Inhalation HQ	

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 27 - Diesel Fuel Pump Island - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	y-Specific	Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose			(mg/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
VOLATILE ORGANIC COMPOUNDS	0.00	2 15 04	0.00.00	1 60 10	4 05 02	4 05 02	8.6E-03	7.7E-04	0.0E+00	1.8E-08	0.00077
Benzene	0.28	3.1E-06	0.0E+00	1.5E-10	4.0E-03	4.0E-03	8.6E-03 2.9E-01	8.8E-04	0.0E+00	1.5E-08	0.0009
Ethylbenzene	8.1	8.8E-05	0.0E+00	4.4E-09 1.4E-08			2.9E-01 2.9E-02	1.4E-04	0.0E+00	4.7E-07	0.0014
m,p-Xylene	25	2.8E-04	0.0E+00	1.4E-08 8.8E-09	2.0E-01 2.0E-01		2.9E-02 2.9E-02	8.9E-04	0.0E+00	3.0E-07	0.00089
o-Xylene	16	1.8E-04	0.0E+00	8.8E-09 4.1E-09	2.0E-01 2.0E-01		2.9E-02 1.1E-01	4.1E-04	0.0E+00	3.7E-08	0.00041
Toluene	7.6	8.2E-05	0.0E+00	4.16-09	2.06-01	2.06-01	1.16-01	4.112-04	0.01+00	5.72.00	0.00011
POLYNUCLEAR AROMATIC HYDROCAL	RBONS										
Naphthalene	191	2.1E-03	8.6E-04	1.0E-07	2.0E-02	2.0E-02	8.6E-04	1.0E-01	4.3E-02	1.2E-04	0.15
										HI	0.15
PETROLEUM HYDROCARBONS <sup>c</sup>											
	51,000	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	40,800	4.5E-01	Inc	2.2E-05	1.0E-01	na	2.9E-01	4.5E+00	Inc	7.6E-05	4.5
Diesel Range Organics, Aliphatic	20,400	2.2E-01	Inc	1.1E-05	4.0E-02	na	5.7E-01	5.6E+00	Inc	1.9E-05	5.6
Diesel Range Organics, Aromatic				na®	na®	na°	na°	na <sup>e</sup>	na <sup>e</sup>	na <sup>e</sup>	na <sup>e</sup>
Gasoline Range Organics	491	na	na°		na 5.0E+00		5.3E+00	7.5E-04	Inc	3.5E-08	0.00075
Gasoline Range Organics, Aliphatic	344	3.8E-03	Inc	1.9E-07			1.1E-01	1.3E-04	Inc	1.2E-06	0.013
Gasoline Range Organics, Aromatic	246	2.7E-03	Inc	1.3E-07	2.0E-01	na	,			naf	naf
Residual Range Organics	3,459	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na <sup>f</sup>	na'	na'	na <sup>f</sup>	na <sup>f</sup>		
Residual Range Organics, Aliphatic	3,113	3.4E-02	Inc	1.7E-06	2.0E+00	na	na	1.7E-02	Inc	Inc	0.017
Residual Range Organics, Aromatic	1,038	1.1E-02	Inc	5.6E-07	3.0E-02	na	na	3.8E-01	Inc	Inc	0.38
										HI	10
Notes:											
<sup>a</sup> Based on the maximum or 95 percent upper con	fidence limit (95% UC	L) on the me	an					HI	Hazard in	dex.	
concentration detected at the site.		2010 Boo 198 (199 (1990) 199						HQ	Hazard qu	otient.	
	· · · · · · · · · · · · · · · · · · ·							Inc		e pathway.	
<sup>b</sup> Consistent with EPA policy, lead is not evaluate			urd							s per kilogran	n
<sup>c</sup> Risks associated with indicator compounds are i								mg/kg	-	•	
estimates for each site. However, the health haz	ards associated with p	etroleum mix	tures					mg/kd-d	Milligram	s per kilogran	n per day.

will be evaluated and reported separately.

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

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na

not available

### NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 27 - Diesel Fuel Pump Island - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation			Pathwa	y-Specific	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Referen Oral	 (mg/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

e Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 27 - Diesel Fuel Pump Island - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Soil Concentration <sup>®</sup> (mg/kg)	Soil Ingestion Dose (mg/kg-d)	Dermal Dose (mg/kg-d)	Dust Inhalation Dose (mg/kg-d)					Pathway-Specific Haza		ard Chemica	
					Reference Dose (mg/kg-d)			Soil		Dust	Specific	
					Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ	
<b>VOLATILE ORGANIC COMPOUNDS</b>												
Benzene	0.28	8.1E-09	0.0E+00	2.5E-12	4.0E-03	4.0E-03	8.6E-03	2.0E-06	0.0E+00	2.9E-10	0.00000	
Ethylbenzene	8.1	2.3E-07	0.0E+00	7.1E-11	1.0E-01	1.0E-01	2.9E-01	2.3E-06	0.0E+00	2.4E-10	0.00000	
n,p-Xylene	25	7.2E-07	0.0E+00	2.2E-10	2.0E-01	2.0E-01	2.9E-02	3.6E-06	0.0E+00	7.7E-09	0.00000	
-Xylene	16	4.7E-07	0.0E+00	1.4E-10	2.0E-01	2.0E-01	2.9E-02	2.3E-06	0.0E+00	4.9E-09	0.00000	
Toluene	7.6	2.2E-07	0.0E+00	6.6E-11	2.0E-01	2.0E-01	1.1E-01	1.1E-06	0.0E+00	6.0E-10	0.00000	
POLYNUCLEAR AROMATIC HYDROCA	RBONS											
Naphthalene	191	5.5E-06	9.4E-06	1.7E-09	2.0E-02	2.0E-02	8.6E-04	2.7E-04	4.7E-04	2.0E-06	0.000	
										HI	0.000	
PETROLEUM HYDROCARBONS <sup>e</sup>												
Diesel Range Organics	51,000	nad	nad	nad	nad	nad	nad	nad	naď	na <sup>d</sup>	na <sup>d</sup>	
Diesel Range Organics, Aliphatic	40,800	1.2E-03	Inc	3.6E-07	1.0E-01	na	2.9E-01	1.2E-02	Inc	1.2E-06	0.012	
Diesel Range Organics, Aromatic	20,400	5.8E-04	Inc	1.8E-07	4.0E-02	na	5.7E-01	1.5E-02	Inc	3.1E-07	0.01	
	491	na <sup>e</sup>	na	na	na®	nae	na	na	na	na <sup>e</sup>	na	
Gasoline Range Organics	344	9.8E-06	Inc	3.0E-09	5.0E+00	na	5.3E+00	2.0E-06	Inc	5.7E-10	0.0000	
Gasoline Range Organics, Aliphatic	246	7.0E-06	Inc	2.2E-09	2.0E-01	na	1.1E-01	3.5E-05	Inc	2.0E-08	0.0000	
Gasoline Range Organics, Aromatic		na	na <sup>f</sup>	na	na	naf	naf	na	naf	naf	na <sup>f</sup>	
Residual Range Organics	3,459			2.7E-08	2.0E+00	na	na	4.4E-05	Inc	Inc	4.4E-0	
Residual Range Organics, Aliphatic	3,113	8.9E-05	Inc Inc	9.1E-08	3.0E-02	na	na	9.9E-04	Inc	Inc	0.000	
Residual Range Organics, Aromatic	1,038	3.0E-05	Inc	9.1E-09	3.012-02	na	na	,,,, <u>,</u> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
										HI	0.02	
25:	1. 1. <u>1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1</u>											
Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean								HI	Hazard index	ι.		
concentration detected at the site.								HQ Hazard quotient.				
Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.								Inc	Incomplete pathway.			
The state of the DDA malian land is not avaluate	d in the cumulative	HI ectimate						Inte	Incompress p			

estimates for each site. However, the health hazards associated with petroleum mixtures will be evaluated and reported separately.

Milligrams per kilogram. mg/kg Milligrams per kilogram per day. mg/kd-d not available na

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).
#### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 27 - Diesel Fuel Pump Island - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust							~
	Soil	Ingestion	Dermal	Inhalation			-	Pathwa	ay-Specific I	lazard	Chemical-
	Concentration <sup>*</sup>	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ

e Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	-		(mg/kg-d) <sup>-1</sup>	Ingestion	Dermal	VOC Inhalation	Specific Risk
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermar	malation	Risk
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.030	1.1E-04	3.2E-05	3.4E-04	5.5E-02	5.5E-02	2.7E-02	6.3E-06	1.8E-06	9.3E-06	1.7E-05
Ethylbenzene	0.12	4.6E-04	4.6E-04	2.1E-03	3.9E-03	3.9E-03	3.9E-03	1.8E-06	1.8E-06	8.1E-06	1.2E-05
			-							ILCR	3E-05
Notes:											
<sup>a</sup> Based on the maximum or 95 percent upper co	onfidence limit (95%	UCL) on the	mean					ILCR	Incrementa	l lifetime cano	cer risk.
concentration detected at the site.								Inc	Incomplete		
1) Doses and cancer risks shown only for carcino	genic chemicals with	h available to	xicity values.	· ·				mg/L	Milligrams		
2) Absorbed doses were calculated for dermal co								mg/kg-d	Milligrams	per kilogram	per day.
calculated for ingestion or inhalation of a med								VOC	Volatile or	ganic compou	nd.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater	Ingestion	Dermal	Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical
	Concentration <sup>*</sup>	Dose	Dose	Dose	Cancer Sl	ope Factor	(mg/kg-d) <sup>-1</sup>			voc	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
VOLATILE ORGANIC COMPOUNDS							0.75.00	2 55 05	7.05.06	3.6E-05	6.8E-05
Benzene	0.030	4.5E-04	1.3E-04	1.3E-03	5.5E-02	5.5E-02	2.7E-02	2.5E-05	7.0E-06		
Ethylbenzene	0.12	1.8E-03	1.8E-03	8.0E-03	3.9E-03	3.9E-03	3.9E-03	7.0E-06	7.0E-06	3.1E-05	4.5E-05
										ILCR	1E-04

Incomplete pathway.

Milligrams per liter.

Milligrams per kilogram per day.

Volatile organic compound.

Inc

mg/L

VOC

mg/kg-d

concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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#### CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

<b>Concentration</b> <sup>a</sup>			Inhalation				Fathway	-Specific Ca	Incer Misk	Chemical
Concentration	Dose	Dose	Dose	Cancer S	lope Factor	(mg/kg-d) <sup>-1</sup>			VOC	Specific
(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
0.030	1.2E-05	2.4E-06	3.5E-05	5.5E-02	5.5E-02	2.7E-02	6.5E-07	1.3E-07	9.5E-07	1.7E-06
0.12	4.7E-05	3.5E-05	2.1E-04	3.9E-03	3.9E-03	3.9E-03	1.8E-07	1.4E-07	8.2E-07	1.1E-06
									ILCR	3E-06
							II CP	Incrementa	l lifetime cance	or rick
	0.030 0.12	0.030 1.2E-05 0.12 4.7E-05	0.030 1.2E-05 2.4E-06	0.030 1.2E-05 2.4E-06 3.5E-05 0.12 4.7E-05 3.5E-05 2.1E-04	0.030 1.2E-05 2.4E-06 3.5E-05 5.5E-02 0.12 4.7E-05 3.5E-05 2.1E-04 3.9E-03	0.030 1.2E-05 2.4E-06 3.5E-05 5.5E-02 5.5E-02 0.12 4.7E-05 3.5E-05 2.1E-04 3.9E-03 3.9E-03	0.030 1.2E-05 2.4E-06 3.5E-05 5.5E-02 5.5E-02 2.7E-02 0.12 4.7E-05 3.5E-05 2.1E-04 3.9E-03 3.9E-03 3.9E-03	0.030 1.2E-05 2.4E-06 3.5E-05 5.5E-02 5.5E-02 2.7E-02 6.5E-07 0.12 4.7E-05 3.5E-05 2.1E-04 3.9E-03 3.9E-03 3.9E-03 1.8E-07	(ing kg d)         (ing kg	(mg/kg-d)         (mg/kg-d)         (mg/kg-d)         Oran         Dermit         Initiation         ingentile           0.030         1.2E-05         2.4E-06         3.5E-05         5.5E-02         5.5E-02         2.7E-02         6.5E-07         1.3E-07         9.5E-07           0.12         4.7E-05         3.5E-05         2.1E-04         3.9E-03         3.9E-03         1.8E-07         1.4E-07         8.2E-07           ILCR

mg/L

VOC

mg/kg-d

Milligrams per liter.

Milligrams per kilogram per day.

Volatile organic compound.

concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were

calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer S Oral	lope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	VOC Inhalation	Specific Risk
VOLATILE ORGANIC COMPOUNDS Benzene Ethylbenzene	0.030	1.2E-05 4.7E-05	2.4E-06 3.5E-05	3.5E-05 2.1E-04	5.5E-02 3.9E-03	5.5E-02 3.9E-03	2.7E-02 3.9E-03	6.5E-07 1.8E-07	1.3E-07 1.4E-07	9.5E-07 8.2E-07	1.7E-06 1.1E-06
										ILCR	3E-06
<ul> <li>otes:</li> <li><sup>a</sup> Based on the maximum or 95 percent upper cor concentration detected at the site.</li> <li>) Doses and cancer risks shown only for carcinog</li> <li>) Absorbed doses were calculated for dermal con calculated for insection or inhalation of a median or inhalation or inhalation of a median or inhalation of a median or inhalation of a median or inhalation or inhalation or inhalation of a median or inhalation of a median or inhalation of a median or inhalation or inhalation or inhalation of a median or inhalation of a median or inhalation of a median or inhalation or inhalation or inhalation of a median or inhalation of a median or inhalation or inhala</li></ul>	enic chemicals with tact with the medium	available toxi	city values.	* 5 -				ILCR Inc mg/L mg/kg-d VOC	Incomplete Milligrams Milligrams		er day.

calculated for ingestion or inhalation of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific l	Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	(mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Lead	0.19	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
	0.0020	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead, Dissolved Manganese	0.0020	1.7E-03	8.1E-05	Inc	1.4E-01	1.4E-01	1.4E-05	1.2E-02	5.8E-04	Inc	0.013
Manganese	0.20	1.76-05	0.110 00	ine							
VOLATILE ORGANIC COMPOUNDS								( 27 02	6 25 02	2 55 01	0.37
Benzene	0.03	2.5E-04	2.5E-04	2.1E-03	4.0E-03	4.0E-03	8.6E-03	6.3E-02	6.2E-02 3.5E-02	2.5E-01 4.4E-02	0.089
Ethylbenzene	0.12	1.0E-03	3.5E-03	1.3E-02	1.0E-01	1.0E-01	2.9E-01	1.0E-02	3.5E-02	4.46-02	0.009
										HI	0.47
PETROLEIRA WYDROCA BRONG											
PETROLEUM HYDROCARBONS <sup>c</sup>	~	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	64	na 4.3E-01	Inc	2.9E-01	1.0E-01	na	2.9E-01	4.3E+00	Inc	1.0E+00	5.3
Diesel Range Organics, Aliphatic	51 26	4.3E-01 2.2E-01	Inc	1.4E-01	4.0E-01	na	5.7E-01	5.4E+00	Inc	2.5E-01	5.7
Diesel Range Organics, Aromatic		na <sup>e</sup>	na <sup>e</sup>	na <sup>e</sup>	na®	na	na	na	nae	na	na
Gasoline Range Organics	1.7	na 9.8E-03	Inc	1.3E-01	5.0E+00	na	5.3E+00	2.0E-03	Inc	2.4E-02	0.026
Gasoline Range Organics, Aliphatic	1.2	9.8E-03 7.0E-03	Inc	9.2E-02	2.0E-01	na	1.1E-01	3.5E-02	Inc	8.4E-01	0.87
Gasoline Range Organics, Aromatic	0.83			naf	naf	na <sup>f</sup>	naf	na <sup>f</sup>	na <sup>f</sup>	naf	na <sup>f</sup>
Residual Range Organics	1.6	naf	na <sup>f</sup>				na	6.1E-03	Inc	Inc	0.0061
Residual Range Organics, Aliphatic	1.4	1.2E-02	Inc	8.5E-06 2.8E-06	2.0E+00 3.0E-02	na na	na	1.4E-01	Inc	Inc	0.14
Residual Range Organics, Aromatic	0.5	4.1E-03	Inc	2.8E-00	3.0E-02	na	па	1.42 01			
										HI	12
Notes:											
<sup>a</sup> Based on the maximum or 95 percent upper	confidence limit (95	% UCL) on t	he mean					HI	Hazard inde		
concentration detected at the site.								HQ	Hazard quot		
<sup>b</sup> Consistent with EPA policy, lead is not eval	uated in the cumulat	ive HI estima	te.					Inc	Incomplete	Second Second	
e Risks associated with indicator compounds a	are included in cumu	lative risk an	d hazard					mg/L	Milligrams		
estimates for each site. However, the health								mg/kd-d	Milligrams	per kilogram p	er day.
will be evaluated and reported separately.								na	not available		
<sup>d</sup> Exposure dose and noncancer hazards were	calculated for petrol	eum hydrocar	bons measur	ed as DRO (r	method 810	0)		VOC	Volatile org	anic compound	d.
by segregating total DRO concentrations in	to aliphatic and aron	natic fractions	s, assuming 8	0% aliphatic							
by segregating total DRO concentrations in	to any name and aron		5								

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				VOC				
	Surface Water	Ingestion	Dermal	Inhalation		Pathway-Specific	Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)		VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion Dermal	Inhalation	HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific	Hazard	Chemical
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
NORCANICS											
INORGANICS	0.10	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead	0.19				na <sup>b</sup>						
Lead, Dissolved	0.0020	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>		na 1.4E-01	na 1.4E-05	na 4.8E-02	па 2.3Е-03	Inc	0.050
Manganese	0.20	6.7E-03	3.2E-04	Inc	1.4E-01	1.4E-01	1.4E-05	4.66-02	2.56-05	inc	0.050
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.03	9.9E-04	9.6E-04	1.3E-03	4.0E-03	4.0E-03	8.6E-03	2.5E-01	2.4E-01	1.6E-01	0.64
Ethylbenzene	0.12	3.9E-03	1.4E-02	8.0E-03	1.0E-01	1.0E-01	2.9E-01	3.9E-02	1.4E-01	2.8E-02	0.20
										HI	0.90
PETROLEUM HYDROCARBONS											4
Diesel Range Organics	64	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	51	1.7E+00	Inc	1.1E+00	1.0E-01	na	2.9E-01	1.7E+01	Inc	3.9E+00	21
Diesel Range Organics, Aromatic	26	8.4E-01	Inc	5.6E-01	4.0E-02	na	5.7E-01	2.1E+01	Inc	9.8E-01	22
Gasoline Range Organics	1.7	na°	na°	na°	na°	na®	na°	na°	na°	na	na°
Gasoline Range Organics, Aliphatic	1.2	3.8E-02	Inc	5.0E-01	5.0E+00	na	5.3E+00	7.6E-03	Inc	9.5E-02	0.10
Gasoline Range Organics, Aromatic	0.83	2.7E-02	Inc	3.6E-01	2.0E-01	na	1.1E-01	1.4E-01	Inc	3.3E+00	3.4
Residual Range Organics	1.6	naf	na <sup>f</sup>	naf	na <sup>f</sup>	naf					
Residual Range Organics, Aliphatic	1.4	4.7E-02	Inc	3.3E-05	2.0E+00	na	na	2.4E-02	Inc	na	0.024
Residual Range Organics, Aromatic	0.5	1.6E-02	Inc	1.1E-05	3.0E-02	na	na	5.3E-01	Inc	na	0.53
										HI	47
lotes:	e –										
* Based on the maximum or 95 percent upper	confidence limit (95	5% UCL) on 1	the mean					HI	Hazard inde		
concentration detected at the site.								HQ	Hazard quot	ient.	
<sup>b</sup> Consistent with EPA policy, lead is not eval	uated in the cumula	tive HI estima	ate.					Inc	Incomplete	pathway.	
<ul> <li>Risks associated with indicator compounds</li> </ul>	are included in cum	ulative risk ar	nd hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the health								mg/kd-d	Milligrams	per kilogram p	er day.
will be evaluated and reported separately.		(20)						na	not available	e	
<sup>d</sup> Exposure dose and noncancer hazards were	calculated for petrol	leum hydroca	rbons measur	ed as DRO (r	nethod 810	0)		VOC	Volatile org	anic compoun	d.

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				VOC				
	Surface Water	Ingestion	Dermal	Inhalation		Pathway-Specific I	Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)		VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation I	Ingestion Dermal	Inhalation	HQ

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Incestion	Dermal	VOC Inhalation				Pathy	vay-Specific H	azard	Chemica
	Surface Water Concentration <sup>a</sup>	Ingestion Dose	Dermai	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal		Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Lead	0.19	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead, Dissolved	0.002	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Manganese	0.20	2.3E-04	2.3E-06	Inc	1.4E-01	1.4E-01	1.4E-05	1.7E-03	1.7E-05	Inc	0.001
VOLATILE ORGANIC COMPOUNDS							0 (5 03	0.65.03	1.8E-03	1.2E-02	0.022
Benzene	0.03	3.4E-05	7.1E-06	1.0E-04 6.2E-04	4.0E-03 1.0E-01	4.0E-03 1.0E-01	8.6E-03 2.9E-01	8.6E-03 1.4E-03	1.0E-03	2.1E-02	0.004
Ethylbenzene	0.12	1.4E-04	1.0E-04	6.2E-04	1.0E-01	1.0E-01	2.96-01	1.46-05	1.01 05	2.12.00	
									· · [	HI	0.001
PETROLEUM HYDROCARBONS <sup>e</sup>								d	đ	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	64	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na 4.8E-02	na 0.63
Diesel Range Organics, Aliphatic	51.2	5.8E-02	Inc	1.4E-02	1.0E-01	na	2.9E-01	5.8E-01 7.3E-01	Inc Inc	4.8E-02 1.2E-02	0.74
Diesel Range Organics, Aromatic	25.6	2.9E-02	Inc	7.0E-03	4.0E-02	na	5.7E-01	na <sup>e</sup>	na <sup>e</sup>	na	na
Gasoline Range Organics	1.7	nae	na	na <sup>e</sup>	na <sup>e</sup>	na	na <sup>e</sup> 5.3E+00	na 2.6E-04	Inc	1.2E-03	0.001
Gasoline Range Organics, Aliphatic	1.155	1.3E-03	Inc	6.3E-03 4.5E-03	5.0E+00 2.0E-01	na na	1.1E-01	4.7E-03	Inc	4.1E-02	0.04
Gasoline Range Organics, Aromatic	0.825	9.4E-04	Inc	4.5E-05	na <sup>f</sup>	naf	naf	naf	naf	na <sup>f</sup>	naf
Residual Range Organics	1.6	naf	naf	na 4.1E-07	na 2.0E+00	na	na	8.2E-04	Inc	Inc	0.000
Residual Range Organics, Aliphatic	1.4	1.6E-03 5.5E-04	Inc Inc	4.1E-07 1.4E-07	3.0E+00	па	na	1.8E-02	Inc	Inc	0.01
Residual Range Organics, Aromatic	0.5	5.5E-04	Inc	1.46-07	5.00 02						1.4
										HI	1.4
tes:			h					ні	Hazard index		
Based on the maximum or 95 percent upper	confidence limit (95	% UCL) on t	ne mean					HQ	Hazard quotie		
concentration detected at the site.								Inc	Incomplete p		
Consistent with EPA policy, lead is not evaluate Risks associated with indicator compounds a	uated in the cumulat are included in cumu	ive HI estima Ilative risk an	ite. d hazard					mg/L	Milligrams pe	er liter.	
estimates for each site. However, the health	hazards associated	with petroleur	m mixtures					mg/kd-d	Milligrams pe	er kilogram p	oer day.
will be evaluated and reported separately.								na	not available		
Exposure dose and noncancer hazards were					athed 910	0)		VOC	Volatile orga	nic compour	d.

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 27 - Diesel Fuel Pump Island - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				VOC				
	Surface Water	Ingestion	Dermal	Inhalation	_	Pathway-Specific	Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)		VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion Dermal	Inhalation	HQ

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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#### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation			_	Pathway-S	pecific Ca	ncer Risk	Chemical
	Concentration <sup>2</sup>	Dose	Dose	Dose	Cancer Slo	ope Factor	(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
NODGING											
INORGANICS		( 15 07	0.05.00	4 612 11		-	8.4E+00	na	na	3.7E-10	3.7E-10
Beryllium	1.5	6.1E-07	0.0E+00	4.5E-11	na	na	0.40+00	na	iiu	5.75 10	
VOLATILE ORGANIC COMPOUNDS											
Ethylbenzene	1.1	4.4E-07	0.0E+00	3.2E-11	3.9E-03	3.9E-03	3.9E-03	1.7E-09	0.0E+00	1.3E-13	1.7E-0
Methylene chloride	0.16	6.4E-08	0.0E+00	4.7E-12	7.5E-03	7.5E-03	1.6E-03	4.8E-10	0.0E+00	7.7E-15	4.8E-1
POLYCHLORINATED BIPHENYLS											
PCB-1254 (Aroclor 1254)	0.47	1.9E-07	1.0E-07	1.4E-11	2.0E+00	2.0E+00	2.0E+00	3.8E-07	2.1E-07	2.8E-11	5.9E-0
POLYNUCLEAR AROMATIC HYDROCARBONS											
	4.4	1.8E-06	9.1E-07	1.3E-10	7.3E-01	7.3E-01	7.3E-01	1.3E-06	6.6E-07	9.4E-11	2.0E-0
Benzo(a)anthracene	2.3	9.3E-07	4.7E-07	6.8E-11	7.3E+00	7.3E+00	7.3E+00	6.8E-06	3.5E-06	4.9E-10	1.0E-0
Benzo(a)pyrene Benzo(b)fluoranthene	2.6	1.0E-06	5.4E-07	7.6E-11	7.3E-01	7.3E-01	7.3E-01	7.6E-07	3.9E-07	5.6E-11	1.2E-0
										ILCR	1E-05

* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.	ILCR	Incremental lifetime cancer risk.
Based on the maximum of 95 percent upper confidence minical with available toxicity values	Inc	Incomplete pathway.
1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.	mg/kg	Milligrams per kilogram.
2) Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.	mg/kg-d	Milligrams per kilogram per day.
Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.	na	Not available.
3) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation	na	

of a medium

Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

#### CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathway-	Specific Ca	ncer Risk	Chemical-
Constituent	Concentration <sup>®</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific Risk
INORGANICS Beryllium	1.5	1.5E-08	0.0E+00	4.6E-12	na	na	8.4E+00	na	na	3.8E-11	3.8E-11
VOLATILE ORGANIC COMPOUNDS Ethylbenzene Methylene chloride	1.1 0.16	1.1E-08 1.6E-09	0.0E+00 0.0E+00	3.3E-12 4.8E-13	3.9E-03 7.5E-03	3.9E-03 7.5E-03	3.9E-03 1.6E-03	4.2E-11 1.2E-11	0.0E+00 0.0E+00	1.3E-14 7.9E-16	4.2E-11 1.2E-11
POLYCHLORINATED BIPHENYLS PCB-1254 (Aroclor 1254)	0.47	4.6E-09	8.5E-09	1.4E-12	2.0E+00	2.0E+00	2.0E+00	9.2E-09	1.7E-08	2.8E-12	2.6E-08
POLYNUCLEAR AROMATIC HYDROCARBONS Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene	4.4 2.3 2.6	4.3E-08 2.3E-08 2.5E-08	8.0E-08 4.2E-08 4.7E-08	1.3E-11 6.9E-12 7.8E-12	7.3E-01 7.3E+00 7.3E-01	7.3E-01 7.3E+00 7.3E-01	7.3E-01 7.3E+00 7.3E-01	3.1E-08 1.6E-07 1.9E-08	5.8E-08 3.0E-07 3.4E-08	9.7E-12 5.1E-11 5.7E-12 ILCR	9.0E-08 4.7E-07 5.3E-08 6E-07

#### Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

 ILCR
 Incremental lifetime cancer risk.

 Inc
 Incomplete pathway.

 mg/kg
 Milligrams per kilogram.

 mg/kg-d
 Milligrams per kilogram per day.

 na
 Not available.

#### 

#### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific	Hazard	Chemical
	Concentration <sup>*</sup>	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											0.0000
Beryllium	1.5	5.5E-06	0.0E+00	2.7E-10	2.0E-03	2.0E-03	5.7E-06	2.8E-03	0.0E+00	4.8E-05	0.0028
Thallium	0.26	9.5E-07	0.0E+00	4.7E-11	7.0E-05	7.0E-05	7.0E-05	1.4E-02	0.0E+00	6.7E-07	0.014
VOLATILE ORGANIC COMPOUNDS											
Ethylbenzene	1.1	4.0E-06	0.0E+00	2.0E-10	1.0E-01	1.0E-01	2.9E-01	4.0E-05	0.0E+00	6.9E-10	0.00004
Methylene chloride	0.16	5.8E-07	0.0E+00	2.9E-11	6.0E-02	6.0E-02	8.6E-01	9.7E-06	0.0E+00	3.4E-11	0.00001
POLYCHLORINATED BIPHENYLS											
PCB-1254 (Aroclor 1254)	0.47	1.7E-06	7.6E-07	8.5E-11	2.0E-05	2.0E-05	2.0E-05	8.6E-02	3.8E-02	4.3E-06	0.12
										HI	0.14
PETROLEUM HYDROCARBONS <sup>c</sup>									а.		
Diesel Range Organics	92,650	nad	na <sup>d</sup>	nad	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	74,120	2.7E-01	Inc	1.3E-05	1.0E-01	na	2.9E-01	2.7E+00	Inc	4.6E-05	2.7
Diesel Range Organics, Aromatic	37,060	1.3E-01	Inc	6.7E-06	4.0E-02	na	5.7E-01	3.4E+00	Inc	1.2E-05	3.4
Gasoline Range Organics	120	na°	na°	na <sup>c</sup>	na	na	nae	na°	na	na	na
Gasoline Range Organics, Aliphatic	84	3.1E-04	Inc	1.5E-08	5.0E+00	na	5.3E+00	6.1E-05	Inc	2.9E-09	0.00006
Gasoline Range Organics, Aromatic	60	2.2E-04	Inc	1.1E-08	2.0E-01	na	1.1E-01	1.1E-03	Inc	9.9E-08	0.0011
Residual Range Organics	2,073	na	na <sup>r</sup>	na	naf	na	na	na	na <sup>f</sup>	na <sup>f</sup>	naf
Residual Range Organics, Aliphatic	1,866	6.8E-03	Inc	3.4E-07	2.0E+00	па	na	3.4E-03	Inc	Inc	0.0034
Residual Range Organics, Aromatic	622	2.3E-03	Inc	1.1E-07	3.0E-02	na	па	7.5E-02	Inc	Inc	0.075
										HI	6.2
otes:										Sector Contractor	
Based on the maximum or 95 percent upper con	fidence limit (95% UC	CL) on the me	an					HI	Hazard ind	ex.	
concentration detected at the site.								HQ	Hazard quo		
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	ed in the cumulative H	I estimate.						Inc	Incomplete	pathway.	
<ul> <li>Risks associated with indicator compounds are</li> </ul>	included in cumulative	risk and haza	ard					mg/kg	Milligrams	per kilogram	

estimates for each site. However, the health hazards associated with petroleum mixtures

will be evaluated and reported separately.

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

Milligrams per kilogram per day.

not available

mg/kd-d

na

#### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathwa	y-Specific	Hazard	Chemical-
	Concentration <sup>*</sup>	Dose	Dose	Dose	Refere	ence Dose (m	g/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent INORGANICS Beryllium Thallium VOLATILE ORGANIC COMPOUNDS Ethylbenzene Methylene chloride POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260) PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic	Soil Concentration <sup>®</sup> (mg/kg) 1.5 0.26 1.1 0.16	Ingestion Dose (mg/kg-d) 4.3E-08 7.4E-09 3.1E-08	Dermal Dose (mg/kg-d) 0.0E+00 0.0E+00	Dose (mg/kg-d) 1.3E-11 2.3E-12	Referent           Oral           2.0E-03           7.0E-05	2.0E-03 7.0E-06	ng/kg-d) Inhalation 5.7E-06	Soil Ingestion 2.2E-05	<b>Dermal</b> 0.0E+00	Dust Inhalation	Specific HQ
Constituent INORGANICS Beryllium Thallium VOLATILE ORGANIC COMPOUNDS Ethylbenzene Methylene chloride POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260) PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic	(mg/kg) 1.5 0.26 1.1	4.3E-08 7.4E-09	(mg/kg-d) 0.0E+00	1.3E-11	2.0E-03	2.0E-03					14 T) T
Beryllium Thallium VOLATILE ORGANIC COMPOUNDS Ethylbenzene Methylene chloride POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260) PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic	0.26	7.4E-09					5.7E-06	2.2E-05	0.0E+00	2.25.04	
Beryllium Thallium VOLATILE ORGANIC COMPOUNDS Ethylbenzene Methylene chloride POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260) PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic	0.26	7.4E-09					5.7E-06	2.2E-05	0.0E+00	0.00	0 00000 1
Thallium VOLATILE ORGANIC COMPOUNDS Ethylbenzene Methylene chloride POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260) PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic	0.26		0.0E+00	2.3E-12	7.0E-05	7 0E-06			0.01100	2.3E-06	0.000024
Ethylbenzene Methylene chloride POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260) PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic		3.1E-08				7.0L-00	7.0E-05	1.1E-04	0.0E+00	3.3E-08	0.00011
Methylene chloride POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260) PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic		3.1E-08									
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260) PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic	0.16		0.0E+00	9.7E-12	1.0E-01	1.0E-01	2.9E-01	3.1E-07	0.0E+00	3.3E-11	0.0000031
PCB-1260 (Aroclor 1260) PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic		4.6E-09	0.0E+00	1.4E-12	6.0E-02	6.0E-02	8.6E-01	7.6E-08	0.0E+00	1.6E-12	0.00000076
PETROLEUM HYDROCARBONS <sup>c</sup> Diesel Range Organics Diesel Range Organics, Aliphatic	0.47	1.3E-08	2.5E-08	4.1E-12	2.0E-05	2.0E-05	2.0E-05	6.7E-04	1.2E-03	2.1E-07	0.0019
Diesel Range Organics Diesel Range Organics, Aliphatic	0.47	1.52-00	2.52-00	4.12.12	2.02.00					ні	0.0020
Diesel Range Organics Diesel Range Organics, Aliphatic											0.0020
Diesel Range Organics, Aliphatic		d	đ	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	naď	na <sup>d</sup>
	92,650	nad	nad		na 1.0E-01		na 2.9E-01	2.1E-02	Inc	2.2E-06	0.021
Diesel Range Organics Aromatic	74,120	2.1E-03	Inc	6.5E-07	4.0E-01	na	5.7E-01	2.6E-02	Inc	5.7E-07	0.026
Dieser Kange Organies, Anomatie	37,060	1.1E-03	Inc	3.3E-07		na		na	na	na°	na
Gasoline Range Organics	120	na	na <sup>e</sup>	na	na	na	na <sup>e</sup> 5.3E+00	na 4.8E-07	Inc	1.4E-10	0.00000048
Gasoline Range Organics, Aliphatic	84	2.4E-06	Inc	7.4E-10	5.0E+00 2.0E-01	na	1.1E-01	4.8E-07 8.6E-06	Inc	4.8E-09	0.0000086
Gasoline Range Organics, Aromatic	60	1.7E-06	Inc	5.3E-10		na	na <sup>f</sup>	6	naf	naſ	na <sup>f</sup>
Residual Range Organics	2,073	na <sup>r</sup>	na <sup>f</sup>	na <sup>f</sup>	naf	na		na' 2.7E-05	Inc	Inc	0.000027
Residual Range Organics, Aliphatic	1,866	5.3E-05	Inc	1.6E-08	2.0E+00	na	na	5.9E-04	Inc	Inc	0.00059
Residual Range Organics, Aromatic	622	1.8E-05	Inc	5.5E-09	3.0E-02	na	na	5.76-04	Inc		
										HI	0.048
Notes:											
" Based on the maximum or 95 percent upper confiden	nce limit (95% I	UCL) on the r	nean					HI	Hazard index	κ.	

concentration detected at the site.

<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.

° Risks associated with indicator compounds are included in cumulative risk and hazard

estimates for each site. However, the health hazards associated with petroleum mixtures

will be evaluated and reported separately.

<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)

by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

Incomplete pathway.

not available

Milligrams per kilogram.

Milligrams per kilogram per day.

Inc

na

mg/kg

mg/kd-d

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation			Pathwa	y-Specific I	lazard	Chemical-
Constituent	Concentration <sup>*</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose _ (mg/kg-d)	Reference Dose (mg Oral Dermal	g/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

f Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

<sup>g</sup> DRO\_Aliphatic screened out during Tier I selection.

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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#### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Dose (mg/kg-d) 0.0E+00 0.0E+00 3.2E-07 2.8E-07 3.1E-07 2.5E-07	Dose (mg/kg-d) 1.5E-12 5.2E-11 4.5E-11 4.0E-11 4.4E-11 3.5E-11	Cancer Sk Oral 5.5E-02 3.9E-03 7.3E-01 7.3E-01 7.3E-01 7.3E-01	Dermal           5.5E-02           3.9E-03           7.3E-01           7.3E-01           7.3E-01           7.3E-01           7.3E-01	(mg/kg-d) <sup>-1</sup> Inhalation 2.7E-02 3.9E-03 7.3E-01 7.3E+00 7.6E-01 7.3E-01	Sediment Ingestion 1.1E-09 2.8E-09 4.5E-07 4.0E-06 4.4E-07 3.5E-07	Dermal 0.0E+00 0.0E+00 2.3E-07 2.0E-06 2.2E-07 1.8E-07	Dust Inhalation 4.0E-14 2.0E-13 3.3E-11 2.9E-10 3.3E-11 2.6E-11	Specific Risk 1.1E-09 2.8E-09 6.9E-07 6.0E-00 6.6E-07 5.3E-07
(mg/kg-d) 0.0E+00 0.0E+00 3.2E-07 2.8E-07 3.1E-07	1.5E-12 5.2E-11 4.5E-11 4.0E-11 4.4E-11	Oral 5.5E-02 3.9E-03 7.3E-01 7.3E+00 7.3E-01	Dermal 5.5E-02 3.9E-03 7.3E-01 7.3E+00 7.3E-01	Inhalation           2.7E-02           3.9E-03           7.3E-01           7.3E+00           7.6E-01	1.1E-09 2.8E-09 4.5E-07 4.0E-06 4.4E-07	0.0E+00 0.0E+00 2.3E-07 2.0E-06 2.2E-07	4.0E-14 2.0E-13 3.3E-11 2.9E-10 3.3E-11	1.1E-09 2.8E-09 6.9E-07 6.0E-00 6.6E-07
0.0E+00 3.2E-07 2.8E-07 3.1E-07	5.2E-11 4.5E-11 4.0E-11 4.4E-11	3.9E-03 7.3E-01 7.3E+00 7.3E-01	3.9E-03 7.3E-01 7.3E+00 7.3E-01	3.9E-03 7.3E-01 7.3E+00 7.6E-01	2.8E-09 4.5E-07 4.0E-06 4.4E-07	0.0E+00 2.3E-07 2.0E-06 2.2E-07	2.0E-13 3.3E-11 2.9E-10 3.3E-11	2.8E-09 6.9E-07 6.0E-00 6.6E-07
0.0E+00 3.2E-07 2.8E-07 3.1E-07	5.2E-11 4.5E-11 4.0E-11 4.4E-11	3.9E-03 7.3E-01 7.3E+00 7.3E-01	3.9E-03 7.3E-01 7.3E+00 7.3E-01	3.9E-03 7.3E-01 7.3E+00 7.6E-01	2.8E-09 4.5E-07 4.0E-06 4.4E-07	0.0E+00 2.3E-07 2.0E-06 2.2E-07	2.0E-13 3.3E-11 2.9E-10 3.3E-11	2.8E-09 6.9E-07 6.0E-00 6.6E-07
0.0E+00 3.2E-07 2.8E-07 3.1E-07	5.2E-11 4.5E-11 4.0E-11 4.4E-11	3.9E-03 7.3E-01 7.3E+00 7.3E-01	3.9E-03 7.3E-01 7.3E+00 7.3E-01	3.9E-03 7.3E-01 7.3E+00 7.6E-01	2.8E-09 4.5E-07 4.0E-06 4.4E-07	0.0E+00 2.3E-07 2.0E-06 2.2E-07	2.0E-13 3.3E-11 2.9E-10 3.3E-11	2.8E-09 6.9E-00 6.0E-00 6.6E-07
3.2E-07 2.8E-07 3.1E-07	4.5E-11 4.0E-11 4.4E-11	7.3E-01 7.3E+00 7.3E-01	7.3E-01 7.3E+00 7.3E-01	7.3E-01 7.3E+00 7.6E-01	4.5E-07 4.0E-06 4.4E-07	2.3E-07 2.0E-06 2.2E-07	3.3E-11 2.9E-10 3.3E-11	6.9E-07 6.0E-00 6.6E-07
2.8E-07 3.1E-07	4.0E-11 4.4E-11	7.3E+00 7.3E-01	7.3E+00 7.3E-01	7.3E+00 7.6E-01	4.0E-06 4.4E-07	2.0E-06 2.2E-07	2.9E-10 3.3E-11	6.0E-00 6.6E-07
2.8E-07 3.1E-07	4.0E-11 4.4E-11	7.3E+00 7.3E-01	7.3E+00 7.3E-01	7.3E+00 7.6E-01	4.0E-06 4.4E-07	2.0E-06 2.2E-07	2.9E-10 3.3E-11	6.0E-00 6.6E-07
3.1E-07	4.4E-11	7.3E-01	7.3E-01	7.6E-01	4.4E-07	2.2E-07	3.3E-11	6.6E-0
2.5E-07	3.5E-11	7.3E-01	7.3E-01	7.3E-01	3.5E-07	1.8E-07	2.6E-11	5.3E-0
3.6E-08	4.8E-12	2.0E+00	2.0E+00	2.0E+00	1.3E-07	7.2E-08	9.6E-12	2.0E-0
1.2E-07	1.5E-11	2.0E+00	2.0E+00	2.0E+00	4.2E-07	2.3E-07	3.1E-11	6.5E-0
6.3E-10	2.9E-13	1.8E+00	1.8E+00	1.9E+00	7.3E-09			8.4E-0
1.4E-09	1.9E-13	1.3E+00	1.3E+00	1.3E+00	3.4E-09	1.9E-09	2.5E-13	5.3E-0
							ILCR	9E-00
	6.3E-10 1.4E-09	6.3E-10 2.9E-13 1.4E-09 1.9E-13	6.3E-10 2.9E-13 1.8E+00	6.3E-10 2.9E-13 1.8E+00 1.8E+00 1.4E-09 1.9E-13 1.3E+00 1.3E+00	6.3E-10 2.9E-13 1.8E+00 1.8E+00 1.9E+00 1.4E-09 1.9E-13 1.3E+00 1.3E+00 1.3E+00	6.3E-10 2.9E-13 1.8E+00 1.8E+00 1.9E+00 7.3E-09 1.4E-09 1.9E-13 1.3E+00 1.3E+00 1.3E+00 3.4E-09	6.3E-10       2.9E-13       1.8E+00       1.9E+00       7.3E-09       1.1E-09         1.4E-09       1.9E-13       1.3E+00       1.3E+00       1.3E+00       3.4E-09       1.9E-09	6.3E-10       2.9E-13       1.8E+00       1.9E+00       7.3E-09       1.1E-09       5.6E-13         1.4E-09       1.9E-13       1.3E+00       1.3E+00       3.4E-09       1.9E-09       2.5E-13

Milligrams per kilogram per day.

Not available.

mg/kg-d

па

 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Sediment	Sediment Ingestion	Sediment Dermal	Dust Inhalation				Pathway-	Specific Ca	ncer Risk	Chemical-
	Concentration*	Dose	Dose	Dose		ope Factor (	mg/kg-d) <sup>-1</sup> Inhalation	Sediment Ingestion	Dermal	Dust Inhalation	Specific Risk
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Innaiation	Ingestion	Derma	Innutation	
VOLATILE ORGANIC COMPOUNDS Benzene Ethylbenzene	0.050 1.8	4.9E-10 1.7E-08	0.0E+00 0.0E+00	1.5E-13 5.3E-12	2.9E-03 7.5E-03	2.9E-03 7.5E-03	2.7E-02 1.6E-03	1.4E-12 1.3E-10	0.0E+00 0.0E+00	4.1E-15 8.8E-15	1.4E-12 1.3E-10
POLYNUCLEAR AROMATIC HYDROCARBONS Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Ideno(1,2,3-cd)pyrene	1.5 1.4 1.5 1.2	1.5E-08 1.3E-08 1.5E-08 1.2E-08	2.6E-08 2.3E-08 2.5E-08 2.0E-08	4.7E-12 4.1E-12 4.5E-12 3.6E-12	7.3E-01 7.3E+00 7.3E-01 7.3E-01	7.3E-01 7.3E+00 7.3E-01 7.3E-01	7.3E-01 7.3E+00 7.3E-01 7.3E-01	1.1E-08 9.7E-08 1.1E-08 8.6E-09	1.9E-08 1.7E-07 1.8E-08 1.5E-08	3.4E-12 3.0E-11 3.3E-12 2.6E-12	3.0E-08 2.6E-07 2.9E-08 2.3E-08
POLYCHLORINATED BIPHENYLS PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260)	0.16 0.52	1.6E-09 5.1E-09	3.0E-09 9.4E-09	4.9E-13 1.6E-12	2.0E+00 2.0E+00	2.0E+00 2.0E+00	2.0E+00 2.0E+00	3.2E-09 1.0E-08	5.9E-09 1.9E-08	9.8E-13 3.1E-12	9.1E-09 2.9E-08
PESTICIDES beta-BHC gamma-BHC (Lindane)	0.010 0.0065	9.8E-11 6.4E-11	3.9E-11 2.5E-11	3.0E-14 2.0E-14	1.8E+00 1.3E+00	1.8E+00 1.3E+00	1.9E+00 1.3E+00	1.8E-10 8.3E-11	7.0E-11 3.3E-11	5.7E-14 2.5E-14	2.5E-10 1.2E-10 <b>4E-07</b>

#### Notes:

\* Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

ILCR

mg/kg

mg/kg-d

Inc

na

Incremental lifetime cancer risk.

Milligrams per kilogram per day.

Incomplete pathway.

Not available.

Milligrams per kilogram.

## TABI 9

#### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Sediment	Sediment Ingestion	Sediment Dermal	Dust Inhalation				Pathway-	Specific Ca	ncer Risk	Chemical-
	Concentration	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Sediment		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
Construction											
INORGANICS											0.000070
Chromium	28	1.0E-04	0.0E+00	5.0E-09	1.5E+00	1.5E+00	1.5E+00	6.8E-05	0.0E+00	3.4E-09	0.000068
Lead	7.4	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na"	na <sup>b</sup>
Zinc	26	9.5E-05	0.0E+00	4.7E-09	3.0E-01	3.0E-01	3.0E-01	3.2E-04	0.0E+00	1.6E-08	0.00032
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.050	1.8E-07	0.0E+00	9.0E-12	4.0E-03	4.0E-03	8.6E-03	4.5E-05	0.0E+00	1.1E-09	0.000046
Ethylbenzene	1.8	6.4E-06	0.0E+00	3.2E-10	1.0E-01	1.0E-01	2.9E-01	6.4E-05	0.0E+00	1.1E-09	0.000064
DOL WORK ODDIATED BIDHENIN C											
POLYCHLORINATED BIPHENYLS	0.16	5.8E-07	2.6E-07	2.9E-11	2.0E-05	2.0E-05	2.0E-05	2.9E-02	1.3E-02	1.4E-06	0.042
PCB 1254 (Aroclor 1254)	0.52	1.9E-06	2.0E-07 8.4E-07	9.4E-11	2.0E-05	2.0E-05	2.0E-05	9.5E-02	4.2E-02	4.7E-06	0.14
PCB 1260 (Aroclor 1260)	0.52	1.96-00	0.4L-07	J.4L-11	2.02-05	2.00 00	21012 00				
PESTICIDES							1.05.00	2.0E-08	3.2E-09	9.5E-13	0.00000023
beta-BHC	0.010	3.6E-08	5.8E-09	1.8E-12	1.8E+00	1.8E+00	1.9E+00	2.0E-08 2.4E-07	3.2E-09 3.0E-08	9.5E-13 4.0E-12	0.00000023
gamma-BHC (Lindane)	0.0065	2.4E-08	3.0E-09	1.2E-12	1.0E-01	1.0E-01	2.9E-01	2.46-07	5.01-08	4.06-12	0.00000027
POLYNUCLEAR AROMATIC HYDROCARBONS								9			0.12
2-Methylnaphthalene	500	1.8E-03	7.5E-04	9.0E-08	2.0E-02	2.0E-02	8.6E-04	9.1E-02	3.7E-02	1.1E-04	0.13 0.045
Naphthalene	175	6.4E-04	2.6E-04	3.2E-08	2.0E-02	2.0E-02	8.6E-04	3.2E-02	1.3E-02	3.7E-05	0.045
DIOXINS/FURANS											
Dibenzofuran	4.5	1.6E-05	5.2E-08	8.1E-10	4.0E-03	4.0E-03	4.0E-03	4.1E-03	1.3E-05	2.0E-07	0.0041
										ні	0.36
											0.00
PETROLEUM HYDROCARBONS <sup>c</sup>			4	đ	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	98,564	na <sup>d</sup>	naď	nad			na 2.9E-01	2.9E+00	Inc	4.9E-05	2.9
Diesel Range Organics, Aliphatic	78,851	2.9E-01	Inc	1.4E-05	1.0E-01	na	5.7E-01	3.6E+00	Inc	1.2E-05	3.6
Diesel Range Organics, Aromatic	39,426	1.4E-01	Inc	7.1E-06	4.0E-02	na			na	na	na
Gasoline Range Organics	220	na®	na	na	na <sup>e</sup>	na	na	na		na 5.2E-09	0.00011
Gasoline Range Organics, Aliphatic	154	5.6E-04	Inc	2.8E-08	5.0E+00	na	5.3E+00	1.1E-04	Inc	1.8E-07	0.0020
Gasoline Range Organics, Aromatic	110	4.0E-04	Inc	2.0E-08	2.0E-01	na	1.1E-01	2.0E-03	Inc	na <sup>f</sup>	naf
Residual Range Organics	3,634	nať	na <sup>r</sup>	na <sup>r</sup>	na <sup>f</sup>	na <sup>f</sup>	na	na	na		na 0.0060
Residual Range Organics, Aliphatic	3,271	1.2E-02	Inc	5.9E-07	2.0E+00	na	na	6.0E-03	Inc	Inc	0.13
Residual Range Organics, Aromatic	1,090	4.0E-03	Inc	2.0E-07	3.0E-02	na	na	1.3E-01	Inc	Inc	0.15
										HI	6.6

Notes:

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Sediment Concentration <sup>a</sup> (mg/kg)	Sediment Ingestion Dose (mg/kg-d)	Sediment Dermal Dose (mg/kg-d)	Dust Inhalation Dose (mg/kg-d)	Refere Oral	nce Dose (m Dermal	ng/kg-d) Inhalation	Sediment	-Specific Ca Dermal	ncer Risk Dust Inhalation	Chemical- Specific Risk
<ul> <li>Constituent</li> <li><sup>a</sup> Based on the maximum or 95 percent upper confidence limit concentration detected at the site.</li> <li><sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cum</li> <li><sup>c</sup> Risks associated with indicator compounds are included in creestimates for each site. However, the health hazards associate will be evaluated and reported separately.</li> <li><sup>d</sup> Exposure dose and noncancer hazards were calculated for peby segregating total DRO concentrations into aliphatic and a hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000)</li> <li><sup>e</sup> Exposure dose and noncancer hazards were calculated for peby segregating total GRO concentrations into aliphatic and a hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000)</li> <li><sup>f</sup> Exposure dose and noncancer hazards were calculated for peby segregating total RRO concentrations into aliphatic and a hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000)</li> </ul>	(95% UCL) on the ulative HI estimate umulative risk and l ed with petroleum troleum hydrocarbo uromatic fractions, a bc). troleum hydrocarbo uromatic fractions, a bc).	mean hazard mixtures ons measured assuming 809 ons measured assuming 709	as DRO (met & aliphatic & aliphatic & aliphatic	thod 8100) thod 8015)				HI HQ Inc mg/kg mg/kd-d na	Hazard ind Hazard quo Incomplete Milligrams	pathway. pathway. per kilogram. per kilogram	
<ol> <li>Doses and noncancer hazards shown only for noncarcinogen</li> <li>Absorbed doses were calculated for dermal contact with the of a medium</li> <li>Noncancer hazards are unitless values which represent the prefect. They are calculated using the following formula: Non-</li> </ol>	medium, and intake	es were calcung an adverse	lated for inges e health		n						

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## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Sediment	Sediment Ingestion	Sediment Dermal	Dust Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical-
	Concentration	Dose	Dose	Dose	Pofore	nce Dose (r	ng/kg_d)	Sediment		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)		Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS											
Chromium	28	8.0E-07	0.0E+00	2.5E-10	1.5E+00	1.5E+00	1.5E+00	5.3E-07	0.0E+00	1.6E-10	0.0000053
Lead	7.4	na <sup>b</sup>	na <sup>b</sup>	na"	na <sup>b</sup>	na <sup>b</sup>					
Zinc	26	7.4E-07	0.0E+00	2.3E-10	3.0E-01	3.0E-01	3.0E-01	2.5E-06	0.0E+00	7.6E-10	0.0000025
VOLATILE ORGANIC COMPOUNDS											
Benzene	0.050	1.4E-09	0.0E+00	4.4E-13	4.0E-03	4.0E-03	8.6E-03	3.6E-07	0.0E+00	5.1E-11	0.0000004
Ethylbenzene	1.8	5.1E-08	0.0E+00	1.6E-11	1.0E-01	1.0E-01	2.9E-01	5.1E-07	0.0E+00	5.4E-11	0.0000005
POLYCHLORINATED BIPHENYLS											
PCB 1254 (Aroclor 1254)	0.16	4.6E-09	8.4E-09	1.4E-12	2.0E-05	2.0E-05	2.0E-05	2.3E-04	4.2E-04	7.0E-08	0.00065
PCB 1260 (Aroclor 1260)	0.52	1.5E-08	2.7E-08	4.6E-12	2.0E-05	2.0E-05	2.0E-05	7.4E-04	1.4E-03	2.3E-07	0.0021
PESTICIDES											
beta-BHC	0.010	2.9E-10	1.9E-10	8.8E-14	1.8E+00	1.8E+00	1.9E+00	1.6E-10	1.0E-10	4.6E-14	0.0000000026
gamma-BHC (Lindane)	0.0065	1.9E-10	9.8E-11	5.7E-14	1.3E+00	1.3E+00	1.3E+00	1.4E-10	7.5E-11	4.4E-14	0.0000000022
POLYNUCLEAR AROMATIC HYDROCAR	BONS								1 25 02	5 15 06	0.0019
2-Methylnaphthalene	500	1.4E-05	2.4E-05	4.4E-09	2.0E-02	2.0E-02	8.6E-04	7.1E-04	1.2E-03	5.1E-06 1.8E-06	0.00068
Naphthalene	175	5.0E-06	8.6E-06	1.5E-09	2.0E-02	2.0E-02	8.6E-04	2.5E-04	4.3E-04	1.8E-00	0.00008
DIOXINS/FURANS				1 05 11	4.05.03	4.0E-03	4.0E-03	3.2E-05	4.2E-07	9.9E-09	0.000033
Dibenzofuran	4.5	1.3E-07	1.7E-09	4.0E-11	4.0E-03	4.0E-03	4.0E-03	5.26-05	4.20-07		
										НІ	0.0054
PETROLEUM HYDROCARBONS <sup>c</sup>			4	4	na <sup>d</sup>	nad	na <sup>d</sup>				
Diesel Range Organics	98,564	na <sup>d</sup>	na <sup>d</sup>	nad			na 2.9E-01	2.3E-02	Inc	2.4E-06	0.023
Diesel Range Organics, Aliphatic	78,851	2.3E-03	Inc	6.9E-07	1.0E-01	na	5.7E-01	2.3E-02	Inc	6.1E-07	0.028
Diesel Range Organics, Aromatic	39,426	1.1E-03	Inc	3.5E-07	4.0E-02	na				na	na
Gasoline Range Organics	220	na	na <sup>c</sup>	na <sup>e</sup>	na	na	na	na <sup>°</sup>	na	na 2.6E-10	0.0000088
Gasoline Range Organics, Aliphatic	154	4.4E-06	Inc	1.4E-09	5.0E+00	na	5.3E+00	8.8E-07	Inc Inc	2.6E-10 8.8E-09	0.000016
Gasoline Range Organics, Aromatic	110	3.1E-06	Inc	9.7E-10	2.0E-01	na	1.1E-01	1.6E-05		na <sup>f</sup>	naf
Residual Range Organics	3,634	na <sup>f</sup>	na	na <sup>f</sup>	nať	na	na <sup>f</sup>	na	naf		na 0.000047
Residual Range Organics, Aliphatic	3,271	9.3E-05	Inc	2.9E-08	2.0E+00	па	na	4.7E-05	Inc	Inc Inc	0.000047
Residual Range Organics, Aromatic	1,090	3.1E-05	Inc	9.6E-09	3.0E-02	na	na	1.0E-03	Inc	inc	0.0010
										HI	0.052

Notes:

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Sediment	Ingestion	Dermal	Inhalation				Pathwa	y-Specific Car	ncer Risk	Chemical
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral	ence Dose (r Dermal	ng/kg-d) Inhalation	Sediment Ingestion	Dermal	Dust Inhalation	Specific Risk
	I' I' (ACC LICE)							ні	Hazard index	c.	
Based on the maximum or 95 percent upper confidence	e limit (95% UCL) o	n the mean						но	Hazard quoti		
concentration detected at the site.	1							Inc	Incomplete p		
Consistent with EPA policy, lead is not evaluated in the Risks associated with indicator compounds are include								mg/kg	Milligrams p		
estimates for each site. However, the health hazards as			2					mg/kd-d		er kilogram per	day.
	sociated with perior	cummixture	,					na	not available		
will be evaluated and reported separately.	for a stralour budro	carbons man	sured as DR(	(method 8100	0			na	not a vanaoro		
Exposure dose and noncancer hazards were calculated					)						
by segregating total DRO concentrations into aliphatic		ons, assumin	g ou <i>10</i> amplia	uc							
hydrocarbons and 40% aromatic hydrocarbons (ADEC			c. C. D.C.	(method 8015	`						
Exposure dose and noncancer hazards were calculated					)						
by segregating total GRO concentrations into aliphatic		ons, assumin	g 70% alipna	tic							
hydrocarbons and 50% aromatic hydrocarbons (ADEC				. (							
Exposure dose and noncancer hazards were calculated											
by segregating total RRO concentrations into aliphatic		ons, assumin	g 90% alipha	tic							
hydrocarbons and 30% aromatic hydrocarbons (ADEC	, 2000c).										
Doses and noncancer hazards shown only for noncarci Absorbed doses were calculated for dermal contact with	nogenic chemicals when the medium, and it	vith available ntakes were	toxicity valu calculated for	ingestion or in	halation						
of a medium Noncancer hazards are unitless values which represent	the probability of ir	curring an a	iverse health								
effect. They are calculated using the following formul		Eunosura De	Deference	dose							

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## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca		Chemical-
	Concentration <sup>*</sup>	Dose	Dose	Dose			(mg/kg-d) <sup>-1</sup>			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	0.00081	3.1E-06	1.8E-05	Inc	2.0E+00	2.0E+00	2.0E+00	6.2E-06	3.6E-05	Inc	4.2E-05
										ILCR	4E-05
Notes:											
<sup>a</sup> Based on the maximum or 95 percent upper of	confidence limit (95	% UCL) on t	the mean					ILCR	Incrementa	l lifetime cano	cer risk.
concentration detected at the site.								Inc	Incomplete	pathway.	
1) Doses and cancer risks shown only for carcir	nogenic chemicals w	with available	toxicity valu	les.				mg/L	Milligrams	per liter.	
<ol> <li>Absorbed doses were calculated for dermal c calculated for ingestion or inhalation of a me</li> </ol>	contact with the med							mg/kg-d VOC	U	per kilogram ganic compou	
3) Cancer risks are unitless values which repres	ent the probability of	of incurring a	n adverse he	alth							

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	se Dose	VOC Inhalation			n 	Pathway	ncer Risk	Chemical-	
	Concentration <sup>a</sup>	Dose		Dose (mg/kg-d)	Cancer S Oral	lope Factor Dermal		Ingestion	Dermal	VOC Inhalation	Specific Risk
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-u)	Ofai	Dermar	Innatation	ingestion	2011111		
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	0.00081	3.2E-07	1.4E-06	Inc	2.0E+00	2.0E+00	2.0E+00	6.3E-07	2.7E-06	Inc	3.3E-06
										ILCR	3E-06
lotes:											
<sup>a</sup> Based on the maximum or 95 percent upper of	confidence limit (95%	UCL) on the	mean					ILCR	Incrementa	l lifetime cance	er risk.
concentration detected at the site.								Inc	Incomplete		
<ul> <li>Doses and cancer risks shown only for carcin</li> <li>Absorbed doses were calculated for dermal c</li> </ul>	ogenic chemicals with	available to	xicity values					mg/L mg/kg-d	Milligrams Milligrams	per liter. per kilogram p	er day.
calculated for ingestion or inhalation of a me		in, and intake	.3					VOC	Volatile Or	ganic Compou	nds
B) Cancer risks are unitless values which represent effect. They are calculated using the following	ent the probability of i	ncurring an a Risk = Exposi	dverse healt are Dose x C	n ancer Slope F	actor.						

## TADE .-153

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$					VOC				<b>D</b> (1	6	Incord	Chemical-
Constituent         (mg/kg-d)		Surface Water	Ingestion		Inhalation				Pathy	vay-Specific I		
Construction         (mg/g)         (	Constituent	-						0	- Ingestion	Dermal		
Chromium       0.015       1.3E-04       1.2E-05       Inc       1.5E+00       1.5E+00       8.5E-05       8.0E-06       Inc       0.000093         Copper       0.040       3.4E-04       Inc       3.7E-02       3.7E-02       3.7E-02       9.7E-03       4.3E-04       Inc       0.000093         Lead       0.086       na <sup>k</sup> <th< th=""><th>Constituent</th><th>(ingr.)</th><th>(ing/kg-u)</th><th>(ing/kg-u)</th><th>(Ing/kg-u)</th><th>Orai</th><th>Derma</th><th></th><th></th><th></th><th></th><th></th></th<>	Constituent	(ingr.)	(ing/kg-u)	(ing/kg-u)	(Ing/kg-u)	Orai	Derma					
Chromum0.0151.5E-041.2E-03inc1.2E-03inc1.2E-03inc1.2E-03inc1.2E-03inc0.2E-034.3E-04Inc0.0096Lead0.086 $n^{ab}$ <	INORGANICS											0.000002
Copper0.04003.4E-041.0E-03inc3.1Four5.1	Chromium	0.015	1.3E-04		Inc							
Lead0.086na	Copper	0.040	3.4E-04									
Lead, Dissolved0.011na	Lead	0.086	na <sup>b</sup>	na <sup>b</sup>								
Zinc $0.62$ $5.2E.03$ $2.5E.04$ Inc $3.0E.01$ $3.0E.01$ $3.0E.01$ $3.0E.01$ $1.7E.02$ $8.2E.04$ Inc $0.008$ POLYCHLORINATED BIPHENYLSPCB-1260 (Arcclor 1260) $0.00081$ $6.8E.06$ $1.4E.04$ Inc $2.0E.05$ $2.0E.05$ $2.0E.05$ $3.4E.01$ $6.9E+00$ Inc $7.3$ PETROLEUM HYDROCARBONS' $IHI$ $7.3$ Diesel Range Organics, Aliphatic $37$ $3.1E-01$ $Inc$ $2.0E-05$ $2.0E-05$ $2.0E-05$ $3.4E-01$ $6.9E+00$ Inc $7.3$ Diesel Range Organics, Aliphatic $37$ $3.1E-01$ $Inc$ $2.1E-01$ $Inc$ $1.0E-01$ $na^4$ <td>Lead, Dissolved</td> <td>0.011</td> <td>na<sup>b</sup></td> <td>na<sup>b</sup></td> <td>na<sup>b</sup></td> <td>na<sup>b</sup></td> <td>na<sup>b</sup></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Lead, Dissolved	0.011	na <sup>b</sup>									
Zinc, Dissolved $0.23$ $1.92-03$ $9.02-03$ inc $3.02-01$ $5.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ $1.02-02$ <t< td=""><td></td><td>0.62</td><td>5.2E-03</td><td>2.5E-04</td><td>Inc</td><td>3.0E-01</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		0.62	5.2E-03	2.5E-04	Inc	3.0E-01						
PCB-1260 (Aroclor 1260) $0.00081$ $6.8E-06$ $1.4E-04$ Inc $2.0E-05$ $2.0E-05$ $2.0E-05$ $2.0E-05$ $3.4E-01$ $6.9E+00$ $Inc$ $7.3$ PETROLEUM HYDROCARBONS <sup>6</sup> Diesel Range Organics46 $na^d$ <	Zinc, Dissolved	0.23	1.9E-03	9.0E-05	Inc	3.0E-01	3.0E-01	3.0E-01	6.3E-03	3.0E-04	Inc	0.0066
PCB-1260 (Arcelor 1260)       0.00081       6.8E-06       1.4E-04       Inc       2.0E-03       2.	POLYCHLORINATED BIPHENYLS									( 0E - 00	Inc	72
Diesel Range Organics       46       na <sup>d</sup> </td <td>PCB-1260 (Aroclor 1260)</td> <td>0.00081</td> <td>6.8E-06</td> <td>1.4E-04</td> <td>Inc</td> <td>2.0E-05</td> <td>2.0E-05</td> <td>2.0E-05</td> <td>3.4E-01</td> <td>6.9E+00</td> <td>the state of the s</td> <td></td>	PCB-1260 (Aroclor 1260)	0.00081	6.8E-06	1.4E-04	Inc	2.0E-05	2.0E-05	2.0E-05	3.4E-01	6.9E+00	the state of the s	
Diesel Range Organics       46       na <sup>d</sup> </td <td>PETROLEUM HYDROCARBONS</td> <td></td>	PETROLEUM HYDROCARBONS											
Diesel Range Organics, Aliphatic       37       3.1E-01       Inc       2.1E-01       1.0E-01       na       2.9E-01       3.1E+00       Inc       7.2E-01       3.9E         Diesel Range Organics, Aromatic       19       1.6E-01       Inc       1.0E-01       4.0E-02       na       5.7E-01       3.9E+00       Inc       1.8E-01       4.1         Gasoline Range Organics       0.57       na <sup>6</sup>		46	nad	nad	na <sup>d</sup>	nad	nad	na <sup>d</sup>				
Diesel Range Organics, Aromatic       19       1.6E-01       Inc       1.0E-01       4.0E-02       na       5.7E-01       3.9E+00       Inc       1.8E-01       4.1         Gasoline Range Organics       0.57       na <sup>e</sup>			3.1E-01	Inc	2.1E-01	1.0E-01	na					
Gasoline Range Organics       0.57       na <sup>e</sup> na <sup></sup>		19	1.6E-01	Inc	1.0E-01	4.0E-02	na					
Gasoline Range Organics, Aliphatic       0.40       3.3E-03       Inc       4.4E-02       5.0E+00       na       5.3E+00       6.7E-04       Inc       5.3E+03       6.050 o         Gasoline Range Organics, Aromatic       0.28       2.4E-03       Inc       3.2E-02       2.0E-01       na       1.1E-01       1.2E-02       Inc       2.9E-01       0.30         Notes:       *       *       Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.       HI       Hazard index.         *       Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.       Inc       Incomplete pathway.         *       Risks associated with indicator compounds are included in cumulative risk and hazard       mg/L       Milligrams per liter.         will be evaluated and reported separately.       Milligrams per kilogram per day.         *       Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)       VOC       Volatile organic compound.		0.57	na°	nae			na°					
Gasoline Range Organics, Aromatic       0.28       2.4E-03       Inc       3.2E-02       2.0E-01       na       1.1E-01       1.2E-02       Inc       2.9E-01       0.30         Notes:       *       Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.       HI       Hazard index.       HQ       Hazard quotient.         *       Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.       Inc       Incomplete pathway.       mg/L       Milligrams per liter.         *       Risks associated with indicator compounds are included in cumulative risk and hazard       mg/L       Milligrams per liter.       mg/kd-d       Milligrams per day.         will be evaluated and reported separately.       na       not available       VOC       Volatile organic compound.         *       Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)       VOC       Volatile organic compound.		0.40	3.3E-03	Inc			na					
Notes:       Image: High and the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.       High Hazard index.         Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.       HQ       Hazard quotient.         b Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.       Inc       Incomplete pathway.         c Risks associated with indicator compounds are included in cumulative risk and hazard       mg/L       Milligrams per liter.         estimates for each site. However, the health hazards associated with petroleum mixtures       mg/kd-d       Milligrams per kilogram per day.         will be evaluated and reported separately.       na       not available         d Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)       VOC       Volatile organic compound.         by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic       State Align and the second action of the secon		0.28	2.4E-03	Inc	3.2E-02	2.0E-01	na	1.1E-01	1.2E-02	Inc	2.9E-01	0.50
Based on the maximum or 95 percent upper confidence limit (95% UCL) on the meanHIHazard index.concentration detected at the site.HQHazard quotient.Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.IncIncomplete pathway.Risks associated with indicator compounds are included in cumulative risk and hazardmg/LMilligrams per liter.estimates for each site. However, the health hazards associated with petroleum mixturesmg/kd-dMilligrams per kilogram per day.will be evaluated and reported separately.nanot availabled Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)VOCVolatile organic compound.by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphaticStore and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)VOCVolatile organic compound.											HI	8.3
<ul> <li><sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean</li> <li><sup>b</sup> Concentration detected at the site.</li> <li><sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.</li> <li><sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazard</li> <li><sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazard</li> <li><sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazard</li> <li><sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazard</li> <li><sup>c</sup> Risks associated and reported separately.</li> <li><sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)</li> <li><sup>d</sup> VOC</li> <li><sup>d</sup> Volatile organic compound.</li> </ul>	Notes:								н	Hazard inde	x.	
concentration detected at the site.IncIncomplete pathway. <sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.IncMilligrams per liter. <sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazardmg/LMilligrams per liter. <sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazardmg/kd-dMilligrams per kilogram per day. <sup>c</sup> stimates for each site. However, the health hazards associated with petroleum mixturesmanot availablewill be evaluated and reported separately.nanot available <sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)VOCVolatile organic compound.by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphaticState State	<sup>a</sup> Based on the maximum or 95 percent up	per confidence limit (959	% UCL) on th	ie mean								
<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative H estimate.       mg/L       Milligrams per liter. <sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazard       mg/L       Milligrams per liter.         estimates for each site. However, the health hazards associated with petroleum mixtures       mg/kd-d       Milligrams per kilogram per day.         will be evaluated and reported separately.       na       not available <sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)       VOC       Volatile organic compound.         by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic       VOC       Volatile organic compound.	concentration detected at the site.								-			
<ul> <li>Risks associated with indicator compounds are included in cumulative risk and many estimates for each site. However, the health hazards associated with petroleum mixtures</li> <li>will be evaluated and reported separately.</li> <li>In a not available</li> <li>In a voil a compound.</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of the petroleum hydrocarbons measured as DRO (method 8100)</li> <li>Work of th</li></ul>	<sup>b</sup> Consistent with EPA policy, lead is not e	evaluated in the cumulati	ve HI estimat	ie.						•		
will be evaluated and reported separately.       na       not available         d Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)       VOC       Volatile organic compound.         by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic       aliphatic       No										-		
will be evaluated and reported separately.nanot availabled Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)VOCVolatile organic compound.by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphaticVOCVolatile organic compound.									mg/kd-d			er day.
<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100) VOC Volatile organic compound. by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic	will be evaluated and reported separately								na	not available	e	
by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic	<sup>d</sup> Exposure dose and noncancer hazards we	ere calculated for petrole	um hydrocar	bons measure	d as DRO (me	ethod 8100)			VOC	Volatile orga	anic compoun	d.
	by segregating total DRO concentrations	s into aliphatic and arom	atic fractions.	, assuming 80	% aliphatic							

• Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as GRO (method 8015)

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

			VOC					~
Surface	Water Ingestion	Dermal	Inhalation		Pathy	way-Specific	Hazard	Chemical-
Concent		Dose	Dose	Reference Dose (mg/kg-d)			VOC	Specific
Constituent (mg/		(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalati		Dermal	Inhalation	HQ
Constituent		(						

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

#### TAB 54

# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	Inhalation				Path	way-Specific	Hazard	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Chromium, Dissolved	0.015	1.7E-05	3.4E-07	Inc	1.5E+00	1.5E+00	1.5E+00	1.1E-05	2.3E-07	Inc	0.00001
Copper	0.040	4.6E-05	4.6E-07	Inc	3.7E-02	3.7E-02	3.7E-02	1.2E-03	1.2E-05	Inc	0.0012
Lead, Dissolved	0.086	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead, Dissolved	0.011	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Zinc	0.62	7.0E-04	7.0E-06	Inc	3.0E-01	3.0E-01	3.0E-01	2.3E-03	2.3E-05	Inc	0.0024
Zinc, Dissolved	0.23	2.6E-04	2.6E-06	Inc	3.0E-01	3.0E-01	3.0E-01	8.6E-04	8.6E-06	Inc	0.00086
POLYCHLORINATED BIPHENYLS								a same and			
PCB-1260 (Aroclor 1260)	0.00081	9.2E-07	4.0E-06	Inc	2.0E-05	2.0E-05	2.0E-05	4.6E-02	2.0E-01	Inc	0.24
										HI	0.25
PETROLEUM HYDROCARBONS <sup>c</sup>			,			4	đ	d	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	46	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	Inc	na 3.5E-02	na 0.46
Diesel Range Organics, Aliphatic	37	4.2E-02	Inc	1.0E-02	1.0E-01 4.0E-02	na	2.9E-01 5.7E-01	4.2E-01 5.3E-01	Inc	8.9E-02	0.54
Diesel Range Organics, Aromatic	19	2.1E-02	Inc	5.1E-03		na	na <sup>e</sup>	na®	na <sup>e</sup>	na	na
Gasoline Range Organics	0.57	na®	na	na <sup>e</sup>	na <sup>e</sup> 5.0E+00	na	na 5.3E+00	па 9.0Е-05	Inc	4.0E-04	0.00049
Gasoline Range Organics, Aliphatic	0.3955	4.5E-04	Inc	2.1E-03 1.5E-03	2.0E+00	na na	1.1E-01	1.6E-03	Inc	1.4E-02	0.016
Gasoline Range Organics, Aromatic	0.2825	3.2E-04	Inc	1.5E-05	2.06-01	na	1.12-01	1.02-05	me		
										HI	1.0
otes:								ні	Hazard index	v	
<sup>a</sup> Based on the maximum or 95 percent upper	r confidence limit (959	% UCL) on th	e mean								
concentration detected at the site.								HQ	Hazard quot		
Consistent with EPA policy, lead is not eva	aluated in the cumulati	ve HI estimat	e.					Inc	Incomplete p		
Risks associated with indicator compounds estimates for each site. However, the healt								mg/L mg/kd-d	Milligrams p	er liter. Der kilogram p	er dav.
	n nazarus associateu w	in peroieun	Thirtures					na	not available		,
will be evaluated and reported separately.	loulated for potrola	um hudrocart	one measure	d as DRO (m	ethod 8100	0		VOC		anic compound	d.
Exposure dose and noncancer hazards were by segregating total DRO concentrations i	e calculated for petrole	atic fractions	accuming 80	% alinhatic	culou or oo	,		VUC	volatile orga	ine compound	<b>u</b> .
		and fractions,	assuming ou	no ampirado							
hydrocarbons and 40% aromatic hydrocarb • Exposure dose and noncancer hazards were	ons (ADEC, 2000c).										

# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	a.				VOC			
		Surface Water	Ingestion	Dermal	Inhalation	_	Pathway-Specific	Hazard Chemical-
		<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)		VOC Specific
-	Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion Dermal	Inhalation HQ

by segregating total GRO concentrations into aliphatic and aromatic fractions, assuming 70% aliphatic

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## TAB 55

## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Groundwater	Ingestion	Dermal	Inhalation		_		Pathway-Specific Cancer I		ncer Risk	Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer S	lope Factor	(mg/kg-d) <sup>-1</sup>			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS										÷	
Arsenic	0.039	1.5E-04	2.0E-06	Inc	1.5E+00	1.5E+00	1.5E+01	2.2E-04	3.1E-06	Inc	2.3E-04
										ILCR	2E-04
lotes:											
* Based on the maximum or 95 percent	upper confidence limit (95	% UCL) on t	the mean					ILCR	Incrementa	l lifetime cano	cer risk.
concentration detected at the site.								Inc	Incomplete	pathway.	
) Doses and cancer risks shown only for	or carcinogenic chemicals w	vith available	toxicity valu	ies.				mg/L	Milligrams	per liter.	
2) Absorbed doses were calculated for d								mg/kg-d	Milligrams	per kilogram	per day.
calculated for ingestion or inhalation		,						VOC	-	ganic compou	
3) Cancer risks are unitless values which		of incurring a	n adverse he	alth							

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## CANCER RISK CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathway	-Specific Ca	ncer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	lope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Ingestion	Dermal	VOC Inhalation	Specific Risk
INORGANICS Arsenic	0.039	1.5E-05	1.5E-07	Inc	1.5E+00	1.5E+00	1.5E+01	2.3E-05	2.3E-07	Inc	2.3E-05
<ul> <li>Totes:</li> <li>Based on the maximum or 95 percent to concentration detected at the site.</li> <li>Doses and cancer risks shown only for</li> </ul>				es.	- - -			ILCR Inc mg/L	Incomplete Milligrams	per liter.	
<ol> <li>Doses and cancer risks shown only for</li> <li>Absorbed doses were calculated for de calculated for ingestion or inhalation of</li> <li>Cancer risks are unitless values which</li> </ol>	rmal contact with the medion of a medium.	ium, and inta	kes were					mg/kg-d VOC	U	per kilogram ganic compour	

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

#### TABI 57

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 28 - Drainage Basin - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathwa	ay-Specific ]	Hazard	_ Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (	mg/kg-d)			VOC	Specifi
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
INORGANICS											
Arsenic	0.039	3.3E-04	1.6E-05	Inc	3.0E-04	3.0E-04	3.0E-04	1.1E+00	5.2E-02	Inc	1.2
Copper	0.18	1.5E-03	7.2E-05	Inc	3.7E-02	3.7E-02	3.7E-02	4.1E-02	1.9E-03	Inc	0.043
Lead	0.20	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Nickel	0.16	1.4E-03	1.3E-05	Inc	2.0E-02	2.0E-02	2.0E-02	6.8E-02	6.4E-04	Inc	0.068
										HI	1.3
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	3.2	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	2.6	2.2E-02	Inc	1.4E-02	1.0E-01	na	2.9E-01	2.2E-01	Inc	5.0E-02	0.27
Diesel Range Organics, Aromatic	1.3	1.1E-02	Inc	7.2E-03	4.0E-02	na	5.7E-01	2.7E-01	Inc	1.3E-02	0.28
										HI	0.55

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean	HI	Hazard index.
concentration detected at the site.	HQ	Hazard quotient.
<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.	Inc	Incomplete pathway.
e Risks associated with indicator compounds are included in cumulative risk and hazard	mg/L	Milligrams per liter.
estimates for each site. However, the health hazards associated with petroleum mixtures	mg/kd-d	Milligrams per kilogram per day.
will be evaluated and reported separately.	na	not available
<sup>d</sup> Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as DRO (method 8100)	VOC	Volatile organic compound.
by segregating total DRO concentrations into aliphatic and aromatic fractions, assuming 80% aliphatic		

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE INCIDENTAL VISITOR SITE 28 - Drainage Basin - SHALLOW SUBSURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Surface Water	Ingestion	Dermal	VOC Inhalation				Pathy	vay-Specific I	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/L)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral	nce Dose ( Dermal	mg/kg-d) Inhalation	Ingestion	Dermal	VOC Inhalation	Specific HQ
INORGANICS Arsenic Copper Lead Nickel	0.039 0.18 0.20 0.16	4.5E-05 2.1E-04 na <sup>b</sup> 1.8E-04	4.5E-07 2.1E-06 na <sup>b</sup> 3.7E-07	Inc Inc na <sup>b</sup> Inc	3.0E-04 3.7E-02 na <sup>b</sup> 2.0E-02	3.0E-04 3.7E-02 na <sup>b</sup> 2.0E-02	3.0E-04 3.7E-02 na <sup>b</sup> 2.0E-02	1.5E-01 5.6E-03 na <sup>b</sup> 9.1E-03	1.5E-03 5.6E-05 na <sup>b</sup> 1.8E-05	Inc Inc na <sup>b</sup> Inc	0.15 0.0056 na <sup>b</sup> 0.0092
										HI	0.16
PETROLEUM HYDROCARBONS <sup>e</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic	3.2 2.6 1.3	na <sup>d</sup> 2.9E-03 1.5E-03	na <sup>d</sup> Inc Inc	na <sup>d</sup> 7.0E-04 3.5E-04	na <sup>d</sup> 1.0E-01 4.0E-02	na <sup>d</sup> na na	na <sup>d</sup> 2.9E-01 5.7E-01	na <sup>d</sup> 2.9E-02 3.7E-02	na <sup>d</sup> Inc Inc	na <sup>d</sup> 2.4E-03 6.2E-04 HI	na <sup>d</sup> 0.032 0.037 <b>0.069</b>
<ul> <li>Based on the maximum or 95 percent upper concentration detected at the site.</li> <li><sup>b</sup> Consistent with EPA policy, lead is not eval</li> <li><sup>c</sup> Risks associated with indicator compounds estimates for each site. However, the health will be evaluated and reported separately.</li> <li><sup>d</sup> Exposure dose and noncancer hazards were by segregating total DRO concentrations in</li> </ul>	luated in the cumulati are included in cumul hazards associated w calculated for petrole	ve HI estimate ative risk and with petroleum um hydrocart	e.   hazard n mixtures	d as DRO (me % aliphatic	thod 8100)			HI HQ Inc mg/L mg/kd-d na VOC	not available	ient. pathway. per liter. per kilogram p	

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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# CANCER RISK CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 28 - Drainage Basin - PLANT CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Plant Concentration <sup>*</sup> (mg/kg)	Plant Ingestion Dose (mg/kg-d)	Cancer Slope Factor Oral (mg/kg-d) <sup>-1</sup>	Pathway-Specific Cancer Risk Plant Ingestion	Chemical- Specific Risk
INORGANICS	0.55	1.7E-04	1.5E+00	2.6E-04	2.6E-04
Arsenic Cadmium	1.1	3.4E-04	na	na	0.0E+00
POLYNUCLEAR AROMATIC HYDROCARBON	S				
Benzo(a)anthracene	0.088	2.7E-05	7.3E-01	2.0E-05	2.0E-05
Benzo(a)pyrene	0.13	3.9E-05	7.3E+00	2.9E-04	2.9E-04
Benzo(b)fluoranthene	0.15	4.8E-05	7.3E-01	3.5E-05	3.5E-05
Benzo(k)fluoranthene	0.12	3.9E-05	7.3E-02	2.8E-06	2.8E-06
Chrysene	0.16	4.9E-05	7.3E-03	3.6E-07	3.6E-07
Dibenzo(a,h)anthracene	0.027	8.3E-06	7.3E+00	6.1E-05	6.1E-05
Indeno(1,2,3-cd)pyrene	0.19	5.8E-05	7.3E-01	4.3E-05	4.3E-05
POLYCHLORINATED BIPHENYLS					
PCB-1254 (Aroclor 1254)	0.18	5.6E-05	2.0E+00	1.1E-04	1.1E-04
PCB-1260 (Aroclor 1260)	0.099	3.1E-05	2.0E+00	6.2E-05	6.2E-05
				ILCR	9E-04

# Notes:

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

Only plant samples obtained from harvested species are included in the concentration derivation.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

# NONCANCER HAZARD CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 28 - Drainage Basin - PLANT CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

NORGANICS ntimony	0.0030				
	0.0030				
ntimony	0.0030	5.8E-06	4.0E-04	1.4E-02	0.014
	0.55	1.0E-03	3.0E-04	3.5E+00	3.5
rsenic	36	7.0E-03	7.0E-02	1.0E+00	1.0
arium	1.1	2.2E-03	5.0E-04	4.3E+00	4.3
admium	9.6	1.8E-02	1.5E+00	1.2E-02	0.012
hromium	3.2	6.1E-02	3.7E-02	1.7E-01	0.17
opper		na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
ead	5.0		3.0E-04	1.7E-01	0.17
Iercury	0.027	5.2E-05	2.0E-04	3.6E-01	0.36
lickel	3.7	7.2E-03	5.0E-02	1.9E-02	0.019
elenium	0.050	9.6E-05 4.4E-05	5.0E-03	8.8E-03	0.0088
ilver	0.023		7.0E-03	8.6E-01	0.86
anadium	3.1	6.0E-03	3.0E-01	3.9E-01	0.39
inc	61	1.2E-01	3.0E-01	5.512-01	
OLYNUCLEAR AROMATIC HYDROCARBONS					0.0010
-Methylnaphthalene	0.013	2.5E-05	2.0E-02	1.2E-03	0.0012
Acenaphthene	0.052	1.0E-04	6.0E-02	1.7E-03	0.0017
Inthracene	0.013	2.6E-05	3.0E-01	8.5E-05	0.000085
enzo(g,h,i)perylene	0.075	1.4E-04	2.0E-02	7.2E-03	0.0072
Juoranthene	0.44	8.5E-04	4.0E-02	2.1E-02	0.021
luorene	0.034	6.6E-05	4.0E-02	1.6E-03	0.0016
Japhthalene	0.017	3.2E-05	2.0E-02	1.6E-03	0.0016
Phenanthrene	0.42	8.0E-04	3.0E-01	2.7E-03	0.0027
yrene	0.36	6.9E-04	3.0E-02	2.3E-02	0.023
OLYCHLORINATED BIPHENYLS	0.18	3.4E-04	2.0E-05	1.7E+01	17

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# NONCANCER HAZARD CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 28 - Drainage Basin - PLANT CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Plant Concentration <sup>a</sup>	Plant Ingestion Dose	Reference Dose Oral	Pathway-Specific Hazard Plant	Chemical- Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)		9.4
PCB-1260 (Aroclor 1260)	0.099	1.9E-04	2.0E-05	9.4E+00	38

#### Notes:

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

Only plant samples obtained from harvested species are included in the concentration derivation.

<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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## CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 29 - Suqitughneg River - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Sediment	Sediment Ingestion	Sediment Dermal	Dust Inhalation				Pathway-S	Specific Car	ncer Risk	Chemical
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Cancer Sl Oral	ope Factor Dermal	(mg/kg-d) <sup>-1</sup> Inhalation	Sediment Ingestion	Dermal	Dust Inhalation	Specific Risk
INORGANICS Arsenic	5.7	2.3E-06	2.7E-07	1.7E-10	1.5E+00	1.5E+00	1.5E+01	3.4E-06	4.1E-07	2.5E-09	3.9E-06
							1			ILCR	4E-06
<ul> <li>botes:</li> <li>Based on the maximum or 95 percent up</li> <li>Doses and cancer risks shown only for ca</li> <li>Absorbed doses were calculated for derm of a medium</li> <li>Cancer risks are unitless values which re</li> </ul>	arcinogenic chemicals with av nal contact with the medium,	vailable toxic and intakes v	ity values. vere calculate			on		ILCR Inc mg/kg mg/kg-d	Incomplet Milligram	al lifetime can te pathway. Is per kilogram Is per kilogram	n.

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## CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 29 - Suqitughneg River - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Sediment								ncer Risk	Chemical-	
	Concentration <sup>®</sup>	Dose	Dose	Dose		ope Factor		Sediment	<b>D</b> 1	Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
INORGANICS Arsenic	5.7	5.6E-08	2.2E-08	1.7E-11	1.5E+00	1.5E+00	1.5E+01	8.4E-08	3.3E-08	2.6E-10	1.2E-07
										ILCR	1E-07
Notes: <sup>a</sup> Based on the maximum 1) Doses and cancer risks 2) Absorbed doses were of a medium 3) Cancer risks are unitle		ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	l lifetime canc pathway. per kilogram. per kilogram j							

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 29 - Suqitughneg River - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Sediment	Sediment	Dust				Pathway	Specific Ca	ncer Risk	Chemical-
	Sediment	Ingestion	Dermal	Inhalation Dose	Deferen	nce Dose (m	a/ka_d)	Sediment	optenie of	Dust	Specific
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	(mg/kg-d)	Oral		Inhalation		Dermal	Inhalation	Risk
Constituent	(IIIg/Kg/	(ing ng u)	(	(							
INORGANICS											0.070
Aluminum	15,900	5.8E-02	0.0E+00	2.9E-06	1.0E+00	1.0E+00	1.4E-03	5.8E-02	0.0E+00	2.1E-03	0.060 0.076
Arsenic	5.7	2.1E-05	2.0E-06	1.0E-09	3.0E-04	3.0E-04	3.0E-04	6.9E-02	6.6E-03	3.4E-06	0.0061
Barium	115	4.2E-04	0.0E+00	2.1E-08	7.0E-02	7.0E-02	1.4E-04	6.0E-03	0.0E+00 0.0E+00	1.5E-04 2.2E-04	0.0001
Cobalt	7.0	2.5E-05	0.0E+00	1.3E-09	2.0E-02	2.0E-02	5.7E-06	1.3E-03		na <sup>b</sup>	na <sup>b</sup>
Lead	114	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>		
Manganese	0.05	1.8E-07	0.0E+00	9.0E-12	1.4E-01	1.4E-01	1.4E-05		0.0E+00	6.5E-07	0.0000019 0.018
Vanadium	35	1.3E-04	0.0E+00	6.3E-09	7.0E-03	7.0E-03	7.0E-03	1.8E-02	0.0E+00	9.0E-07	0.018
VOCs								5 0 D 0 0	0.05.00	2.05.11	0.000000058
m,p-Xylene	0.0032	1.2E-08	0.0E+00	5.8E-13	2.0E-01	2.0E-01	2.9E-02	5.8E-08	0.0E+00	2.0E-11	0.00000038
DIOXINS/FURANS										2.05.10	0.000070
Dibenzofuran	0.0086	3.1E-08	9.9E-11	1.6E-12	4.0E-03	4.0E-03	4.0E-03	7.8E-06	2.5E-08	3.9E-10	0.0000079
										HI	0.16
PETROLEUM HYDROCARBONS <sup>e</sup>					4	4	d	d	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	1,859	nad	na <sup>d</sup>	nad	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	na Inc	9.3E-07	0.054
Diesel Range Organics, Aliphatic	1,488	5.4E-03	Inc	2.7E-07	1.0E-01	na	2.9E-01	5.4E-02 6.8E-02	Inc	2.4E-07	0.068
Diesel Range Organics, Aromatic	744	2.7E-03	Inc	1.3E-07	4.0E-02	na	5.7E-01	0.8E-02	inc	2.46-07	0.000
										HI	0.12
Notes:				_					Hazard ind	lav	
<sup>a</sup> Based on the maximum or 95 percent upper con	nfidence limit (95% U	CL) on the me	ean					HI			
concentration detected at the site.								HQ	Hazard que		
<sup>b</sup> Consistent with EPA policy, lead is not evaluat	ted in the cumulative H	I estimate.						Inc	Incomplete		
<sup>c</sup> Risks associated with indicator compounds are included in cumulative risk and hazard								mg/kg		s per kilogram s per kilogram	
estimates for each site. However, the health hazards associated with petroleum mixtures								mg/kd-d	U	•	per day.
will be evaluated and reported separately.								na	not availab	ne	
<sup>d</sup> Exposure dose and noncancer hazards were cal	culated for petroleum	hydrocarbons	measured as	DRO (method 8	8100)						
by segregating total DRO concentrations into	aliphatic and aromatic	fractions, assi	uming 80% al	iphatic							
hydrocarbons and 40% aromatic hydrocarbons	(ADEC, 2000c).										
1) Doses and noncancer hazards shown only for n	oncarcinogenic chemi	cals with avai	lable toxicity	values.							
a) the shall deser users calculated for dermal cor	stact with the medium	and intakes v	vere calculated	d for ingestion	or inhalation						

 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

#### TABL 3

### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 29 - Suqitughneg River - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Sediment	Sediment Ingestion	Sediment Dermal	Dust Inhalation		Pathway-Spec	ific Cancer Risk	Chemical-
Constituent	Concentration <sup>a</sup>	Dose	Dose	Dose	Reference Dose (mg/kg-d)	Sediment	Dust	Specific
	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral Dermal Inhalation	Ingestion De	ermal Inhalation	Risk

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 29 - Suqitughneg River - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Sediment	Sediment	Dust				Pathwa	y-Specific Ca	ncer Risk	Chemical-
	Sediment	Ingestion	Dermal	Inhalation	D. 6	D	- (lan d)	Sediment	y-opeenie oa	Dust	Specific
Granditurent	Concentration <sup>a</sup>	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Oral	nce Dose (m Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
Constituent	(mg/kg)	(mg/kg-u)	(mg/kg-u)	(Ing/kg-u)	Orai	Dermai	malation	ingestion	Derman	Annuation	1001
INORGANICS											
Aluminum	15,900	4.5E-04	0.0E+00	1.4E-07	1.0E+00	1.0E+00	1.4E-03	4.5E-04	0.0E+00	1.0E-04	0.00055
Arsenic	5.7	1.6E-07	6.4E-08	5.0E-11	3.0E-04	3.0E-04	3.0E-04	5.4E-04	2.1E-04	1.7E-07	0.00076
Barium	115	3.3E-06	0.0E+00	1.0E-09	7.0E-02	7.0E-02	1.4E-04	4.7E-05	0.0E+00	7.2E-06	0.000054
Cobalt	7.0	2.0E-07	0.0E+00	6.1E-11	6.0E-02	6.0E-02	6.0E-02	3.3E-06	0.0E+00	1.0E-09	0.0000033
Manganese	114	3.3E-06	0.0E+00	1.0E-09	1.4E-01	1.4E-01	1.4E-05	2.3E-05	0.0E+00	7.2E-05	0.000095
Mercury	0.05	1.4E-09	0.0E+00	4.4E-13	3.0E-04	3.0E-04	3.0E-04	4.8E-06	0.0E+00	1.5E-09	0.0000048
Vanadium	35	1.0E-06	0.0E+00	3.1E-10	7.0E-03	7.0E-03	7.0E-03	1.4E-04	0.0E+00	4.4E-08	0.00014
VOLATILE ORGANIC COMPOUNDS											
m,p-Xylene	0.0032	9.1E-11	0.0E+00	2.8E-14	7.0E-01	7.0E-01	2.9E-02	1.3E-10	0.0E+00	9.7E-13	0.0000000013
DIOXINS/FURANS											0.00000000
Dibenzofuran	0.0086	2.5E-10	3.2E-12	7.6E-14	4.0E-03	4.0E-03	4.0E-03	6.1E-08	8.1E-10	1.9E-11	0.00000062
										HI	0.0016
PETROLEUM HYDROCARBONS <sup>c</sup>								4	4	đ	na <sup>d</sup>
Diesel Range Organics	1,859	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na 0.00042
Diesel Range Organics, Aliphatic	1,488	4.2E-05	Inc	1.3E-08	1.0E-01	na	2.9E-01	4.2E-04	Inc	4.5E-08	0.00042
Diesel Range Organics, Aromatic	744	2.1E-05	Inc	6.5E-09	4.0E-02	na	5.7E-01	5.3E-04	Inc	1.1E-08	0.00033
										HI	0.0010
lotes:								ні	Hazard inde	v	
" Based on the maximum or 95 percent upper co	nfidence limit (95% U	JCL) on the r	nean								
concentration detected at the site.								HQ	Hazard quot		
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	ted in the cumulative	HI estimate.						Inc	Incomplete p	pathway.	
Consistent with EFA policy, lead is not evalua	ieu in nie euniana.							mg/kg	Milligrams p	per kilogram.	
	in studied in summitation	up rick and he	and					mg/kd-d	Milligrams	per kilogram pe	er day.
<sup>c</sup> Risks associated with indicator compounds are estimates for each site. However, the health ha								na	not available		
will be evaluated and reported separately.		•									
<sup>d</sup> Exposure dose and noncancer hazards were cal	lculated for petroleum	hydrocarbor	is measured a	as DRO (meth	od 8100)						
by segregating total DRO concentrations into	aliphatic and aromatic	fractions, as	suming 80%	aliphatic							
hydrocarbons and 40% aromatic hydrocarbons	(ADEC, 2000c).										
) Doses and noncancer hazards shown only for r b) Absorbed doses were calculated for dermal con-	oncarcinogenic chem	icals with ava , and intakes	ailable toxici were calcula	ty values. ted for ingesti	on or inhala	tion					

of a medium

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## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 29 - Suqitughneg River - SEDIMENT NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Sediment	Sediment Ingestion	Sediment Dermal	Dust Inhalation			17 - 84	Pathway-	Specific Ca	ncer Risk	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refer	ence Dose (n Dermal	ng/kg-d) Inhalation	Sediment Ingestion	Dermal	Dust Inhalation	Specific Risk

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 29 - Suqitughneg River - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Surface Water Concentration <sup>a</sup> (mg/L)	Ingestion Dose (mg/kg-d)	Dermal Dose (mg/kg-d)	VOC Inhalation Dose (mg/kg-d)	Referer Oral	nce Dose (n Dermal	ng/kg-d) Inhalation	Pathy	vay-Specific I Dermal	lazard VOC Inhalation	Chemical- Specific HQ
INORGANICS Aluminum Barium Manganese Silver, Dissolved Zinc	0.040 0.0050 0.027 0.020 0.0080	3.4E-04 4.2E-05 2.3E-04 1.7E-04 6.8E-05	1.6E-05 2.0E-06 1.1E-05 8.0E-06 3.2E-06	Inc Inc Inc Inc	1.0E+00 7.0E-02 1.4E-01 5.0E-03 3.0E-01	1.0E+00 7.0E-02 1.4E-01 5.0E-03 3.0E-01	1.4E-03 1.4E-05 1.4E-05 5.0E-03 3.0E-01	3.4E-04 6.0E-04 1.6E-03 3.4E-02 2.3E-04	1.6E-05 2.9E-05 7.7E-05 1.6E-03 1.1E-05	Inc Inc Inc Inc Inc	0.00035 0.00063 0.0017 0.035 0.00024 0.038
<b>PETROLEUM HYDROCARBONS</b> <sup>6</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Gasoline Range Organics, Aliphatic Gasoline Range Organics, Aromatic	0.16 0.13 0.064 0.29 0.21 0.15	na <sup>d</sup> 1.1E-03 5.4E-04 na <sup>e</sup> 1.7E-03 1.2E-03	na <sup>d</sup> Inc Inc Inc Inc Inc	na <sup>d</sup> 7.2E-04 3.6E-04 na <sup>e</sup> 2.3E-02 1.6E-02	na <sup>d</sup> 1.0E-01 4.0E-02 na <sup>e</sup> 5.0E+00 2.0E-01	na <sup>d</sup> na na na na na	na <sup>d</sup> 2.9E-01 5.7E-01 na <sup>e</sup> 5.3E+00 1.1E-01	na <sup>d</sup> 1.1E-02 1.4E-02 na <sup>e</sup> 3.5E-04 6.2E-03	na <sup>d</sup> Inc Inc na <sup>°</sup> Inc Inc	HI na <sup>d</sup> 2.5E-03 6.3E-04 na <sup>e</sup> 4.3E-03 1.5E-01 HI	na <sup>d</sup> 0.013 0.014 na <sup>e</sup> 0.0047 0.16 <b>0.19</b>
<ul> <li>Notes:</li> <li><sup>a</sup> Based on the maximum or 95 percent upper concentration detected at the site.</li> <li><sup>b</sup> Consistent with EPA policy, lead is not eval</li> <li><sup>c</sup> Risks associated with indicator compounds estimates for each site. However, the health will be evaluated and reported separately.</li> <li><sup>d</sup> Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocarb.</li> <li><sup>e</sup> Exposure dose and noncancer hazards were by segregating total GRO concentrations in hydrocarbons and 50% aromatic hydrocarb.</li> <li>1) Doses and noncancer hazards shown only for the set of the set of</li></ul>	luated in the cumulati are included in cumu a hazards associated v calculated for petrole nto aliphatic and arom ons (ADEC, 2000c). calculated for petrole nto aliphatic and arom ons (ADEC, 2000c).	ve HI estimat lative risk and with petroleum eum hydrocar atic fractions eum hydrocar atic fractions	te. I hazard n mixtures bons measure , assuming 80 bons measure , assuming 70	9% aliphatic ad as GRO (mo 9% aliphatic				HI HQ Inc mg/L mg/kd-d na VOC	not available	ient. pathway. per liter. per kilogram j	

#### TAB 65

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 29 - Suqitughneg River - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

					VOC							
		Surface Water	Ingestion	Dermal	Inhalation				Pathw	ay-Specific I	Iazard	Chemical-
		<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Referen	nce Dose (m	ng/kg-d)			VOC	Specific
·	Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 29 - Suqitughneg River - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	C. C. Water	Incostion	Dermal	VOC Inhalation				Pathy	vay-Specific I	Hazard	Chemical-
	Surface Water Concentration <sup>a</sup>	Ingestion Dose	Dose	Dose	Referen	nce Dose (n	ng/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral		Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(ing/D)	(	(					14 M			
INORGANICS								-			0.00035
Aluminum	0.040	3.4E-04	1.6E-05	Inc	1.0E+00	1.0E+00	1.4E-03	3.4E-04	1.6E-05	Inc	0.00033
Barium	0.0050	4.2E-05	2.0E-06	Inc	7.0E-02	7.0E-02	1.4E-05	6.0E-04	2.9E-05	Inc	0.0003
Manganese	0.027	2.3E-04	1.1E-05	Inc	1.4E-01	1.4E-01	1.4E-05	1.6E-03	7.7E-05	Inc	0.0017
Silver, Dissolved	0.020	1.7E-04	8.0E-06	Inc	5.0E-03	5.0E-03	5.0E-03	3.4E-02	1.6E-03	Inc Inc	0.00024
Zinc	0.0080	6.8E-05	3.2E-06	Inc	3.0E-01	3.0E-01	3.0E-01	2.3E-04	1.1E-05	Inc	0.00024
										HI	0.038
5											
PETROLEUM HYDROCARBONS <sup>c</sup>					d	đ	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics	0.16	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>		na 1.1E-02	Inc	2.5E-03	0.013
Diesel Range Organics, Aliphatic	0.13	1.1E-03	Inc	7.2E-04	1.0E-01	na	2.9E-01	1.1E-02 1.4E-02	Inc	6.3E-04	0.014
Diesel Range Organics, Aromatic	0.064	5.4E-04	Inc	3.6E-04	4.0E-02	na	5.7E-01				na
Gasoline Range Organics	0.29	na°	na°	na°	na°	na	na <sup>e</sup>	na	na	na <sup>°</sup> 4.3E-03	0.0047
Gasoline Range Organics, Aliphatic	0.21	1.7E-03	Inc	2.3E-02	5.0E+00	na	5.3E+00	3.5E-04	Inc Inc	4.3E-03 1.5E-01	0.0047
Gasoline Range Organics, Aromatic	0.15	1.2E-03	Inc	1.6E-02	2.0E-01	na	1.1E-01	6.2E-03	Inc	1.56-01	0.10
										HI	0.19
Notes:								HI	Hazard inde	x.	
<sup>a</sup> Based on the maximum or 95 percent upper	er confidence limit (95%	% UCL) on th	ne mean						Hazard quot		
concentration detected at the site.								HQ			
<sup>b</sup> Consistent with EPA policy, lead is not ev	aluated in the cumulati	ve HI estimat	te.					Inc	Incomplete		
° Risks associated with indicator compound	s are included in cumu	lative risk and	d hazard					mg/L	Milligrams	per liter.	
estimates for each site. However, the heal	th hazards associated w	vith petroleum	n mixtures					mg/kd-d	Milligrams	per kilogram p	ber day.
will be evaluated and reported separately.		÷						na	not availabl	e	
<sup>d</sup> Exposure dose and noncancer hazards wer	re calculated for petrole	um hydrocar	bons measure	d as DRO (me	ethod 8100)			VOC	Volatile org	anic compour	d.
by segregating total DRO concentrations	into aliphatic and arom	atic fractions	, assuming 80	)% aliphatic							
			, 0								
hydrocarbons and 40% aromatic hydrocar	Dolis (ADEC, 2000C).	um hudrocor	hone measure	d as GRO (m	ethod 8015)						
• Exposure dose and noncancer hazards wer	re calculated for petrole	un nyurocar	occurring 7/	0% aliphatic							
by segregating total GRO concentrations		atic fractions	, assuming /	no amplianc							
t rom the budgesse	Lana (ADEC 2000c)										

hydrocarbons and 50% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 29 - Suqitughneg River - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				voc							
	Surface Water	Ingestion	Dermal	Inhalation			_	Pathwa	ay-Specific I	Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Referen	nce Dose (m	ng/kg-d)			VOC	Specific
Constituent	( <b>mg/L</b> )	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 29 - Suqitughneg River - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Concentration <sup>a</sup> Dose		Dermal	VOC Inhalation		D		Pathw	vay-Specific l	Hazard VOC	Chemical- Specific
			Dose	Dose (mg/kg-d)	Oral	nce Dose (1	Inhalation	Ingestion	Dermal	Inhalation	HQ
Constituent	(mg/L)	(mg/kg-a)	(mg/kg-d)	(mg/kg-u)	Orai	Dermar	minutation	- Bestion			
INORGANICS									1		0.000046
Aluminum	0.040	4.6E-05	4.6E-07	Inc	1.0E+00	1.0E+00	1.4E-03	4.6E-05	4.6E-07	Inc	0.000046
Barium	0.0050	5.7E-06	5.7E-08	Inc	7.0E-02	7.0E-02	1.4E-04	8.2E-05	8.2E-07	Inc	0.000082
Manganese	0.027	3.1E-05	3.1E-07	Inc	1.4E-01	1.4E-01	1.4E-05	2.2E-04	2.2E-06	Inc	0.0046
Silver, Dissolved	0.020	2.3E-05	1.4E-07	Inc	5.0E-03	5.0E-03	5.0E-03	4.6E-03	2.7E-05 3.0E-07	Inc Inc	0.000031
Zinc	0.0080	9.1E-06	9.1E-08	Inc	3.0E-01	3.0E-01	3.0E-01	3.0E-05	3.0E-07	HI	0.0050
PETROLEUM HYDROCARBONS <sup>c</sup>											
	0.16	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	nad	nad
Diesel Range Organics	0.13	1.5E-04	Inc	3.5E-05	1.0E-01	na	2.9E-01	1.5E-03	Inc	1.2E-04	0.0016
Diesel Range Organics, Aliphatic	0.064	7.3E-05	Inc	1.8E-05	4.0E-02	na	5.7E-01	1.8E-03	Inc	3.1E-05	0.0019
Diesel Range Organics, Aromatic	0.29	na°	na®	na°	na®	na®	na®	na°	na°	na	na°
Gasoline Range Organics	0.29	2.4E-04	Inc	1.1E-03	5.0E+00	na	5.3E+00	4.7E-05	Inc	2.1E-04	0.00026
Gasoline Range Organics, Aliphatic	0.15	1.7E-04	Inc	8.0E-04	2.0E-01	na	1.1E-01	8.4E-04	Inc	7.3E-03	0.0081
Gasoline Range Organics, Aromatic	0.15	1.72 01								ні	0.012
7.4										н	0.012
* Based on the maximum or 95 percent upper co	onfidence limit (95	% UCL) on t	he mean					HI	Hazard inde		
concentration detected at the site.								HQ	Hazard quot	ient.	
<sup>b</sup> Consistent with EPA policy, lead is not evaluate	ated in the cumulat	ive HI estima	te.					Inc	Incomplete	pathway.	
<ul> <li>Risks associated with indicator compounds ar</li> </ul>	e included in cumu	lative risk an	d hazard					mg/L	Milligrams	per liter.	
Risks associated with indicator compounds a	c included in early	with petroleur	n mixtures					mg/kd-d	Milligrams	per kilogram p	ber day.
estimates for each site. However, the health h	azarus associateu v	with perform	II IIIXtures					na	not available		
will be evaluated and reported separately.					athod \$100	2)		VOC		anic compour	hd
			hone measure	ית אכן אכן הי	lethod 8100	J)		VUC	volatile org	and compour	ici.
<sup>d</sup> Exposure dose and noncancer hazards were ca	alculated for petrol	eum nydrocai	Jons measure								
<sup>d</sup> Exposure dose and noncancer hazards were ca by segregating total DRO concentrations into	alculated for petrol aliphatic and aron	natic fractions	s, assuming 80	0% aliphatic							
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbon	aliphatic and aron (ADEC, 2000c).	natic fractions	s, assuming 80	0% aliphatic							
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbon • Exposure dose and noncancer hazards were ca	aliphatic and aron (ADEC, 2000c). alculated for petrol	natic fractions eum hydrocar	s, assuming 80 bons measure	0% aliphatic ed as GRO (m							
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbon • Exposure dose and noncancer hazards were ca	aliphatic and aron (ADEC, 2000c). alculated for petrol	natic fractions eum hydrocar	s, assuming 80 bons measure	0% aliphatic ed as GRO (m							
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbon Exposure dose and noncancer hazards were ca by segregating total GRO concentrations into	aliphatic and aron (ADEC, 2000c). alculated for petrol aliphatic and aron	natic fractions eum hydrocar	s, assuming 80 bons measure	0% aliphatic ed as GRO (m							
<ul> <li>by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbon</li> <li>Exposure dose and noncancer hazards were ca by segregating total GRO concentrations into hydrocarbons and 50% aromatic hydrocarbon</li> </ul>	aliphatic and aron (ADEC, 2000c). alculated for petrol- aliphatic and aron (ADEC, 2000c).	natic fractions eum hydrocan natic fractions	s, assuming 80 bons measures, assuming 70	0% aliphatic ed as GRO (m 0% aliphatic	nethod 801						
by segregating total DRO concentrations into hydrocarbons and 40% aromatic hydrocarbon Exposure dose and noncancer hazards were ca by segregating total GRO concentrations into	aliphatic and aron (ADEC, 2000c). alculated for petrol aliphatic and aron (ADEC, 2000c). alculated for petrol	natic fractions eum hydrocan natic fractions eum hydrocan	s, assuming 80 bons measure s, assuming 70 bons measure	0% aliphatic ed as GRO (m 0% aliphatic ed as RRO (m	nethod 801						

#### TAI 166

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 29 - Suqitughneg River - FRESH SURFACE WATER NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		•	<b>D</b>	voc				Dothwy	ay-Specific ]	Jozard	Chemical-
	Surface Water	Ingestion	Dermal	Inhalation				Fattiwa	iy-specific i	lazaru	Chemieur
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	ence Dose (	mg/kg-d)			VOC	Specific
Constituent	(mg/L)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

# CANCER RISK CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 29 - Suqitughneg River - FISH CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Fish Concentration <sup>a</sup> (mg/kg)	Fish Ingestion Dose (mg/kg-d)	Cancer Slope Factor Oral (mg/kg-d) <sup>-1</sup>	Pathway-Specific Cancer Risk Fish Ingestion	Chemical- Specific Risk
CONDITION					
INORGANICS	0.71	5 (E 04	1.5E+00	8.3E-04	8.3E-04
Arsenic	0.71 0.0075	5.6E-04 5.9E-06	na	na	0.0E+00
Cadmium	0.0075	J.9E-00	na		
POLYNUCLEAR AROMATIC HYDROCARBO	NS				
Benzo(a)anthracene	0.0047	3.7E-06	7.3E-01	2.7E-06	2.7E-06
	0.0037	2.9E-06	7.3E+00	2.1E-05	2.1E-05
Benzo(a)pyrene	0.0030	2.4E-06	7.3E-01	1.7E-06	1.7E-06
Benzo(b)fluoranthene	0.0064	5.0E-06	7.3E-02	3.6E-07	3.6E-07
Benzo(k)fluoranthene	0.0084	6.6E-06	7.3E-03	4.8E-08	4.8E-08
Chrysene	0.0041	3.2E-06	7.3E+00	2.3E-05	2.3E-05
Dibenzo(a,h)anthracene	0.0026	2.0E-06	7.3E-01	1.5E-06	1.5E-06
Indeno(1,2,3-cd)pyrene	0.0020				
POLYCHLORINATED BIPHENYLS				2.25.05	2.2E-05
PCB-1254 (Aroclor 1254)	0.014	1.1E-05	2.0E+00	2.2E-05	7.0E-06
PCB-1260 (Aroclor 1260)	0.0045	3.5E-06	2.0E+00	7.0E-06	7.0E-00
				ILCR	9E-04

Notes:

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

Fish samples obtained from ambient locations. Concentration based only on fillet samples.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

 Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

 Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## TAI '-167

# CANCER RISK CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 29 - Suqitughneg River - FISH CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Fish			
	Fish	Ingestion	Cancer Slope Factor	Pathway-Specific Cancer Risk	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Oral	Fish	Specific
Constituent	(mg/kg)	(mg/kg-d)	$(mg/kg-d)^{-1}$	Ingestion	Risk

ILCR - incremental lifetime cancer risk.

mg/kg - Milligrams per kilogram.

mg/kg-d - Milligrams per kilogram per day.

# NONCANCER HAZARD CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 29 - Suqitughneg River - FISH CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

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	Fish	Fish Ingestion	Reference Dose	Pathway-Specific Hazard	Chemical-
	Concentration <sup>*</sup>	Dose	Oral	Fish	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	Ingestion	HQ
INORGANICS					
Arsenic	0.71	3.6E-03	3.0E-04	1.2E+01	12
Barium	0.043	2.2E-04	7.0E-02	3.1E-03	0.0031
Cadmium	0.0075	3.8E-05	1.5E+00	2.5E-05	0.000025
Copper	0.79	4.0E-03	3.7E-02	1.1E-01	0.11
Lead	0.0080	4.0E-05	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Mercury	0.020	1.0E-04	3.0E-04	3.3E-01	0.33
Nickel	0.054	2.7E-04	2.0E-02	1.4E-02	0.014
Selenium	0.15	7.5E-04	5.0E-03	1.5E-01	0.15
Vanadium	0.051	2.6E-04	7.0E-03	3.7E-02	0.037
Zinc	6.9	3.4E-02	3.0E-01	1.1E-01	0.11
Line					
POLYNUCLEAR AROMATIC HYDROCARBONS					
2-Methylnaphthalene	0.0065	3.3E-05	2.0E-02	1.6E-03	0.0016
Acenaphthene	0.0042	2.1E-05	6.0E-02	3.5E-04	0.00035
Anthracene	0.0042	2.1E-05	3.0E-01	7.0E-05	0.000070
Benzo(g,h,i)perylene	0.0043	2.2E-05	2.0E-02	1.1E-03	0.0011
Fluoranthene	0.0050	2.5E-05	4.0E-02	6.3E-04	0.00063
Fluorene	0.0046	2.3E-05	4.0E-02	5.8E-04	0.00058
Naphthalene	0.0033	1.7E-05	2.0E-02	8.3E-04	0.00083
Phenanthrene	0.0048	2.4E-05	3.0E-01	8.1E-05	0.000081
Pyrene	0.0054	2.7E-05	3.0E-02	9.0E-04	0.00090
POLYCHLORINATED BIPHENYLS	0.014	7 05 05	2.0E-05	3.5E+00	3.5
PCB-1254 (Aroclor 1254)	0.014	7.0E-05	2.0E-05	1.1E+00	1.1
PCB-1260 (Aroclor 1260)	0.0045	2.3E-05	2.0E-05	1.12+00	

#### TAE '-168

## NONCANCER HAZARD CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 29 - Suqitughneg River - FISH CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Fish				
	Fish	Ingestion	<b>Reference</b> Dose	Pathway-Specific Hazard	Chemical-	
	<b>Concentration</b> <sup>a</sup>	Dose	Oral	Fish	Specific	
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d) Ingestion		HQ	
				-		
				HI	17	

### Notes:

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

Fish samples obtained from Site 29 - Sugitughneq River. Concentration based only on fillet samples.

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.

HI - Hazard index. HQ - Hazard quotient. mg/kg - Milligrams per kilogram. mg/kg-d - Milligrams per kilogram per day.

# CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 30 - Ambient - FISH CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Fish Concentration <sup>a</sup> (mg/kg)	Fish Ingestion Dose (mg/kg-d)	Cancer Slope Factor Oral (mg/kg-d) <sup>-1</sup>	Pathway-Specific Cancer Risk Fish Ingestion	Chemical- Specific Risk
INORGANICS Arsenic Cadmium	0.88 0.0080	6.9E-04 6.3E-06	1.5E+00 na	1.0E-03 na	1.0E-03 0.0E+00
POLYCHLORINATED BIPHENYLS PCB-1254 (Aroclor 1254)	0.011	8.6E-06	2.0E+00	1.7E-05	1.7E-05
				ILCR	1E-03

### Notes:

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

Fish samples obtained from ambient locations. Concentration based only on fillet samples.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation

of a medium.

3) Cancer risks are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

ILCR - incremental lifetime cancer risk.

mg/kg - Milligrams per kilogram.

mg/kg-d - Milligrams per kilogram per day.

## NONCANCER HAZARD CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 30 - Ambient - FISH CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

TABLE

Constituent	Fish Concentration <sup>a</sup> (mg/kg)	Fish Ingestion Dose (mg/kg-d)	Reference Dose Oral (mg/kg-d)	Pathway-Specific Hazard Fish Ingestion	Chemical Specific HQ
NODGINUCS		8 G			
INORGANICS	0.88	4.4E-03	3.0E-04	1.5E+01	15
Arsenic Barium	0.88	4.4E-03 3.0E-04	7.0E-02	4.2E-03	0.004
Cadmium	0.0080	4.0E-04	5.0E-02	4.2E-03 8.0E-02	0.08
Copper	1.1	5.5E-03	3.7E-02	1.5E-01	0.15
Lead	0.0040	2.0E-05	na <sup>b</sup>	na <sup>b</sup>	0
Mercury	0.034	1.7E-04	3.0E-04	5.7E-01	0.57
Nickel	0.050	2.5E-04	2.0E-02	1.3E-02	0.01
Selenium	0.18	9.0E-04	5.0E-03	1.8E-01	0.18
Vanadium	0.075	3.8E-04	7.0E-03	5.4E-02	0.054
Zinc	14	7.0E-02	3.0E-01	2.3E-01	0.23
POLYNUCLEAR AROMA	ATIC HYDROCAR	BONS			
Fluoranthene	0.0015	7.5E-06	4.0E-02	1.9E-04	0.00019
POLYCHLORINATED BI	PHENYLS				
PCB-1254 (Aroclor 1254)	0.011	5.5E-05	2.0E-05	2.8E+00	2.8
				HI	19

### Notes:

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

Fish samples obtained from Site 29 - Suqitughneq River. Concentration based only on fillet samples.

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.

HI - Hazard index. HQ - Hazard quotient.

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# NONCANCER HAZARD CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 30 - Ambient - FISH CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Fish			
	Fish	Ingestion	<b>Reference Dose</b>	Pathway-Specific Hazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Oral	Fish	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	Ingestion	HQ

mg/kg - Milligrams per kilogram. mg/kg-d - Milligrams per kilogram per day.

### Tabl. \_\_\_/1

# CANCER RISK CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 30 - Ambient - PLANT CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Plant	Plant Ingestion	Cancer Slope Factor	Pathway-Specific Cancer Risk	Chemical- Specific Risk	
	Concentration <sup>a</sup>	Dose	Oral	Plant		
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d) <sup>-1</sup>	Ingestion		
INORGANICS						
Arsenic	0.56	1.7E-04	1.5E+00	2.6E-04	2.6E-04	
Cadmium	0.88	2.7E-04	na	na	0.0E+00	
POLYNUCLEAR AROMATIC HYDROCA	RBONS					
Benzo(a)anthracene	0.075	2.3E-05	7.3E-01	1.7E-05	1.7E-05	
Benzo(a)pyrene	0.021	6.6E-06	7.3E+00	4.8E-05	4.8E-05	
Benzo(b)fluoranthene	0.053	1.7E-05	7.3E-01	1.2E-05	1.2E-05	
Benzo(k)fluoranthene	0.046	1.4E-05	7.3E-02	1.0E-06	1.0E-06	
Chrysene	0.087	2.7E-05	7.3E-03	2.0E-07	2.0E-07	
Dibenzo(a,h)anthracene	0.013	4.1E-06	7.3E+00	3.0E-05	3.0E-05	
Indeno(1,2,3-cd)pyrene	0.024	7.5E-06	7.3E-01	5.5E-06	5.5E-06	
POLYCHLORINATED BIPHENYLS						
PCB-1254 (Aroclor 1254)	0.011	3.4E-06	2.0E+00	6.9E-06	6.9E-06	
PCB-1260 (Aroclor 1260)	0.0095	3.0E-06	2.0E+00	5.9E-06	5.9E-06	
				ILCR	4E-04	

## Notes:

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

Only plant samples obtained from harvested species are included in the concentration derivation.

1) Doses and cancer risks shown only for carcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Cancer risks are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Cancer Risk = Exposure Dose x Cancer Slope Factor.

## Table F-171

# CANCER RISK CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 30 - Ambient - PLANT CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Plant	Plant Ingestion	Cancer Slope Factor	Pathway-Specific Cancer Risk	Chemical-
	Concentration <sup>®</sup>	Dose	Oral	Plant	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d) <sup>-1</sup>	Ingestion	Risk

ILCR - incremental lifetime cancer risk. mg/kg - Milligrams per kilogram. mg/kg-d - Milligrams per kilogram per day.

## TAB 172

## NONCANCER HAZARD CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 30 - Ambient - PLANT CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Constituent	Plant Concentration <sup>a</sup> (mg/kg)	Plant Ingestion Dose (mg/kg-d)	Reference Dose Oral (mg/kg-d)	Pathway-Specific Hazard Plant Ingestion	Chemical- Specific HQ
INORGANICS					
Arsenic	0.56	1.1E-03	3.0E-04	3.6E+00	3.6
Barium	21	4.1E-02	7.0E-02	5.8E-01	0.58
Cadmium	0.88	1.7E-03	5.0E-04	3.4E+00	3.4
Chromium	9.0	1.7E-02	1.0E+00	1.7E-02	0.017
Copper	2.8	5.4E-03	3.7E-02	1.5E-01	0.15
	3.5	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>	na <sup>b</sup>
Lead	0.021	4.0E-05	3.0E-04	1.3E-01	0.13
Mercury	4.2	4.0E-03 8.1E-03	2.0E-02	4.0E-01	0.40
Nickel	4.2 0.05	9.6E-05	5.0E-02	1.9E-02	0.019
Selenium	0.019	3.6E-05	5.0E-03	7.3E-03	0.007
Silver	3.6	7.0E-03	7.0E-03	1.0E+00	1.0
Vanadium	57	1.1E-01	3.0E-01	3.6E-01	0.36
Zinc	57	1.12-01	5.02-01	5100 01	
POLYNUCLEAR AROMATIC HYDROCARBO	ONS				
2-Methylnaphthalene	0.0076	1.5E-05	2.0E-02	7.3E-04	0.00073
Acenaphthene	0.013	2.5E-05	6.0E-02	4.2E-04	0.00042
Anthracene	0.049	9.4E-05	3.0E-01	3.1E-04	0.00031
Benzo(g,h,i)perylene	0.013	2.5E-05	2.0E-02	1.2E-03	0.0012
Fluoranthene	0.38	7.3E-04	4.0E-02	1.8E-02	0.018
Fluorene	0.022	4.2E-05	4.0E-02	1.1E-03	0.0011
Naphthalene	0.0078	1.5E-05	2.0E-02	7.5E-04	0.00075
Phenanthrene	0.29	5.6E-04	3.0E-01	1.9E-03	0.0019
Pyrene	0.28	5.4E-04	3.0E-02	1.8E-02	0.018
POLYCHLORINATED BIPHENYLS					
PCB-1254 (Aroclor 1254)	0.011	2.1E-05	2.0E-05	1.1E+00	1.1
PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260)	0.0095	1.8E-05	2.0E-05	0.910958904	0.91
				HI	12

Notes:

<sup>a</sup> Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site.

## NONCANCER HAZARD CALCULATIONS FOR SUBSISTENCE FOOD USE SITE 30 - Ambient - PLANT CONSUMPTION NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Plant			
	Plant	Ingestion	<b>Reference</b> Dose	Pathway-Specific Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Oral	Plant	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	Ingestion	HQ

Only plant samples obtained from harvested species are included in the concentration derivation.

<sup>b</sup> Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate.

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

HI - Hazard index. HQ - Hazard quotient. mg/kg - Milligrams per kilogram. mg/kg-d - Milligrams per kilogram per day.

### TA] 173

### CANCER RISK CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 31- White Alice Communications Site - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

				Soil	Soil	Dust							
			Soil	Ingestion	Dermal	Inhalation				Pathway-	Specific Car	ncer Risk	Chemical-
			Concentration <sup>a</sup>	Dose	Dose	Dose	Cancer Sl	ope Factor	(mg/kg-d) <sup>-1</sup>	Soil		Dust	Specific
Constituent			(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
POLYCHLORINATED F	BIPHENYLS		22	8 OF 04	4.0E.06	6 5E 10	2.05.00	2.05.00	2.05.00	1.8E-05	9.8E-06	1.3E-09	2.7E-05
PCB-1260 (Aroclor 1260)			22	8.9E-06	4.9E-06	6.5E-10	2.0E+00	2.0E+00	2.0E+00	1.8E-05	9.8E-00	1.3E-09	2.7E-03
												ILCR	3E-05
Notes:								2 12					
* Based on the maximum or 9	95 percent uppe	r confid	ence limit (95% UC	CL) on the me	ean concentra	ation detected	at the site.			ILCR	Increment	al lifetime ca	ncer risk.
1) Doses and cancer risks show	wn only for card	inogeni	c chemicals with av	vailable toxic	ity values.					Inc	Incomplet	e pathway.	
2) Based on the maximum or 9	95 percent uppe	r confid	ence limit (95% UC	CL) on the me	ean concentra	ation detected	at the site.			mg/kg	Milligram	s per kilogram	n.
Doses and cancer risks show	wn only for card	inogeni	c chemicals with av	vailable toxic	ity values.					mg/kg-d	Milligram	s per kilograr	n per day.
3) Absorbed doses were calcu	lated for dermal	contact	with the medium,	and intakes w	ere calculate	d for ingestio	n or inhalation	on					
of a medium													
Cancer risks are unitless va	lues which repre	esent the	e probability of incu	urring an adv	erse health								
				The second s									

## CANCER RISK CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 31 - White Alice Communications Site - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Soil Dermal	Dust Inhalation				Pathwa	y-Specific Ca	ancer Risk	Chemical-
	Concentration <sup>8</sup>	Dose	Dose	Dose	Cancer Slo			Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	22	2.7E-05	1.5E-05	1.9E-09	2.0E+00	2.0E+00	2.0E+00	5.3E-05	2.9E-05	3.9E-09	8.2E-05
										ILCR	8E-05
otes:	C 1 1: :: (0501 1	CI ) on the m	an concentry	tion detected	in soil tundr			ILCR	Incremental	lifetime cance	r risk.
Based on the maximum or 95 percent upper con and soil gravel at the site. Doses and cancer risks shown only for carcinog Absorbed doses were calculated for dermal com		Inc mg/kg mg/kg-d	Incomplete Milligrams								
of a medium. Cancer risks are unitless values which represen	t the probability of in	curring an adv	erse health	61 - E							

#### TAB 75

### CANCER RISK CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 31 - White Alice Communications Site - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil Concentration <sup>a</sup>	Soil Ingestion Dose	Soil Dermal Dose	Dust Inhalation Dose		ope Factor		Soil	-Specific Ca	Dust	Chemical Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	Risk
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	22	2.2E-07	4.0E-07	6.6E-11	2.0E+00	2.0E+00	2.0E+00	4.3E-07	8.0E-07	1.3E-10	1.2E-06
										ILCR	1E-06
tes:											
Based on the maximum or 95 percent upper con Doses and cancer risks shown only for carcinog Absorbed doses were calculated for dermal con of a medium		ILCR Inc mg/kg mg/kg-d	Incomplete Milligrams	l lifetime cance pathway. per kilogram. per kilogram p							

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 31 - White Alive Site - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathw	ay-Specific	Hazard	Chemical-
	Concentration	Dose	Dose	Dose	Refere	nce Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation		Dermal	Inhalation	HQ
Constituent	(ing/kg)	(ing/kg-d)	(ing ing d)	(							
VOLATILE ORGANIC COMPOUNDS		( 35 00	0.017.00	2 15 12	2.0E-01	2.0E-01	2.9E-02	3.1E-07	0.0E+00	1.1E-10	0.0000003
m,p-Xylene	0.017 0.0053	6.2E-08 1.9E-08	0.0E+00 0.0E+00	3.1E-12 9.6E-13	2.0E-01	2.0E-01 2.0E-01	2.9E-02	1.9E-08	1.9E-08	1.9E-08	0.00000001
o-Xylene	0.0055	1.96-08	0.02+00	9.01-15	2.00-01	2.02 01	2002.02				
POLYCHLORINATED BIPHENYLS											
PCB-1260 (Aroclor 1260)	22	8.0E-05	3.6E-05	4.0E-09	2.0E-05	2.0E-05	2.0E-05	4.0E+00	1.8E+00	2.0E-04	5.8
										НІ	5.8
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	8,307	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	naď	na <sup>d</sup>	nad	nad
Diesel Range Organics, Aliphatic	6,646	2.4E-02	Inc	1.2E-06	1.0E-01	na	2.9E-01	2.4E-01	Inc	4.1E-06	0.24
Diesel Range Organics, Aromatic	3,323	1.2E-02	Inc	6.0E-07	4.0E-02	na	5.7E-01	3.0E-01	Inc	1.1E-06	0.30
Residual Range Organics	2,165	na®	na	na <sup>e</sup>	na®	na	na®	na°	na	na	na°
Residual Range Organics, Aliphatic	1,948	7.1E-03	Inc	3.5E-07	2.0E+00	na	na	3.5E-03	Inc	Inc Inc	0.0035 0.079
Residual Range Organics, Aromatic	649	2.4E-03	Inc	1.2E-07	3.0E-02	na	na	7.9E-02	Inc	Inc	0.079
			-							HI	0.63
otes:											
Based on the maximum or 95 percent upper con	nfidence limit (95% UG	CL) on the me	ean					HI	Hazard ind		
concentration detected at the site.								HQ	Hazard quo		
<sup>b</sup> Consistent with EPA policy, lead is not evaluat	ted in the cumulative H	I estimate.						Inc	Incomplete	•	
e Risks associated with indicator compounds are	included in cumulative	e risk and haz	ard					mg/kg		per kilogram	
estimates for each site. However, the health ha	azards associated with p	petroleum mix	ctures					mg/kd-d	U	per kilogram	per day.
will be evaluated and reported separately.								na	not availab	le	
<sup>d</sup> Exposure dose and noncancer hazards were cal	lculated for petroleum l	hydrocarbons	measured as l	DRO (method 8	3100)						
by segregating total DRO concentrations into a											
hydrocarbons and 40% aromatic hydrocarbons											
<ul> <li>Exposure dose and noncancer hazards were cal</li> </ul>		hydrocarbons	measured as l	RRO (method)							
by segregating total RRO concentrations into a											
hydrocarbons and 30% aromatic hydrocarbons											
Doses and noncancer hazards shown only for n	oncarcinogenic chemic	cals with avai	lable toxicity	values.							
Absorbed doses were calculated for dermal cor	ntact with the medium,	and intakes w	vere calculated	for ingestion	or inhalation						
- C - ma limm											

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of a medium.

### TABL 5

### NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 31 - White Alive Site - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust							
	Soil	Ingestion	Dermal	Inhalation				Pathwa	ay-Specific	Hazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refer	ence Dose (n	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 31 - White Alice Communications Site - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil Concentration <sup>a</sup>	Soil Ingestion Dose	Dermal Dose	Dust Inhalation Dose			(mg/kg-d)	Soil	y-Specific	Dust	Chemical- Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
VOLATILE ORGANIC COMPOUNDS m,p-Xylene	0.017	1.9E-07	0.0E+00	9.2E-12		2.0E-01	2.9E-02	9.3E-07	0.0E+00	3.2E-10	0.00000093
o-Xylene	0.0053	5.8E-08	0.0E+00	2.9E-12	2.0E-01	2.0E-01	2.9E-02	2.9E-07	0.0E+00	9.9E-11	0.0000029
POLYCHLORINATED BIPHENYLS PCB-1260 (Aroclor 1260)	22	2.4E-04	1.1E-04	1.2E-08	2.0E-05	2.0E-05	2.0E-05	1.2E+01	5.3E+00	6.0E-04 HI	17 <b>17</b>
PETROLEUM HYDROCARBONS <sup>e</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	8,307 6,646 3,323 2,165 1,948 649	na <sup>d</sup> 7.3E-02 3.6E-02 na <sup>e</sup> 2.1E-02 7.1E-03	na <sup>d</sup> Inc Inc na <sup>e</sup> Inc Inc	na <sup>d</sup> 3.6E-06 1.8E-06 na <sup>e</sup> 1.1E-06 3.5E-07	na <sup>d</sup> 1.0E-01 4.0E-02 na <sup>e</sup> 2.0E+00 3.0E-02	na <sup>d</sup> na na <sup>c</sup> na na	na <sup>d</sup> 2.9E-01 5.7E-01 na <sup>e</sup> na na	na <sup>d</sup> 7.3E-01 9.1E-01 na <sup>e</sup> 1.1E-02 2.4E-01	na <sup>d</sup> Inc Inc Inc Inc	na <sup>d</sup> 1.2E-05 3.2E-06 na <sup>e</sup> Inc Inc HI	na <sup>d</sup> 0.7 0.9 na <sup>e</sup> 0.011 0.24 <b>1.9</b>
<ul> <li>concentration detected at the site.</li> <li><sup>b</sup> Consistent with EPA policy, lead is not evaluate</li> <li>c Risks associated with indicator compounds are i estimates for each site. However, the health haz will be evaluated and reported separately.</li> <li><sup>d</sup> Exposure dose and noncancer hazards were calc</li> </ul>	Based on the maximum or 95 percent upper confidence limit (95% UCL) on the mean concentration detected at the site. Consistent with EPA policy, lead is not evaluated in the cumulative HI estimate. Risks associated with indicator compounds are included in cumulative risk and hazard estimates for each site. However, the health hazards associated with petroleum mixtures									dex. notient. te pathway. ns per kilogran s per kilogran ble	

hydrocarbons and 40% aromatic hydrocarbons (ADEC, 2000c).

\* Exposure dose and noncancer hazards were calculated for petroleum hydrocarbons measured as RRO (method )

by segregating total RRO concentrations into aliphatic and aromatic fractions, assuming 90% aliphatic

hydrocarbons and 30% aromatic hydrocarbons (ADEC, 2000c).

#### **TAB** 77

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 31 - White Alice Communications Site - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation		Pathwa	y-Specific I	Hazard	Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Reference Dose (mg/kg-d) Oral Dermal Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ

1) Doses and noncancer hazards shown only for noncarcinogenic chemicals with available toxicity values.

2) Absorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.

3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 31 - White Alice Communications Site - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation				Pathy	way-Specific I	lazard	Chemical-
	<b>Concentration</b> <sup>a</sup>	Dose	Dose	Dose	Refere	nce Dose (r	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
VOLATILE ORGANIC COMPOUNDS						2.05.01	2.9E-02	2.4E-09	0.0E+00	5.1E-12	0.000000002
m,p-Xylene	0.017	4.9E-10	0.0E+00	1.5E-13	2.0E-01	2.0E-01 2.0E-01	2.9E-02 2.9E-02	7.6E-10	0.0E+00	1.6E-12	0.000000000
o-Xylene	0.0053	1.5E-10	0.0E+00	4.7E-14	2.0E-01	2.0E-01	2.96-02	7.02-10	0.00100	1102 12	
POLYCHLORINATED BIPHENYLS						2.05.05	2.05.05	3.1E-02	5.8E-02	9.7E-06	0.089
PCB-1260 (Aroclor 1260)	22	6.3E-07	1.2E-06	1.9E-10	2.0E-05	2.0E-05	2.0E-05	3.1E-02	3.8E-02	9.72-00	0.007
										HI	0.089
PETROLEUM HYDROCARBONS <sup>e</sup>									đ	d	na <sup>d</sup>
Diesel Range Organics	8,307	na <sup>d</sup>	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na 0.0019
Diesel Range Organics, Aliphatic	6,646	1.9E-04	Inc	5.8E-08	1.0E-01	na	2.9E-01	1.9E-03	Inc	2.0E-07 5.1E-08	0.0019
Diesel Range Organics, Aromatic	3,323	9.5E-05	Inc	2.9E-08	4.0E-02	na	5.7E-01	2.4E-03	Inc		na <sup>e</sup>
Residual Range Organics	2,165	na	na	na	na	na <sup>e</sup>	na	na	na	na	na 0.000028
Residual Range Organics, Aliphatic	1,948	5.6E-05	Inc	1.7E-08	2.0E+00	na	na	2.8E-05	Inc	Inc	0.000028
Residual Range Organics, Aromatic	649	1.9E-05	Inc	5.7E-09	3.0E-02	na	na	6.2E-04	Inc	Inc	0.00002
								8		HI	0.0049
otes:								HI	Hazard inde		
Based on the maximum or 95 percent upper co	onfidence limit (95% U	JCL) on the r	nean								
concentration detected at the site.								HQ	Hazard quoti Incomplete p		
Consistent with EPA policy, lead is not evaluated	ated in the cumulative	HI estimate.						Inc mg/kg	Milligrams p		
Risks associated with indicator compounds ar	e included in cumulati	ve risk and ha	ixtures					mg/kg mg/kd-d		per kilogram pe	er day.
estimates for each site. However, the health h will be evaluated and reported separately.	azards associated with	peutiteum	ixtures					na	not available		
Exposure dose and noncancer hazards were ca	loulated for petroleum	hydrocarbor	s measured a	as DRO (meth	od 8100)						
by segregating total DRO concentrations into	aliphatic and aromatic	fractions, as	suming 80%	aliphatic							
hydrocarbons and 40% aromatic hydrocarbon											
• Exposure dose and noncancer hazards were ca	alculated for petroleum	hydrocarbor	s measured a	as RRO (meth	od )						
by segregating total RRO concentrations into	aliphatic and aromatic	fractions, as	suming 90%	aliphatic							
hydrocarbons and 30% aromatic hydrocarbon											
Down and announcer bezards shown only for	noncarcinogenic chem	icals with av	ailable toxici	ty values.							
Absorbed doses were calculated for dermal co	ontact with the medium	, and intakes	were calcula	ated for ingesti	ion or inhala	ation					
6											

of a medium 3) Noncancer hazards are unitless values which represent the probability of incurring an adverse health

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### NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 31 - White Alice Communications Site - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

		Soil		Dust							
	Soil	Ingestion	Dermal	Inhalation				Pathwa	ay-Specific H	lazard	Chemical-
	Concentration <sup>a</sup>	Dose	Dose	Dose	Refere	ence Dose (r	ng/kg-d)	Soil		Dust	Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ

effect. They are calculated using the following formula: Noncancer HI = Exposure Dose/Reference dose.

## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 33 - Upper Tram Terminal - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil Concentration <sup>®</sup>	Soil Ingestion Dose	Dermal Dose	Dust Inhalation Dose	Refere	nce Dose (m Dermal	ng/kg-d) Inhalation	Soil	ay-Specific	Hazard Dust Inhalation	Chemical Specific HQ
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Orai	Dermai	miaiation	ingestion	Derma		
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	660	naď	nad	nad	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup> 2.9E-01	na <sup>d</sup> 1.9E-02	na <sup>d</sup> Inc	na <sup>d</sup> 3.3E-07	na <sup>d</sup> 0.019
Diesel Range Organics, Aliphatic	528	1.9E-03	Inc	9.5E-08 4.8E-08	1.0E-01 4.0E-02	na na	2.9E-01 5.7E-01	2.4E-02	Inc	8.4E-08	0.024
Diesel Range Organics, Aromatic	264	9.6E-04	Inc na <sup>e</sup>	4.8E-08 na	4.0E=02	na	na°	na°	na	na	na°
Residual Range Organics	2,100 1,890	na <sup>e</sup> 6.9E-03	Inc	3.4E-07	2.0E+00	na	na	3.4E-03	Inc	Inc	0.0034
Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	630	2.3E-03	Inc	1.1E-07	3.0E-02	na	na	7.6E-02	Inc	Inc	0.076
Residual Range Organics, Aromatic										HI	0.12
concentration detected at the site. Consistent with EPA policy, lead is not evaluat Risks associated with indicator compounds are estimates for each site. However, the health ha will be evaluated and reported separately.	included in cumulative azards associated with p	e risk and haz etroleum mix	tures	DRO (method 8	100)			HQ Inc mg/kg mg/kd-d na	U	e pathway. s per kilogram s per kilogram	
Exposure dose and noncancer hazards were cal by segregating total DRO concentrations into	aliphatic and aromatic	fractions, assu	iming 80% al	iphatic	,						
hydrocarbons and 40% aromatic hydrocarbons											
• Exposure dose and noncancer hazards were cal	culated for petroleum	ydrocarbons	measured as	RRO (method)							
by segregating total RRO concentrations into	aliphatic and aromatic	fractions, assu	iming 90% al	iphatic							
hydrocarbons and 30% aromatic hydrocarbons											
Doses and noncancer hazards shown only for r Absorbed doses were calculated for dermal con of a medium	noncarcinogenic chemic ntact with the medium,	and intakes v	vere calculate	a for nigestion o	r inhalation						
<ul> <li>Noncancer hazards are unitless values which reffect. They are calculated using the following</li> </ul>	epresent the probability g formula: Noncancer	of incurring HI = Exposu	an adverse he re Dose/Refer	ence dose.							

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 33 - Upper Tram Terminal - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					y-Specific		Chemical-
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Oral		(mg/kg-d) Inhalation	Soil	Dermal	Dust Inhalation	Specific HQ
	(ing/kg)	(mg/kg-u)	(mg/kg-u)	(mg/kg-u)	Orai	Derman	innanación	ingestion	Dermar	minution	
PETROLEUM HYDROCARBONS <sup>6</sup>											
Diesel Range Organics	660	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	528	5.8E-03	Inc	2.9E-07	1.0E-01	na	2.9E-01	5.8E-02	Inc	9.9E-07	0.058
Diesel Range Organics, Aromatic	264	2.9E-03	Inc	1.4E-07	4.0E-02	na	5.7E-01	7.2E-02	Inc	2.5E-07	0.072
Residual Range Organics	2,100	na	na°	na	nae	nae	na°	na°	nae	na	na
Residual Range Organics, Aliphatic	1,890	2.1E-02	Inc	1.0E-06	2.0E+00	na	na	1.0E-02	Inc	Inc	0.010
Residual Range Organics, Aromatic	630	6.9E-03	Inc	3.4E-07	3.0E-02	na	na	2.3E-01	Inc	Inc	0.23
										ні	0.37
Notes:				1.							0.07
<sup>a</sup> Based on the maximum or 95 percent upper confide	ence limit (95% UC	L) on the me	an					HI	Hazard in	dex.	
concentration detected at the site.		2) 011 110 1110						HQ	Hazard qu	otient.	
<sup>b</sup> Consistent with EPA policy, lead is not evaluated in	the cumulative U	octimate						Inc	Incomplet		
Consistent with EPA policy, lead is not evaluated in	i the cumulative ri	estimate.						mg/kg		s per kilogran	n
° Risks associated with indicator compounds are inclu-	uded in cumulative	risk and haza	rd					mg/kg	•	s per kilogran	
estimates for each site. However, the health hazard									not availal		i por duj.
	s associated with p		ures.					na	not availab		
will be evaluated and reported separately.				DBO (mothed	1 8 1 0 0 )						
<sup>d</sup> Exposure dose and noncancer hazards were calculated					18100)						
by segregating total DRO concentrations into aliph		ractions, assu	ming 80% ali	iphatic							
hydrocarbons and 40% aromatic hydrocarbons (AD											
<ul> <li>Exposure dose and noncancer hazards were calculated</li> </ul>					)						
by segregating total RRO concentrations into aliph	atic and aromatic fr	actions, assur	ming 90% ali	phatic							
hydrocarbons and 30% aromatic hydrocarbons (AD	EC, 2000c).										
<ol> <li>Doses and noncancer hazards shown only for nonca</li> <li>Absorbed doses were calculated for dermal contact of a medium.</li> </ol>	with the medium, a	nd intakes we	ere calculated	for ingestion	n or inhalat	tion					
3) Noncancer hazards are unitless values which repres	ent the probability	of incurring a	n adverse hea	alth							
effect. They are calculated using the following form	nula: Noncancer H	II = Exposure	e Dose/Refere	ence dose.							

## NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 33 - Upper Tram Terminal - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					way-Specific H		Chemical
Constituent	Concentration <sup>®</sup>	Dose	Dose	Dose	Referen	ce Dose (	mg/kg-d)	Soil		Dust	Specific
PETROLEUM HYDROCARBONS <sup>e</sup> Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	660 528 264 2,100 1,890 630	na <sup>d</sup> 1.5E-05 7.5E-06 na <sup>e</sup> 5.4E-05 1.8E-05	na <sup>d</sup> Inc Inc Inc Inc Inc	na <sup>d</sup> 4.6E-09 2.3E-09 na <sup>e</sup> 1.7E-08 5.5E-09	na <sup>d</sup> 1.0E-01 4.0E-02 na <sup>e</sup> 2.0E+00 3.0E-02	na <sup>d</sup> na na <sup>e</sup> na na	na <sup>d</sup> 2.9E-01 5.7E-01 na <sup>e</sup> na na	na <sup>d</sup> 1.5E-04 1.9E-04 na <sup>e</sup> 2.7E-05 6.0E-04	na <sup>d</sup> Inc Inc Inc Inc Inc	na <sup>d</sup> 1.6E-08 4.1E-09 na <sup>e</sup> Inc Inc HI	na <sup>d</sup> 0.00015 0.00019 na <sup>e</sup> 0.00002 0.00000
<ul> <li><sup>a</sup> Based on the maximum or 95 percent upper concentration detected at the site.</li> <li><sup>b</sup> Consistent with EPA policy, lead is not evalue</li> <li><sup>c</sup> Risks associated with indicator compounds a estimates for each site. However, the health will be evaluated and reported separately.</li> <li><sup>d</sup> Exposure dose and noncancer hazards were by segregating total DRO concentrations in hydrocarbons and 40% aromatic hydrocarbons</li> <li><sup>e</sup> Exposure dose and noncancer hazards were by segregating total RRO concentrations in hydrocarbons and 30% aromatic hydrocarbon</li> <li><sup>e</sup> Doses and noncancer hazards shown only for</li> </ul>	uated in the cumulative are included in cumulati hazards associated with calculated for petroleum to aliphatic and aromations (ADEC, 2000c). calculated for petroleum to aliphatic and aromation to aliphatic and aromations (ADEC, 2000c).	HI estimate. ve risk and ha petroleum m hydrocarbon c fractions, as hydrocarbon c fractions, as	ixtures s measured suming 80% s measured suming 90%	aliphatic as RRO (meth aliphatic				HI HQ Inc mg/kg mg/kd-d na	Hazard index Hazard quoti Incomplete p Milligrams p Milligrams p not available	ent. athway. er kilogram. er kilogram p	er day.
<ul> <li>) Doses and noncancer nazards shown only to ) Absorbed doses were calculated for dermal of a medium</li> <li>) Noncancer hazards are unitless values which effect. They are calculated using the follow</li> </ul>	represent the probabili	ty of incurring	g an adverse	health	ion or inhalati	ion					

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## NONCANCER HAZARD CALCULATIONS FOR A FUTURE SEASONAL RESIDENT SITE 34 - Upper Camp - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil Concentration*	Soil Ingestion Dose	Dermal Dose	Dust Inhalation Dose	Refere	nce Dose (n	ng/kg-d)	Pathw Soil	ay-Specific	Hazard Dust	Chemical- Specific
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermal	Inhalation	Ingestion	Dermal	Inhalation	HQ
PETROLEUM HYDROCARBONS <sup>e</sup>											d
Diesel Range Organics	1,100	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad	na <sup>d</sup>	nad	na <sup>d</sup> 5.5E-07	na <sup>d</sup> 0.032
Diesel Range Organics, Aliphatic	880	3.2E-03	Inc	1.6E-07	1.0E-01	na	2.9E-01	3.2E-02	Inc	5.5E-07 1.4E-07	0.032
Diesel Range Organics, Aromatic	440	1.6E-03	Inc	7.9E-08	4.0E-02	na	5.7E-01	4.0E-02	Inc		na <sup>c</sup>
Residual Range Organics	1,162	na°	na	na"	na	na®	na <sup>®</sup>	na	na	na°	na 0.0019
Residual Range Organics, Aliphatic	1,046	3.8E-03	Inc	1.9E-07	2.0E+00	na	na	1.9E-03	Inc Inc	Inc	0.042
Residual Range Organics, Aromatic	349	1.3E-03	Inc	6.3E-08	3.0E-02	na	na	4.2E-02	Inc	inc	0.042
										HI	0.12
<ul> <li>botes:</li> <li><sup>a</sup> Based on the maximum or 95 percent upper conconcentration detected at the site.</li> <li><sup>b</sup> Consistent with EPA policy, lead is not evaluate</li> <li><sup>c</sup> Risks associated with indicator compounds are estimates for each site. However, the health hawill be evaluated and reported separately.</li> <li><sup>d</sup> Exposure dose and noncancer hazards were call by segregating total DRO concentrations into a separate set of the set o</li></ul>	ted in the cumulative H included in cumulative azards associated with p lculated for petroleum h	I estimate. risk and haza etroleum mix nydrocarbons	ard tures measured as I		100)			HI HQ Inc mg/kg mg/kd-d na		otient. e pathway. s per kilogram s per kilogram	
		ructions, assa	in B core in	P							
hydrocarbons and 40% aromatic hydrocarbons • Exposure dose and noncancer hazards were cal		ydrocarbons	measured as I	RRO (method)							
by segregating total RRO concentrations into a	aliphatic and aromatic f	ractions, assu	ming 90% ali	phatic							
hydrocarbons and 30% aromatic hydrocarbons											
<ul> <li>Doses and noncancer hazards shown only for n</li> <li>Absorbed doses were calculated for dermal cor of a medium.</li> </ul>	noncarcinogenic chemic ntact with the medium,	and intakes w	ere calculated	for ingestion o	or inhalation						
<ol> <li>Noncancer hazards are unitless values which re effect. They are calculated using the following</li> </ol>	epresent the probability g formula: Noncancer	of incurring a HI = Exposur	an adverse hea e Dose/Refere	alth ence dose.							
#### TABLE F-186

# NONCANCER HAZARD CALCULATIONS FOR A FUTURE PERMANENT RESIDENT SITE 34 - Upper Camp - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Inhalation				Pathwa	y-Specific	Hazard	Chemical
Constituent	Concentration <sup>a</sup> (mg/kg)	Dose (mg/kg-d)	Dose (mg/kg-d)	Dose (mg/kg-d)	Refere Oral		(mg/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HQ
PETROLEUM HYDROCARBONS <sup>c</sup>										· ·	
Diesel Range Organics	1,100	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>
Diesel Range Organics, Aliphatic	880	9.6E-03	Inc	4.8E-07	1.0E-01	na	2.9E-01	9.6E-02	Inc	1.6E-06	0.10
Diesel Range Organics, Aromatic	440	4.8E-03	Inc	2.4E-07	4.0E-02	na	5.7E-01	1.2E-01	Inc	4.2E-07	0.12
Residual Range Organics	1,162	na®	na°	na	na	na	na <sup>°</sup>	na	na°	na	na <sup>e</sup> 0.0057
Residual Range Organics, Aliphatic	1,046	1.1E-02	Inc	5.7E-07	2.0E+00	na	na	5.7E-03	Inc	Inc Inc	0.0037
Residual Range Organics, Aromatic	349	3.8E-03	Inc	1.9E-07	3.0E-02	na	na	1.3E-01	Inc	Inc	0.15
										HI	0.35
<ul> <li><sup>1</sup> Based on the maximum or 95 percent upper confidence concentration detected at the site.</li> <li><sup>2</sup> Consistent with EPA policy, lead is not evaluated restimates for each site. However, the health hazar will be evaluated and reported separately.</li> <li><sup>3</sup> Exposure dose and noncancer hazards were calculated by segregating total DRO concentrations into align hydrocarbons and 40% aromatic hydrocarbons (A Exposure dose and noncancer hazards were calculated by segregating total RRO concentrations into align hydrocarbons and 30% aromatic hydrocarbons (A Doses and noncancer hazards shown only for non Absorbed doses were calculated for dermal contait of a medium.</li> <li><sup>3</sup> Noncancer hazards are unitless values which represented to the following for the set of the set of</li></ul>	in the cumulative Hi cluded in cumulative rds associated with p ated for petroleum h ohatic and aromatic f DEC, 2000c). lated for petroleum h ohatic and aromatic f DEC, 2000c). carcinogenic chemic ct with the medium, t esent the probability	estimate. risk and haza etroleum mix ydrocarbons ractions, assu ydrocarbons ractions, assu als with avail and intakes w of incurring a	ard tures measured as 1 ming 80% al measured as 1 ming 90% al lable toxicity vere calculate an adverse he	iphatic RRO (method iphatic values. d for ingestio ealth	1)	ation		HQ Inc mg/kg mg/kd-d na	Milligram	te pathway. Is per kilograr Is per kilograr	

## TA -187

# NONCANCER HAZARD CALCULATIONS FOR A CURRENT/FUTURE INCIDENTAL VISITOR SITE 34 - Upper Camp - SOIL NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Soil	Soil Ingestion	Dermal	Dust Inhalation					way-Specific H		Chemical
	Concentration <sup>a</sup>	Dose	Dose	Dose		ce Dose (r Dermal	ng/kg-d) Inhalation	Soil Ingestion	Dermal	Dust Inhalation	Specific HO
Constituent	(mg/kg)	(mg/kg-d)	(mg/kg-d)	(mg/kg-d)	Oral	Dermai	Innalation	Ingestion	Dermai	milalation	nų
PETROLEUM HYDROCARBONS <sup>c</sup>											
Diesel Range Organics	1,100	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	na <sup>d</sup>	nad
Diesel Range Organics, Aliphatic	880	2.5E-05	Inc	7.7E-09	1.0E-01	na	2.9E-01	2.5E-04	Inc	2.7E-08	0.00025
Diesel Range Organics, Aromatic	440	1.3E-05	Inc	3.9E-09	4.0E-02	na	5.7E-01	3.1E-04	Inc	6.8E-09	0.00031
Residual Range Organics	1,162	na <sup>e</sup>	na	nae	na	nae	na	na°	na°	na <sup>e</sup>	na <sup>e</sup>
Residual Range Organics, Aliphatic	1,046	3.0E-05	Inc	9.2E-09	2.0E+00	na	na	1.5E-05	Inc	Inc	0.000015
Residual Range Organics, Aromatic	349	1.0E-05	Inc	3.1E-09	3.0E-02	na	na	3.3E-04	Inc	Inc	0.00033
										HI	0.00091
Dtes:											
Based on the maximum or 95 percent upper	confidence limit (95% U	UCL) on the n	nean					HI	Hazard index	κ.	
concentration detected at the site.								HQ	Hazard quoti	ent.	
<sup>o</sup> Consistent with EPA policy, lead is not evaluate	nated in the cumulative	HI estimate.						Inc	Incomplete p	athway.	
<sup>e</sup> Risks associated with indicator compounds a			zard					mg/kg	Milligrams p	er kilogram.	
estimates for each site. However, the health								mg/kd-d	Milligrams p	er kilogram pe	r day.
will be evaluated and reported separately.		•						na	not available		
<sup>d</sup> Exposure dose and noncancer hazards were	calculated for petroleum	hydrocarbon	s measured a	s DRO (meth	od 8100)						
by segregating total DRO concentrations int											
hydrocarbons and 40% aromatic hydrocarbo			U								
• Exposure dose and noncancer hazards were		hydrocarbon	s measured a	s RRO (meth	od)						
by segregating total RRO concentrations int											
		indetione, ac									
hydrocarbons and 30% aromatic hydrocarbo		icals with an	ailable toxicit	v values							
) Doses and noncancer hazards shown only fo ) Absorbed doses were calculated for dermal of	r noncarcinogenic chem	and intakes	were calcula	ted for ingesti	on or inhalation	on					
of a medium	contact with the medium	, and makes									
Noncancer hazards are unitless values which	represent the probabilit	y of incurring	g an adverse l	health							
effect. They are calculated using the following	ing formula: Noncance	HI = Expos	ure Dose/Ref	erence dose.							

# APPENDIX G

Ecological Tier 1 Screening Tables



#### Tabl Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 3 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data					Ecological	<b>COPEC Screenin</b>	
	Maximum	Minimum	Numb	er of	Detection	BUTL	(mg/kg)	<b>Benchmark</b> <sup>a</sup>		COPEC
Constituent	Detect (mg/kg)		Samples	Detects	Frequency	Soil Tundra	a Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics										
Chromium	12	9.8	2	2	1.0	48	50	5	0.5	No
Copper	22	9	2	2	1.0	107	44	61	6.1	No
Lead	119	27	3	3	1.0	106	112	50	5	Yes
Nickel	16	8	2	2	1.0	59	30	30	3	No
Zinc	118	35	2	2	1.0	615	157	120	12	No
VOCs								21.4	2.14	No
Methylene chloride	0.0093	0.0093	1	1	1.0	nc	nc	21.4	2.14	
PCBs										
PCB-1260 (Aroclor 1260)	0.75	0.29	2	2	1.0	nc	nc	0.111	0.0111	Yes
PAHs		10.00	2		0.3	nc	nc	1.98	0.198	Yes
Anthracene	10.29	10.29	3	1			nc	1.98	0.198	Yes
Naphthalene	50.8	50.8	4	1	0.3	nc	ne	1.70		
Petroleum Hydrocarbons										
	3,760	314	3	3	1.0	nc	nc	na	na	Yes
Diesel Range Organics (DRO) TRPH	6,550	393	3	3	1.0	nc	nc	NA <sup>c</sup>	NA	No

Notes:

<sup>a</sup> Ecological Benchmark Criterion selected based on the

following hierarchy:

1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of

Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November. (Table 1)

Table G-1 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 3 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	avel Data		Detection	- BUTL	ma/ka)	Ecological Benchmark <sup>a</sup>	COPEC Screening Benchmark <sup>b</sup>	COPEC?
<b>a</b>	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numbe Samples		Detection Frequency		0.0		(mg/kg)	(Yes/No)
Constituent										
<ol> <li>The lower of ORNL mammalian or avi Toxicological Benchmarks for Wildlife</li> </ol>	: 1996 Revision.	June. (ORNL, 1	996). (Apper	Idix D Ta	ole 12-NOA	EL-Based Bend	chmark for Fo	od.)		
<sup>b</sup> Ecological risk-based screening criteria	(ERBSC) is equal	to one-tenth the	ecological be	nchmark	criterion.					
<sup>c</sup> TRPH is excluded as a COPEC due to or	utdated analysis m	nethods.								
BUTL - Background upper tolerance limit										
COPEC - Chemical of potential ecological mg/kg - Milligrams per kilogram.	l concern.									
na - Not available. NA - Not applicable.										
VOCs - Volatile Organic Compounds PCB - Polychlorinated Biphenyls										
PAH - Polynuclear Aromatic Hydrocarbon TRPH - Total Residual Petroleum Hydroc	arbons									

#### Table 3-2 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Subsurface Water Site 3 Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsurf	face Water	Data				Ecological	COPEC Screening	
	Maximum	Maximum	Numb	er of	Detection	Subsurface Wate	r BUTL (mg/L)	Benchmark <sup>a</sup>	<b>Benchmark</b> <sup>b</sup>	COPEC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
VOCs				÷.,	10			3.2	0.32	No
Ethylbenzene	0.066	0.066	1	1	1.0	na	na			
Xylenes	0.54	0.54	1	1	1.0	nc	nc	na	na	Yes
PAHs										
Fluorene	0.0012	0.0012	1	1 1	1.0	nc	nc	0.03	0.003	No
Naphthalene	0.013	0.013	1	1	1.0	nc	nc	0.62	0.062	No
· · · · · · · · · · · · · · · · · · ·										
Petroleum Hydrocarbons										
	14	1.8	4	4	1.0	nc	nc	na	na	Yes
Diesel Range Organics (DRO)								na	na	Yes
Residual Range Organics (RRO)	8.1	1.3	3	3	1.0	nc	nc	na	na	100

#### Notes:

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated

with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

1) USEPA National Ambient Water Quality Criteria - Freshwater Chronic Value

NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

2) USEPA National Ambient Water Quality Criteria - Marine Chronic Value

NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

3) USEPA National Ambient Water Quality Criteria - Freshwater Acute Value divided by 10

NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

 USEPA National Ambient Water Quality Criteria - Marine Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

5) Lowest Chronic Value observed in freshwater daphnids ORNL, 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. November. Table 1. Summary of conventional benchmarks for priority contaminants in fresh water.

NA - Not applicable.
mg/L - Milligrams per liter.
BUTL - Background upper tolerance limit.
COPEC - Chemical of potential ecological concern.
na - Not available.
nc - Not calculated.
VOCs - Volatile Organic Compounds
PAH - Polynuclear Aromatic Hydrocarbons

#### Table G-3 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 4

Northeast Cape, St. Lawrence Island, Alaska

		Soil Tur	dra Data				Soil Gra	vel Data						COPEC Screening Benchmark <sup>b</sup>	g COPEC?
	Maximum	Minimum	Numb	per of	Detection	Maximum	Minimum		ber of	Detection	BUTL		Benchmark*		(Yes/No)
Constituent			Samples	Detects	Frequency	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(165/140)
PAHs						14	14	1	1	1.0	nc	nc	1.98	0.198	Yes
Anthracene	na	na	na	na	na		1.75.03	÷		1.0	nc	nc	1.98	0.198	Yes
Chrysene	na	na	na	na	na	11	11	1					30	3.0	Yes
Fluorene	na	na	na	na	na	13	13	1	1	1.0	nc	nc	50	5.0	100
Petroleum Hydrocarbons									÷	10		nc	na	na	Yes
Diesel Range Organics (DRO)	5,300	150	3	3	1.0	459	459	1	1	1.0	nc				Yes
Residual Range Organics (RRO)	na	na	na	na	па	3,420	3,420	1	1	1.0	nc	nc	na	na	No
TRPH	47,000	690	3	3	1.0	na	па	na	na	na	nc	nc	NA <sup>d</sup>	NA	No

Notes:

\* Ecological Benchmark Criterion selected based on the following hierarchy:

1) ECO-SSLs Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November. (Table 1) Soil invertebrate benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. (Table 1)

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil. Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.)

<sup>b</sup> Benchmark Criteria is equal to 1/10 the indicated regulatory criteria.

<sup>e</sup> Soil Screening Criteria are not available for this essential nutrient. This analyte is excluded as a COPEC based on essential nutrient status.

<sup>d</sup> TRPH is excluded as a COPEC due to outdated analysis methods.

NA - Not applicable. mg/kg - Milligrams per kilogram. BUTL - Background upper tolerance limit. COPEC - Chemical of potential ecological concern. na - Not available. nc - Not calculated. PAHs - Polynuclear Aromatic Hydrocarbons TRPH - Total Residual Petroleum Hydrocarbons

#### Ta

# Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Subsurface Water

Site 4

#### Northeast Cape, St. Lawrence Island, Alaska

		Shallow Subsur	face Water	Data				Ecological	COPEC Screening	
	Maximum	Maximum	Numb	per of	Detection	Subsurface Wate	er BUTL (mg/L)	_ Benchmark <sup>®</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Shallow	Deep	(mg/L)	(mg/L)	(Yes/No)
VOCs										
Xylenes	0.0069	0.0069	1	1	1.0	nc	nc	na	na	Yes
Petroleum Hydrocarbons										
Diesel Range Organics (DRO)	3.7	0.96	4	4	1.0	nc	nc	na	na	Yes
Residual Range Organics (RRO)	6.5	2.6	3	3	1.0	nc	nc	na	na	Yes

Notes:

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media

Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

- USEPA National Ambient Water Quality Criteria Freshwater Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- USEPA National Ambient Water Quality Criteria Marine Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- USEPA National Ambient Water Quality Criteria Freshwater Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- USEPA National Ambient Water Quality Criteria Marine Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

5) Lowest Chronic Value observed in freshwater daphnids

ORNL, 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. November. Table 1. Summary of conventional benchmarks for priority contaminants in fresh water.

NA - Not applicable. mg/L - Milligrams per liter. BUTL - Background upper tolerance limit. COPEC - Chemical of potential ecological concern. na - Not available. nc - Not calculated. VOCs - Volatile Organic Compounds

#### T:

## Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil

Site 6

Northeast Cape, St. Lawrence Island, Alaska

		Soil Tur	dra Data				Soil Gr	avel Data					Ecological (	COPEC Screenin	
			Numb	er of	Detection	Maximum	Minimum	Numl	ber of	Detection	BUTL	mg/kg)	Benchmark'	Benchmark <sup>b</sup>	COPEC
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)				Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics															
Aluminum	9,850	9,850	1	1	1.0	7,790	7,790	1	1	1.0	30,357	nc	50	5	Yes
Arsenic	4.1	4.1	1	1	1.0	1.6	1.6	1	1	1.0	7.8	11	37	3.7	No
Barium	54	54	1	1	1.0	53	53	1	1	1.0	174	nc	500	50	No
Beryllium	0.80	0.80	4	1	0.25	1.3	0.6	9	2	0.2	3.8	nc	10	1	No
Cadmium						2.0	1.5	9	5	0.6	1.4	3.1	0.38	0.038	No
Calcium	2,360	2,360	1	1	1.0	1,790	1,790	1	1	1.0	nc	nc	NA°	NA	No
Chromium	20	14	4	3	0.75	18	6.0	9	9	1.0	48	50	5	0.5	No
Cobalt	5.1	5.1	1	1	1.0	2.0	2.0	1	1	1.0	49	nc	32	3.2	No
Copper	23	8.0	4	4	1.0	17	7.4	9	9	1.0	107	44	61	6.1	No
Iron	16,400	16,400	1	1	1.0	12,200	12,200	1	1	1.0	nc	nc	NA °	NA	No
Lead	34	13	4	4	1.0	71	8.0	9	9	1.0	106	112	50	5	No
Magnesium	2,900	2,900	1	1	1.0	1,530	1,530	1	1	1.0	nc	nc	NA <sup>c</sup>	NA	No
Manganese	164	164	1	1	1.0	73	73	1	1	1.0	1,589	nc	500	50	Yes
Nickel	15	9.0	4	3	0.75	10	5.0	9	9	1.0	59	30	30	3	No
Potassium	820	820	1	1	1.0	1,500	1,500	1	1	1.0	nc	nc	NA °	NA	No
	160	160	1	1	1.0	450	450	1	1	1.0	nc	nc	NA °	NA	No
Sodium	100	100		·		0.29	0.29	2	1	0.5	1.6	0.56	1	0.1	No
Thallium	26	26	1	1	1.0	16	16	1	1	1.0	73	nc	2	0.2	No
Vanadium	93	29.8	4	4	1.0	172	20	9	9	1.0	615	157	120	12	Yes
Zinc	93	29.8	•	•											
VOCs										0.11		nc	52.2	5.22	No
Ethylbenzene	0.00088	0.00088	5	1	0.20	0.012	0.012	9	1	0.11	nc		4.162	0.4162	No
m,p-Xylene	0.0033	0.0033	2	1	0.50	0.044	0.044	3	1	0.33	nc	nc	21.4	2.14	No
Methylene chloride	0.0076	0.0076	1	1	1.0	0.0079	0.0044	2	2	1.0	nc	nc	4.162	0.4162	No
o-Xylene	0.001	0.001	2	1	0.50	0.014	0.014	3	1	0.33	nc	nc	200	20	No
Toluene	0.0047	0.0047	5	1	0.20	0.078	0.0052	9	3	0.33	nc	nc	200	20	110
Petroleum Hydrocarbons										1.0			na	na	Yes
Diesel Range Organics (DRO)	4,660	34	4	4	1.0	102,000	12	13	13	1.0	nc	nc		na	Yes
Residual Range Organics (RRO)	220	220	1	1	1.0	8,500	880	5	5	1.0	nc	nc	na NA <sup>d</sup>	NA	No
TRPH	19,200	31	3	3	1.0	262,000	67	8	8	1.0	nc	nc	NA	IN/A	110

Notes:

\* Ecological Benchmark Criterion selected based on the following hierarchy:

1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November. (Table 1) Soil invertebrate benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. (Table 1)

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil. Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.)

<sup>b</sup> Ecological risk-based screening criteria (ERBSC) is equal to one-tenth the ecological benchmark criterion.

\* Soil Screening Criteria are not available for this essential nutrient. This analyte is excluded as a COPEC based on essential nutrient status.

#### Table G-5 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 6 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tur	dra Data	-			Soil Gra	avel Data				COPEC Screening	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numl		Detection Frequency	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb Samples	Detection Frequency	BUTL (mg/kg) Soil Tundra Soil Gravel	Benchmark' (mg/kg)	Benchmark <sup>b</sup> (mg/kg)	COPEC? (Yes/No)
TRPH is excluded as a COPEC due to ou													
NA - Not applicable.													
mg/kg - Milligrams per kilogram. BUTL - Background upper tolerance limit. COPEC - Chemical of potential ecological													
na - Not available. nc - Not calculated. VOCs - Volatile Organic Compounds													
TRPH - Total Residual Petroleum Hydroca	arbons												

#### 

	Eph	emeral Surface	Water Cond	entration		BUTL	(mg/L)	Ecological	COPEC Screening	
Constituent	Maximum Detect (mg/L)	Minimum Detect (mg/L)	Numb Samples		Detection Frequency	Fresh Surface Water	Ephemeral Surface Water	Benchmark <sup>a</sup> (mg/L)	Benchmark <sup>b</sup> (mg/L)	COPEC (Yes/No
Constituent	Detect (ing D)	Dettett (ing 13)								
Inorganics, Total										62
Lead	0.005	0.005	2	1	0.50	nc	0.014	0.003	0.00025	No
Zinc	0.1	0.1	2	1	0.50	nc	0.90	0.11	0.011	No
Inorganics, Dissolved										
Zinc, Dissolved	0.06	0.06	2	1	0.50	nc	0.093	0.11	0.011	No
Petroleum Hydrocarbons										
Diesel Range Organics (DRO)	1.8	1.8	3	1	0.33	nc	nc	na	na	Yes
TRPH	16	1.3	2	2	1.0	nc	nc	NA c	NA	No

#### Notes:

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media

<sup>b</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

 USEPA National Ambient Water Quality Criteria - Freshwater Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

- USEPA National Ambient Water Quality Criteria Marine Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- USEPA National Ambient Water Quality Criteria Freshwater Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- USEPA National Ambient Water Quality Criteria Marine Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- Lowest Chronic Value observed in freshwater daphnids ORNL, 1996. Toxicological Benchmarks for Screening Potential
  - Table 1. Summary of conventional benchmarks for priority contaminants in fresh water.
- <sup>c</sup> TRPH is excluded as a COPEC due to outdated analysis methods.

NA - Not applicable.

- mg/L Milligrams per liter.
- BUTL Background upper tolerance limit.
- COPEC Chemical of potential ecological concern.
- na Not available.
- nc Not calculated.

# Table G-7 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 7 Northeast Cape, St. Lawrence Island, Alaska

	. <u></u>	Soil Tun	dra Data			-		Ecological Benchmark <sup>a</sup>	COPEC Screening Benchmark <sup>b</sup>	COPEC?
	Maximum	Minimum	Numb	and the second se	Detection	and the second se	(mg/kg)			
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics										
Aluminum	12,000	3,640	5	5	1.0	30,357	nc	50	5	No
Arsenic	50	2.0	18	18	1.0	7.8	11	37	3.7	Yes
Barium	135	28	5	5	1.0	174	nc	500	50	No
Beryllium	2.3	0.40	19	8	0.42	3.8	nc	10	1	No
Cadmium	4.1	1.0	19	9	0.47	1.4	3.1	0.38	0.038	Yes
Calcium	5,070	1780	5	5	1.0	nc	nc	NA <sup>c</sup>	NA	No
Chromium	100	5.0	19	18	0.95	48	50	5	0.5	Yes
Cobalt	19	2.0	5	5	1.0	49	nc	32	3.2	No
	320	6.6	19	19	1.0	107	44	61	6.1	Yes
Copper	152,000	8,380	5	5	1.0	nc	nc	NA <sup>c</sup>	NA	No
fron	460	10	20	20	1.0	106	112	50	5	Yes
Lead	3,180	740	5	5	1.0	nc	nc	NA <sup>c</sup>	NA	No
Magnesium	694	55.3	5	5	1.0	1,589	nc	500	50	No
Manganese	0.56	0.10	18	4	0.22	0.43	nc	0.1	0.01	Yes
Mercury		5.0	19	16	0.84	59	30	30	3	Yes
Nickel	280	370	5	5	1.0	nc	nc	NA <sup>c</sup>	NA	No
Potassium	1,080	2.0	19	2	0.11	nc	nc	2	0.2	Yes
Silver	2.0		5	5	1.0	nc	nc	NA <sup>c</sup>	NA	No
Sodium	210	120		2	1.0	1.6	0.56	1	0.1	No
Thallium	1.2	0.28	2		1.0	73	nc	2	0.2	No
Vanadium	31	9.8	5	5		615	157	120	12	No
Zinc	540	29	19	19	1.0	015	157	120		
VOCs					0.20		nc	2,060	206	No
1,1,1-Trichloroethane	0.28	0.14	10	3	0.30	nc		36.6	3.66	No
Acetone	1.4	0.048	10	4	0.40	nc	nc	na	na	Yes
Bromomethane	0.40	0.098	10	5	0.50	nc	nc	4.162	0.4162	No
m,p-Xylene	0.13	0.13	10	1	0.10	nc	nc	21.4	2.14	No
Methylene chloride	0.013	0.0065	9	4	0.44	nc	nc	21.4	20	No
Toluene	0.14	0.026	19	3	0.16	nc	nc	200	20	

# Table G-7 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 7 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data			_		Ecological	COPEC Screenin	
	Maximum	Minimum	Numb	er of	Detection	BUTL	(mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC
Constituent		Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
7.3										
SVOCs										
4-Methylphenol (p-Cresol)	3.85	1.65	14	3	0.21	nc	nc	30	3	Yes
Di-n-butyl phthalate	3.04	3.04	14	1	0.07	nc	nc	200	20	No
PCBs								0.111	0.0111	Yes
PCB-1260 (Aroclor 1260)	13	0.13	22	4	0.18	nc	nc	0.111	0.0111	105
Dioxins & Furans 1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00052	0.0000011	13	4	0.31	nc	nc	0.00006	0.000006	Yes
		0.00000091	13	12	0.92	nc	nc	0.00006	0.000006	Yes
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxi	0.020	0.0000000000000000000000000000000000000	12	4	0.33	nc	nc	0.00006	0.000006	Yes
1,2,3,4,6,7,8-Heptachlorodibenzofuran		0.00000043	13	8	0.62	nc	nc	0.00006	0.000006	Yes
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin		0.00000047	13	1	0.02	nc	nc	0.00006	0.000006	No
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0000013	0.0000013	13	4	0.31	nc	nc	0.00006	0.000006	Yes
1,2,3,4,7,8-Hexachlorodibenzofuran	0.000027		13	4	0.08	nc	nc	0.00006	0.000006	No
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0000020	0.0000020	13	1	0.08	nc	nc	0.00006	0.000006	Yes
1,2,3,6,7,8-Hexachlorodibenzofuran	0.000011	0.000011	13	4	0.31	nc	nc	0.00006	0.000006	Yes
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.000046	0.00000019		4	0.08	nc	nc	0.00006	0.000006	No
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0000040	0.00000040	13	2	0.08	nc	nc	0.00006	0.000006	Yes
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.000031	0.0000051	13	2	0.13	nc	nc	0.00059	0.000059	No
1,2,3,7,8-Pentachlorodibenzofuran	0.0000045	0.0000045	13		0.08	nc	nc	0.00006	0.000006	No
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0000015	0.0000015	13	1	0.08	nc	nc	0.00006	0.000006	Yes
2,3,4,6,7,8-Hexachlorodibenzofuran	0.000019	0.00000041	13	8 1	0.02	nc	nc	0.00006	0.000006	Yes
2,3,4,7,8-Pentachlorodibenzofuran	0.000012	0.000012	13	-	0.08	nc	nc	8E-07	0.0000008	Yes
2,3,7,8-Tetrachlorodibenzofuran	0.000029	0.0000028	13	6	0.40	nc	nc	0.00006	0.000006	Yes
Total Heptachlorodibenzofurans (HpCDF		0.00053	3	1 2	0.33	nc	nc	0.00006	0.000006	Yes
Total Heptachlorodibenzo-p-dioxins (HpC		0.000095	3	2	0.33	nc	nc	0.00006	0.000006	Yes
Total Hexachlorodibenzofurans (HxCDF)		0.00019		-	0.33	nc	nc	0.00006	0.000006	Yes
Total Hexachlorodibenzo-p-dioxins (HxC		0.00034	3	1			nc	0.00006	0.000006	Yes
Total Pentachlorodibenzofurans (PeCDF)	0.00011	0.00011	3	1	0.33	nc	ne	0.00000		

#### Tal Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 7 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data					Ecological	<b>COPEC Screenin</b>	g
	Maximum	Minimum	Numb	er of	Detection	BUTL	(mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Total Tetrachlorodibenzofurans (TCDF)	0.00015	0.00015	3	1	0.33	nc	nc	8E-07	0.0000008	Yes
Total Tetrachlorodibenzo-p-dioxins (TCD		0.000039	3	1	0.33	nc	nc	8E-07	0.0000008	Yes
PAHs										
2-Methylnaphthalene	0.047	0.047	19	1	0.053	nc	nc	1.98	0.198	No
Benzo(a)pyrene	0.082	0.082	19	1	0.053	nc	nc	1.98	0.198	No
Benzo(b)fluoranthene	0.014	0.014	19	1	0.053	nc	nc	1.98	0.198	No
Benzo(k)fluoranthene	0.014	0.014	19	1	0.053	nc	nc	1.98	0.198	No
	0.035	0.013	19	2	0.11	nc	nc	1.98	0.198	No
Chrysene	0.027	0.027	20	1	0.050	nc	nc	1.98	0.198	No
Naphthalene	0.027	0.014	19	1	0.053	nc	nc	1.98	0.198	No
Phenanthrene Pyrene	0.026	0.013	19	2	0.11	nc	nc	1.98	0.198	No
Petroleum Hydrocarbons	22.000	11	24	21	0.88	nc	nc	na	na	Yes
Diesel Range Organics (DRO)	32,000	11	24 7	7	1.0	nc	nc	na	na	Yes
Residual Range Organics (RRO) TRPH	3,900 156,000	620 18	14	14	1.0	nc	nc	NA <sup>d</sup>	NA	No

#### Notes:

<sup>a</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November. (Table 1)

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil.

Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.) <sup>b</sup> Ecological risk-based screening criteria (ERBSC) is equal to one-tenth the ecological benchmark criterion.

<sup>c</sup> Soil Screening Criteria are not available for this essential nutrient. This analyte is excluded as a COPEC based on essential nutrient status.

<sup>d</sup> TRPH is excluded as a COPEC due to outdated analysis methods.

Table G-7 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 7 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data					Ecological	COPEC Screening	5.5
	Maximum	Minimum	Numb	er of	Detection	BU	TL (mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
onstituent		Detect (mg/kg)	Samples	Detects	Frequency	Soil Tun	dra Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
A - Not applicable.										
UTL - Background upper tolerance limit										
OPEC - Chemical of potential ecologica	concern.									
g/kg - Milligrams per kilogram.										
a - Not available.										
c - Not calculated.										
OCs - Volatile Organic Compounds										
VOCs - Semivolatile Organic Compound	ls									
CB - Polychlorinated Biphenyls										
AH - Polynuclear Aromatic Hydrocarbo	ns									
RPH - Total Residual Petroleum Hydroc										

# Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Site 7 Northeast Cape, St. Lawrence Island, Alaska

	Eph	emeral Surface	Water Con	centration		BUTL	(mg/L)	Ecological	<b>COPEC Screening</b>	
		2	Numb		Detection	Fresh Surface	Ephemeral	Benchmark	Benchmark <sup>b</sup>	COPEC
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)	Samples	Detects	Frequency	Water	Surface Water	(mg/L)	(mg/L)	(Yes/No
			8							
Inorganics, Total						1020020	2.2	0.087	0.0087	No
Aluminum	0.32	0.24	2	2	1.0	nc		0.087	0.015	Yes
Arsenic	0.0165	0.0165	5	1	0.20	nc	nc			Yes
Barium	0.012	0.008	2	2	1.0	nc	0.034	na	na NA	No
Calcium	4.99	3.32	2	2	1.0	nc	nc	NA c		
Chromium	0.020	0.020	5	1	0.20	nc	nc	0.074	0.0074	Yes
Copper	0.075	0.0020	5	3	0.60	nc	0.083	0.009	0.0009	No
Iron	3.66	1.16	2	2	1.0	nc	nc	NA c	NA	No
Lead	0.065	0.0020	5	5	1.0	nc	0.014	0.003	0.00025	Yes
Magnesium	1.44	1.28	2	2	1.0	nc	nc	NA c	NA	No
	0.096	0.0070	2	2	1.0	nc	0.12	1.1	0.11	No
Manganese	0.0525	0.0525	5	1	0.20	nc	nc	0.052	0.0052	Yes
Nickel	0.81	0.81	2	1	0.50	nc	nc	NA c	NA	No
Potassium	6.29	4.72	2	2	1.0	nc	nc	NA c	NA	No
Sodium		0.0024	5	1	0.20	nc	nc	0.04	0.004	Yes
Thallium	0.0024		5	5	1.0	nc	0.90	0.11	0.011	No
Zinc	0.81	0.019	3	5	1.0	ne				
Inorganics, Dissolved					0.22		20	1E-05	0.0000012	Yes
Mercury, Dissolved	0.000375	0.000375	3	1	0.33	nc	nc	0.04	0.004	Yes
Thallium, Dissolved	0.0012	0.0012	3	1	0.33	nc	nc	0.04	0.011	No
Zinc, Dissolved	0.07	0.07	3	1	0.33	nc	0.093	0.11	0.011	110
VOCs								-	0.5	No
Toluene	0.0038	0.0038	5	1	0.20	nc	nc	5	0.5	NO
Dission & Francisco										V
Dioxins & Furans	0.0000052	0.0000052	3	1	0.33	nc	nc	1E-08	0.00000001	Yes
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.00000071	0.00000071	3	1	0.33	nc	nc	1E-08	0.00000001	Yes
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin		0.0000014	3	1	0.33	nc	nc	1E-08	0.00000001	Yes
Total Heptachlorodibenzo-p-dioxins (HpCDD)	0.0000014	0.000014	5		0.00					
Petroleum Hydrocarbons			5	2	0.40	nc	nc	na	na	Yes
DRO	11.6	0.20	5	2			nc	NA d	NA	No
TRPH	6.25	6.25	3	1	0.33	nc	ne		10000	

#### Notes:

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media

<sup>b</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

1) USEPA National Ambient Water Quality Criteria - Freshwater Chronic Value

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# Table G-8 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Site 7 Northeast Cape, St. Lawrence Island, Alaska

	Eph	emeral Surface	Water Con	centration	n	BUTL	(mg/L)	Ecological	<b>COPEC Screening</b>	;	
	Maximum	Maximum	Numb		Detection	Fresh Surface	Ephemeral	Benchmark		COPEC?	
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Water	Surface Water	(mg/L)	(mg/L)	(Yes/No)	
NOAA, 1999. Screening Quick Referen	ce Tables (SQuiRT).	September.									
2) USEPA National Ambient Water Quality											
NOAA, 1999. Screening Quick Referen											
3) USEPA National Ambient Water Quality			ided by 10								
NOAA, 1999. Screening Quick Referen											
4) USEPA National Ambient Water Quality			by 10								
NOAA, 1999. Screening Quick Referen											
<ol> <li>Lowest Chronic Value observed in fresh ORNL, 1996. Toxicological Benchmark</li> </ol>	water daphnids										
Table 1. Summary of conventional benc	hmarks for priority co	ontaminants in fre	sh water								
<sup>c</sup> Soil Screening Criteria are not available for	or this essential nutrie	nt. This analyte is	s excluded a	as a COPE	C based on ess	sential nutrient statu	15				
<sup>d</sup> TRPH is excluded as a COPEC due to out											
NA - Not applicable. mg/L - Milligrams per liter.											
BUTL - Background upper tolerance limit. COPEC - Chemical of potential ecological c	concern.										
na - Not available. nc - Not calculated. TRPH - Total residual petroleum hydrocarbo	ons.										

# 

		Soil Tun	dra Data					Ecological	<b>COPEC</b> Screening	
	Maximum	Minimum	Numb	er of	Detection	BUTL (	mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent		Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics										
Aluminum	0.0000036	0.0000036	5	1	0.20	30,357	nc	50	5	No
Antimony	14	14	15	1	0.067	nc	nc	0.29	0.029	Yes
Arsenic	20	3.6	15	7	0.47	7.8	11	37	3.7	Yes
Beryllium	3.55	0.70	15	5	0.33	3.8	nc	10	1	No
Cadmium	7.0	0.75	15	4	0.27	1.4	3.1	0.38	0.038	Yes
Calcium	4,940	1910	5	5	1.0	nc	nc	NA <sup>c</sup>	NA	No
Chromium	60	5.0	15	14	0.93	48	50	5	0.5	Yes
Cobalt	38	4.0	5	4	0.80	49	nc	32	3.2	No
Copper	429	6.0	15	15	1.0	107	44	61	6.1	Yes
Iron	483,000	13,000	5	5	1.0	nc	nc	NA °	NA	No
Lead	630	20	15	14	0.93	106	112	50	5	Yes
Magnesium	3,220	930	5	5	1.0	nc	nc	NA <sup>c</sup>	NA	No
Manganese	970	51	5	5	1.0	1,589	nc	500	50	No
Mercury	0.60	0.60	15	1	0.07	0.43	nc	0.1	0.01	Yes
Nickel	110	7.7	15	11	0.73	59	30	30	3	Yes
Potassium	1,060	650	5	4	0.80	nc	nc	NA <sup>c</sup>	NA	No
Selenium	1.0	1.0	15	1	0.07	nc	nc	1	0.1	Yes
Sodium	280	180	5	5	1.0	nc	nc	NA <sup>c</sup>	NA	No
Thallium	0.28	0.28	2	1	0.50	1.6	0.56	1	0.1	No
Vanadium	44	21	5	4	0.80	73	nc	2	0.2	No
Zinc	1,790	15	15	15	1.0	615	157	120	12	Yes
VOCs										
	0.20	0.20	8	1	0.13	nc	nc	2060	206	No
1,1,1-Trichloroethane	0.00018	0.000040	15	3	0.20	nc	nc	20	2	No
1,2,4-Trichlorobenzene	0.000010	0.0000097	8	2	0.25	nc	nc	na	na	Yes
1,2-Dibromoethane	0.025	0.0000016	15	7	0.47	nc	nc	na	na	Yes
1,2-Dichlorobenzene 1,2-Dichloroethane	0.00079	0.000014	8	5	0.63	nc	nc	14.2	1.42	No

# Table G-9 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 9 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data					Ecological	COPEC Screening	g COPEC?
	Maximum	Minimum	Numb	oer of	Detection	BUTL (		Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
1,2-Dichloropropane	0.00040	0.0000070	8	4	0.50	nc	nc	700	70	No
1,3,5-Trimethylbenzene	0.00018	0.0000013	8	5	0.63	nc	nc	52.2	5.22	No
1,3-Dichlorobenzene	0.068	0.0000025	15	7	0.47	nc	nc	na	na	Yes
1,3-Dichloropropane	0.000097	0.00000059	8	5	0.63	nc	nc	na	na	Yes
1,4-Dichlorobenzene	0.025	0.000014	15	3	0.20	nc	nc	20	2	No
2,2-Dichloropropane	0.0000092	0.0000092	8	1	0.13	nc	nc	na	na	Yes
2-Butanone	0.0000045	0.00000059	8	2	0.25	nc	nc	6,487	649	No
2-Chloroethyl vinyl ether	0.0000026	0.00000054	5	2	0.40	nc	nc	na	na	Yes
2-Chlorotoluene	0.0000045	0.0000013	8	2	0.25	nc	nc	na	na	Yes
2-Hexanone	0.0000087	0.0000078	5	2	0.40	nc	nc	na	na	Yes
4-Bromophenyl phenyl ether	0.0000024	0.0000012	10	2	0.20	nc	nc	na	na	Yes
4-Chlorophenyl phenyl ether	0.0000029	0.00000064	10	2	0.20	nc	nc	na	na	Yes
4-Isopropyltoluene	0.0000047	0.00000077	8	3	0.38	nc	nc	na	na	Yes
	0.000013	0.0000048	8	2	0.25	nc	nc	36.6	3.66	No
Acetone Bromomethane	0.36	0.36	8	1	0.13	nc	nc	na	na	Yes
	0.014	0.014	8	1	0.13	nc	nc	300	30	No
Styrene	6.0	0.23	16	2	0.13	nc	nc	200	20	No
Toluene	0.0	0.20								
			1							
SVOCs	0.0000032	0.0000032	10	1	0.10	nc	nc	9	0.9	No
2,4,5-Trichlorophenol	0.0000032	0.0000011	10	2	0.20	nc	nc	10	1	No
2,4,6-Trichlorophenol	0.0000025	0.00000034	10	2	0.20	nc	nc	na	na	Yes
2,4-Dichlorophenol	0.0000013	0.0000014	10	1	0.10	nc	nc	na	na	Yes
2,4-Dimethylphenol	0.0000014	0.0000014	10	1	0.10	nc	nc	20	2	No
2,4-Dinitrophenol	0.0000016	0.0000016	10	1	0.10	nc	nc	na	na	Yes
2,4-Dinitrotoluene	0.0000016	0.0000016	10	1	0.10	nc	nc	na	na	Yes
2,6-Dinitrotoluene		0.00000022	10	3	0.30	nc	nc	na	na	Yes
2-Methyl-4,6-dinitrophenol	0.0000037	0.00000022	10	1	0.10	nc	nc	na	na	Yes
2-Methylphenol (o-Cresol)		0.00000033	10	1	0.10	nc	nc	na	na	Yes
3,3-Dichlorobenzidine	0.00000068		10	2	0.10	nc	nc	na	na	Yes
3-Nitroaniline	0.0000019	0.0000080	10	2	0.20	ne				

# Ta.... 9 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 9 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data					Ecological	<b>COPEC</b> Screening	g
-	Maximum	Minimum	Numb	er of	Detection	BUTL (	mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent		Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
4-Chloroaniline	0.0000026	0.00000061	10	2	0.20	nc	nc	na	na	Yes
4-Chlorotoluene	0.025	0.0000043	8	4	0.50	nc	nc	na	na	Yes
4-Nitroaniline	0.000030	0.000030	10	1	0.10	nc	nc	na	na	Yes
4-Nitrophenol	0.00013	0.000088	10	3	0.30	nc	nc	7	0.7	No
bis-(2-ethylhexyl)phthalate	1.0	1.0	10	1	0.10	nc	nc	200	20	No
PCBs										
PCB-1260 (Aroclor 1260)	0.13	0.13	15	1	0.067	nc	nc	0.111	0.0111	Yes
Pesticides			•							
4,4'-DDD	0.0000019	0.0000019	10	1	0.10	nc	nc	0.002	0.0002	No
4,4'-DDE	0.0000016	0.0000016	10	1	0.10	nc	nc	0.002	0.0002	No
4,4'-DDT	0.00000054	0.0000017	10	3	0.30	nc	nc	0.002	0.0002	No
Dioxins & Furans										
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00012	0.000038	10	6	0.60	nc	nc	6E-05	0.000006	Yes
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxi	0.0011	0.0000070	10	9	0.90	nc	nc	6E-05	0.000006	Yes
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.000030	0.0000025	10	7	0.70	nc	nc	6E-05	0.000006	Yes
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxii	0.00012	0.00000059	10	8	0.80	nc	nc	6E-05	0.000006	Yes
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.000023	0.0000023	9	1	0.11	nc	nc	6E-05	0.000006	No
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0000066	0.0000023	10	4	0.40	nc	nc	6E-05	0.000006	Yes
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.0000029	0.0000011	10	4	0.40	nc	nc	6E-05	0.000006	No
1,2,3,6,7,8-Hexachlorodibenzofuran	0.0000016	0.0000014	10	2	0.20	nc	nc	6E-05	0.000006	No
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.0000045	0.00000059	9	2	0.22	nc	nc	6E-05	0.000006	No
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0000038	0.0000038	10	1	0.10	nc	nc	6E-05	0.000006	No
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.000083	0.0000012	10	4	0.40	nc	nc	6E-05	0.000006	Yes
1,2,3,7,8-Pentachlorodibenzofuran	0.0000021	0.00000022	10	3	0.30	nc	nc	6E-04	0.000059	No
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0000035	0.0000035	9	1	0.11	nc	nc	6E-05	0.000006	No
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0000032	0.0000080	10	4	0.40	nc	nc	6E-05	0.000006	No
2,3,4,6,7,8-Pentachlorodibenzofuran	0.0000032	0.00000033	10	3	0.30	nc	nc	6E-05	0.000006	No

# Table G-9 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 9 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data					Ecological	<b>COPEC</b> Screening	
		Minimum	Numb	er of	Detection	BUTL (	mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra		(mg/kg)	(mg/kg)	(Yes/No)
2,3,7,8-Tetrachlorodibenzofuran	0.0000066	0.00000026	10	7	0.70	nc	nc	8E-07	0.0000008	Yes
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0000017	0.00000028	10	3	0.30	nc	nc	3E-07	0.0000003	Yes
Total Heptachlorodibenzofurans (HpCDF)	0.000095	0.000095	3	1	0.33	nc	nc	6E-05	0.000006	Yes
Total Heptachlorodibenzo-p-dioxins (HpC	0.00018	0.000040	3	2	0.67	nc	nc	6E-05	0.000006	Yes
Total Tetrachlorodibenzofurans (TCDF)	0.00001	0.0000097	3	2	0.67	nc	nc	8E-07	0.0000008	Yes
DATE										
PAHs	0.0000021	0.0000011	16	2	0.13	nc	nc	1.98	0.198	No
2-Methylnaphthalene	0.000021	0.00000088	16	8	0.50	nc	nc	20	2.0	No
Acenaphthene	0.000025	0.00000099	16	7	0.44	nc	nc	1.98	0.198	No
Acenaphthylene	0.00033	0.0000099	16	1	0.063	nc	nc	1.98	0.198	No
Anthracene		0.057	16	1	0.063	nc	nc	1.98	0.198	No
Benzo(k)fluoranthene	0.057	0.064	16	1	0.063	nc	nc	1.98	0.198	No
Chrysene	0.064 0.023	0.004	16	1	0.063	nc	nc	1.98	0.198	No
Fluoranthene	0.023	0.025	16	1	0.063	nc	nc	1.98	0.198	No
Indeno(1,2,3-cd)pyrene		0.018	16	1	0.063	nc	nc	1.98	0.198	No
Phenanthrene	0.024		16	1	0.063	nc	nc	1.98	0.198	No
Pyrene	0.041	0.041	10		0.005					
Petroleum Hydrocarbons			16	16	1.0	nc	nc	па	na	Yes
Diesel Range Organics (DRO)	510	8.9	16	16	1.0		nc	na	na	Yes
Residual Range Organics (RRO)	2,100	53	6	6	1.0	nc		NA d	NA	No
TRPH	5,260	169	10	10	1.0	nc	nc	INA	1 14 5	

#### Notes:

<sup>a</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November. (Table 1)

#### Tal Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 9 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data				Ecological	COPEC Screening	
		Minimum	Numb	per of	Detection	BUTL (mg/kg)	<b>Benchmark</b> <sup>a</sup>	Benchmark	COPEC?
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)		Detects	Frequency	Soil Tundra Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Constituent	Detect (mg/kg)	Detect (ing ing)							

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil.

Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.)

<sup>b</sup> Ecological risk-based screening criteria (ERBSC) is equal to one-tenth the ecological benchmark criterion.

<sup>c</sup> Soil Screening Criteria are not available for this essential nutrient. This analyte is excluded as a COPEC based on essential nutrient status.

<sup>d</sup> TRPH is excluded as a COPEC due to outdated analysis methods.

NA - Not applicable.

BUTL - Background upper tolerance limit.
COPEC - Chemical of potential ecological concern.
mg/kg - Milligrams per kilogram.
na - Not available.
nc - Not calculated.
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
PCB - Polychlorinated Biphenyls
PAH - Polynuclear Aromatic Hydrocarbons
TRPH - Total Residual Petroleum Hydrocarbons

#### Tal 0 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Site 9

Northeast Cape, St. Lawrence Island, Alaska

	Eph	emeral Surface	Water Con	centration		BUTL	(mg/L)	Ecological	COPEC Screening	
	Maximum	Maximum	Num	per of	Detection	Fresh Surface	Ephemeral	Benchmark <sup>a</sup>		COPEC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Water	Surface Water	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total								0.007	0.0097	No
Aluminum	0.23	0.040	6	6	1.0	nc	2.2	0.087	0.0087	Yes
Barium	0.020	0.0050	6	6	1.0	nc	0.034	na	na	
Calcium	3.0	1.0	6	6	1.0	nc	nc	NA c	NA	No
Copper	0.0040	0.0040	9	1	0.11	nc	0.083	0.009	0.0009	No
Iron	1.5	0.14	6	6	1.0	nc	nc	NA	NA	No
	0.011	0.0060	9	2	0.22	nc	0.014	0.003	0.00025	No
Lead	0.95	0.82	6	6	1.0	nc	nc	NA c	NA	No
Magnesium	0.029	0.0060	6	6	1.0	nc	0.12	1.1	0.11	No
Manganese	1.0	0.52	6	2	0.33	nc	nc	NA c	NA	No
Potassium		4.0	6	6	1.0	nc	nc	NA c	NA	No
Sodium	4.4		9	2	0.22	nc	0.90	0.11	0.011	No
Zinc	0.060	0.011	9	2	0.22	ne	0170			
Inorganics, Dissolved Zinc, Dissolved	0.060	0.060	3	1	0.33	nc	0.093	0.11	0.011	Yes
Dioxins & Furans 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.0000037	0.0000037	3	1	0.33	nc	nc	1E-08	0.000000001	Yes

Notes:

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media

Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

 USEPA National Ambient Water Quality Criteria - Freshwater Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

 USEPA National Ambient Water Quality Criteria - Marine Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

 USEPA National Ambient Water Quality Criteria - Freshwater Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

 USEPA National Ambient Water Quality Criteria - Marine Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

5) Lowest Chronic Value observed in freshwater daphnids

ORNL, 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. November.

Table 1. Summary of conventional benchmarks for priority contaminants in fresh water.

#### Table G-10 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Site 9 Northeast Cape, St. Lawrence Island, Alaska

	Ephemeral Surface	Water Concentration	BUTL (mg/L)	Ecological	COPEC Screening	
	Maximum Maximum	Number of Detection	Fresh Surface Ephemeral	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Maximum Detect (mg/L) Detect (mg/L)	Samples Detects Frequency	Water Surface Water	(mg/L)	(mg/L)	(Yes/No)

° Soil Screening Criteria are not available for this essential nutrient. This analyte is excluded as a COPEC based on essential nutrient status.

NA - Not applicable.

mg/L - Milligrams per liter.

BUTL - Background upper tolerance limit.

COPEC - Chemical of potential ecological concern. na - Not available.

nc - Not calculated.

# Tab.- \_ 1 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 21 Northeast Cape, St. Lawrence Island, Alaska

			Soil Tun	dra Data					Ecological	<b>COPEC Screenin</b>	g
		Maximum	Minimum				-			- · · · b	CODEC
		Detect (mg/kg)	Detect (mg/kg)	Numb		Detection		(mg/kg)	Benchmark <sup>a</sup>		COPEC
Constituent				Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics											
Aluminum		33,100	3,975	10	10	1.00	30,357	nc	50	5	Yes
Antimony		38	38	19	1	0.053	nc	nc	0.29	0.029	Yes
Arsenic		170	2.8	19	19	1.0	7.8	11	37	3.7	Yes
Barium		193	56.5	10	10	1.0	174	nc	500	50	Yes
Beryllium		1.8	0.30	19	9	0.47	3.8	nc	10	1	No
Cadmium		69	0.40	19	8	0.42	1.4	3.1	0.38	0.038	Yes
Calcium		6,910	1,320	10	10	1.0	nc	nc	NA <sup>c</sup>	NA	No
Chromium		93	4.0	19	19	1.0	48	50	5	0.5	Yes
Cobalt		14.2	2.5	10	10	1.0	49	nc	32	3.2	No
		130	4.0	19	19	1.0	107	44	61	6.1	Yes
Copper		57,400	12,700	10	10	1.0	nc	nc	NA <sup>c</sup>	NA	No
ron		88	6.1	19	18	0.95	106	112	50	5	No
Lead		8,770	1,320	10	10	1.0	nc	nc	NA <sup>c</sup>	NA	No
Magnesium		786	77	10	10	1.0	1,589	nc	500	50	No
Manganese		4.8	0.070	19	6	0.32	0.43	nc	0.1	0.01	Yes
Mercury		4.8	9.8	19	14	0.74	59	30	30	3	No
Nickel			560	10	10	1.0	nc	nc	NA <sup>c</sup>	NA	No
Potassium		3,670	1.0	19	3	0.16	nc	nc	1	0.1	Yes
Selenium		2.0	0.90	19	3	0.16	nc	nc	2	0.2	Yes
Silver		6.7			10	1.0	nc	nc	NA <sup>c</sup>	NA	No
Sodium		580	170	10	10	1.0	1.6	0.56	1	0.1	No
Thallium		0.53	0.53	1		1.0	73	nc	2	0.2	Yes
Vanadium		81	8.5	10	10	1.0	615	157	120	12	Yes
Zinc		1,130	24	19	19	1.0	015	157	120		
VOCs										<u></u>	N
1,1,1-Trichloroe	thane	0.016	0.016	4	1	0.25	nc	nc	2,060	206	No
1,2,4-Trimethylt		0.19	0.032	4	2	0.50	nc	nc	52.2	5.22	No
1,3,5-Trimethylt		0.071	0.012	4	2	0.50	nc	nc	52.2	5.22	No

## Table G-11 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 21 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data					Ecological	<b>COPEC</b> Screenin	g
	Maximum	Minimum	ula Data							
	Detect (mg/kg)	Detect (mg/kg)	Numb	oer of	Detection	BUTL (	mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC
Constituent			Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
2-Butanone	0.18	0.043	4	3	0.75	nc	nc	6,487	648.7	No
Acetone	0.53	0.036	4	4	1.0	nc	nc	36.6	3.66	No
Ethylbenzene	0.0067	0.0067	19	1	0.053	nc	nc	52.2	5.22	No
sopropylbenzene	0.013	0.013	4	1	0.25	nc	nc	52.2	5.22	No
n,p-Xylene	0.096	0.0074	14	7	0.50	nc	nc	4.162	0.4162	No
Methylene chloride	0.0060	0.0060	4	1	0.25	nc	nc	21.4	2.14	No
n-Butylbenzene	0.062	0.062	4	1	0.25	nc	nc	52.2	5.22	No
n-Propylbenzene	0.040	0.040	4	1	0.25	nc	nc	52.2	5.22	No
p-Xylene	0.0063	0.0063	14	1	0.071	nc	nc	4.162	0.4162	No
ec-Butylbenzene	0.036	0.036	4	1	0.25	nc	nc	52.2	5.22	No
Foluene	0.14	0.0060	19	13	0.68	nc	nc	200	20	No
loluene	0.14									No
SVOCs										
4-Chloroaniline	5.47	5.47	9	1	0.11	nc	nc	na	na	Yes
bis-(2-ethylhexyl)phthalate	0.98	0.84	9	2	0.22	nc	nc	200	20	No
Di-n-butyl phthalate	5.69	0.90	9	4	0.44	nc	nc	200	20	No
DI-II-Outyr phulaiate										
PCBs										
PCB-1254 (Aroclor 1254)	0.14	0.14	19	2	0.11	nc	nc	0.111	0.0111	Yes
PCB-1260 (Aroclor 1260)	3.0	0.15	19	4	0.21	nc	nc	0.111	0.0111	Yes
CD-1200 (MICCION 1200)										
Petroleum Hydrocarbons										V
Diesel Range Organics (DRO)	3,800	46	19	16	0.84	nc	nc	na	na	Yes
Residual Range Organics (RRO)	3,700	25	10	10	1.0	nc	nc	na	na	Yes
TRPH	15,700	85	9	9	1.0	nc	nc	NA <sup>d</sup>	NA	No

### Notes:

<sup>a</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

#### Tal... 11 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 21 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data		5	-	Ecological	COPEC Screening	g
	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb	er of	Detection	- BUTL (mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent			Samples	Detects	Frequency	Soil Tundra Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)

#### 1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November. (Table 1)

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil.

Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.)

<sup>b</sup> Ecological risk-based screening criteria (ERBSC) is equal to one-tenth the ecological benchmark criterion.

<sup>c</sup> Soil Screening Criteria are not available for this essential nutrient. This analyte is excluded as a COPEC based on essential nutrient status.

<sup>d</sup> TRPH is excluded as a COPEC due to outdated analysis methods.

NA - Not applicable.

BUTL - Background upper tolerance limit.
COPEC - Chemical of potential ecological concern.
mg/kg - Milligrams per kilogram.
na - Not available.
nc - Not calculated.
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
PCB - Polychlorinated Biphenyls
TRPH - Total Residual Petroleum Hydrocarbons

# Tal 2 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Site 21 Northeast Cape, St. Lawrence Island, Alaska

	Eph	emeral Surface	Water Con	centration	i	BUTL	(mg/L)	Ecological	COPEC Screening	
	Maximum	Maximum	Numb	1.00	Detection	Fresh Surface	Ephemeral	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Water	Surface Water	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total										
Aluminum	0.71	0.11	2	2	1.0	nc	2.2	0.087	0.0087	No
Arsenic	0.0020	0.0020	4	2	0.50	nc	nc	0.15	0.015	Yes
Barium	0.010	0.0050	2	2	1.0	nc	0.034	na	na	Yes
Calcium	14	11	2	2	1.0	nc	nc	NA c	NA	No
Copper	0.020	0.020	4	1	0.25	nc	0.083	0.009	0.0009	No
Iron	6.3	4.2	2	2	1.0	nc	nc	NA c	NA	No
Lead	0.0040	0.0020	4	3	0.75	nc	0.014	0.003	0.00025	No
Magnesium	3.0	2.5	2	2	1.0	nc	nc	NA c	NA	No
-	0.69	0.49	2	2	1.0	nc	0.12	1.1	0.11	Yes
Manganese	2.7	2.4	2	2	1.0	nc	nc	NA c	NA	No
Potassium	38	27	2	2	1.0	nc	nc	NA c	NA	No
Sodium		0.0090	4	3	0.75	nc	0.90	0.11	0.011	No
Zinc	0.49	0.0090	4	5	0.75	no				
Inorganics, Dissolved							0.002	0.11	0.011	No
Zinc, Dissolved	0.070	0.070	2	1	0.50	nc	0.093	0.11	0.011	110
							•			
Petroleum Hydrocarbons Diesel Range Organics (DRO)	0.47	0.20	4	3	0.75	nc	nc	na	na	Yes

#### Notes:

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

 USEPA National Ambient Water Quality Criteria - Freshwater Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

2) USEPA National Ambient Water Quality Criteria - Marine Chronic Value

NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

- 3) USEPA National Ambient Water Quality Criteria Freshwater Acute Value divided by 10
  - NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- 4) USEPA National Ambient Water Quality Criteria Marine Acute Value divided by 10
  - NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- 5) Lowest Chronic Value observed in freshwater daphnids

 Table G-12

 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water

 Site 21

# Northeast Cape, St. Lawrence Island, Alaska

	Eph	emeral Surface	Water Con	centration	1	BUTL	(mg/L)	Ecological	COPEC Screening	
	Maximum	Maximum	Numb		Detection	Fresh Surface Water	Ephemeral Surface Water	Benchmark <sup>a</sup> (mg/L)	Benchmark <sup>b</sup> (mg/L)	COPEC? (Yes/No)
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Water	Buildee Water	(8/		
ORNL, 1996. Toxicological Bench Contaminants of Concern for Effect November. Table 1. Summary of conventional	s on Aquatic Biota:	1996 Revision.	s in fresh w	ater.						
Table 1. Summary of conventional	benchmarks for price	This on	alute is evel	luded as a	COPEC based	on essential nutrie	nt status.			
<sup>c</sup> Soil Screening Criteria are not availab	le for this essential	nutrient. This an	aryte is exc.	luucu as a	COI LC based	on essential neuro				
NA - Not applicable. mg/L - Milligrams per liter. BUTL - Background upper tolerance lir COPEC - Chemical of potential ecologi na - Not available. nc - Not calculated.										

## Tat 3 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 22 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data					Ecological	COPEC Screenin	g
			Numb	per of	Detection	BUTL (	mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)			Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
Constituent	Detteet (ing ng/									
Inorganics					1.0		nc	0.29	0.029	Yes
Antimony	34	34	1	1	1.0	nc 48	50	5.0	0.5	No
Chromium	16	7.7	5	5	1.0	107	44	61	6.1	No
Copper	22	22	1	1	1.0		112	50	5.0	Yes
Lead	497	31	9	9	1.0	106	30	30	3.0	No
Nickel	13	13	1	1	1.0	59		120	12	Yes
Zinc	169	60	5	5	1.0	615	157	120	12	105
VOCs									0.41/2	No
o-Xylene	0.37	0.15	8	3	0.375	nc	nc	4.162	0.4162	INO
SVOCs										Yes
Di-n-butyl phthalate	3.5	3.5	1	1	1.0	nc	nc	na	na	Tes
PAHs									2.0	No
Acenaphthene	0.086	0.0076	11	4	0.36	nc	nc	20	2.0	No
Anthracene	0.01180	0.00020	11	3	0.27	nc	nc	1.98	0.198	
Benzo(a)anthracene	0.0200	0.0015	11	3	0.27	nc	nc	1.98	0.198	No
Benzo(a)pyrene	0.35	0.35	11	1	0.09	nc	nc	1.98	0.198	Yes
	0.42	0.00035	11	4	0.36	nc	nc	1.98	0.198	Yes
Benzo(b)fluoranthene	0.015	0.00015	11	4	0.36	nc	nc	1.98	0.198	No
Benzo(g,h,i)perylene	0.77	0.00020	11	7	0.64	nc	nc	1.98	0.198	Yes
Chrysene	0.00032	0.00032	11	1	0.09	nc	nc	1.98	0.198	No
Dibenzo(a,h)anthracene	0.00032	0.00032	11	7	0.64	nc	nc	1.98	0.198	No
Fluoranthene		0.00020	11	3	0.27	nc	nc	30	3.0	No
Fluorene	0.036	0.00020	11	1	0.09	nc	nc	1.98	0.198	No
Indeno(1,2,3-cd)pyrene	0.00032		11	8	0.73	nc	nc	1.98	0.198	Yes
Naphthalene	1.2	0.00031		8	0.73	nc	nc	1.98	0.198	Yes
Phenanthrene	0.21	0.00022	11		1.0	nc	nc	30	3.0	No
Phenol	0.74	0.74	1	1		nc	nc	1.98	0.198	No
Pyrene	0.10	0.00018	11	7	0.64	lic	ne			

#### Table G-13 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 22 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data	1				Ecological (	COPEC Screenin	
Constituent	Maximum Detect (mg/kg)	Minimum Detect (mg/kg)	Numb Samples		Detection Frequency	BUTL ( Soil Tundra	mg/kg) Soil Gravel	Benchmark <sup>a</sup> (mg/kg)	Benchmark <sup>b</sup> (mg/kg)	COPEC? (Yes/No)
Petroleum Hydrocarbons								na	па	Yes
Diesel Range Organics (DRO) Gasoline Range Organics (GRO)	4,070 38	284 24	10 10	5 3	0.07 0.63	nc	nc	na	na	Yes Yes
Residual Range Organics (RRO) TRPH	3,815 5,920	5.4 5,920	8 1	7	0.88 1.0	nc	nc nc	na NA <sup>c</sup>	NA	No

Notes:

\* Ecological Benchmark Criterion selected based on the following hierarchy:

1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November. (Table 1)

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil.

Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.)

<sup>b</sup> Ecological risk-based screening criteria (ERBSC) is equal to one-tenth the ecological benchmark criterion.

c TRPH is excluded as a COPEC due to outdated analysis methods.

NA - Not applicable.

BUTL - Background upper tolerance limit.

COPEC - Chemical of potential ecological concern.

mg/kg - Milligrams per kilogram.

na - Not available.

nc - Not calculated.

VOCs - Volatile Organic Compounds

SVOCs - Semivolatile Organic Compounds

PCB - Polychlorinated Biphenyls

PAH - Polynuclear Aromatic Hydrocarbons

TRPH - Total Residual Petroleum Hydrocarbons

#### T Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 28 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data				Soil Gra	avel Data					0	COPEC Screenin	
	Maximum	Minimum	Numi	er of	Detection	Maximum	Minimum	Numb		Detection	BUTL (		Benchmark	Benchmark <sup>b</sup>	COPEC
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No
Inorganics															
Beryllium	na	na	na	па	na	1.8	1.8	11	1	0.091	3.8	nc	10	1	Yes
Cadmium	na	na	na	na	na	2.6	2.4	11	2	0.18	1.4	3.1	0.38	0.038	No
Chromium	31	14	6	6	1.0	41	7.3	11	11	1.0	48	50	5	0.5	No
Copper	na	na	na	na	na	34	8.8	11	11	1.0	107	44	61	6.1	No
ead	42	24	6	6	1.0	100	7.1	11	- 11	1.0	106	112	50	5	No
Nickel	na	na	na	na	na	25	7.8	11	8	0.73	59	30	30	3	No
Challium	na	na	na	na	na	0.26	0.26	1	1	1.0	1.6	0.56	1	0.1	No
Zinc	124	49	6	6	1.0	140	12	11	11	1.0	615	157	120	12	No
VOCs															
Acetone	na	na	na	na	na	0.19	0.032	5	3	0.60	nc	nc	36.6	3.66	No
Ethylbenzene	па	na	na	na	na	1.1	1.1	10	1	0.10	nc	nc	52.2	5.22	No
Methylene chloride	na	na	na	na	na	0.16	0.0071	5	4	0.80	nc	nc	21.4	2.14	No
PCBs															
PCB-1254 (Aroclor 1254)	0.20	0.20	9	1	0.11	1.5	0.24	10	3	0.30	nc	nc	0.111	0.0111	Yes
PAHs															
2-Methylnaphthalene	0.031	0.031	8	1	0.13	na	na	na	na	na	nc	nc	1.98	0.198	No
Anthracene	1.9	0.016	8	2	0.25	na	na	na	na	na	nc	nc	1.98	0.198	Yes
Benzo(a)anthracene	4.4	4.4	8	1	0.13	na	na	na	na	na	nc	nc	1.98	0.198	Yes
Benzo(a)pyrene	2.3	2.3	8	1	0.13	na	na	na	na	na	nc	nc	1.98	0.198	Yes
Benzo(b)fluoranthene	2.6	2.6	8	1	0.13	na	na	na	na	na	nc	nc	1.98	0.198	Yes
senzo(g,h,i)perylene	0.056	0.056	8	1	0.13	na	na	na	na	na	nc	nc	1.98	0.198	No
Benzo(k)fluoranthene	2.7	2.7	8	1	0.13	na	na	na	na	na	nc	nc	1.98	0.198	Yes
Chrysene	5.5	5.5	8	1	0.13	na	na	na	na	na	nc	nc	1.98	0.198	Yes
luoranthene	9.3	0.035	8	2	0.25	na	na	na	na	na	nc	nc	1.98	0.198	Yes
henanthrene	4.1	0.016	8	2	0.25	na	na	na	na	na	nc	nc	1.98	0.198	Yes
Pyrene	7.5	0.025	8	2	0.25	na	na	na	na	na	nc	nc	1.98	0.198	Yes
Petroleum Hydrocarbons													58 		
Diesel Range Organics (DRO)	83,000	95	10	10	1.0	92,650	7.9	11	10	0.91	nc	nc	na	na	Yes
DRO_ Aromatic	59	59	2	1	0.50	na	na	na	na	na	nc	nc	па	na	Yes
DRO_Aliphatic	490	50	2	2	1.0	na	na	na	na	na	nc	nc	na	na	Yes
Gasoline Range Organics (GRO)				1070		120	3.7	10	4	0.40	nc	nc	na	na	Yes
esidual Range Organics (RRO)	2,200	1,200	6	6	1.0	na	na	na	na	na	nc	nc	na	na	Yes
	360	230	2	2	1.0	na	na	na	na	na	nc	nc	na	na	Yes
RO_Aromatic RPH	110,000	47,000	2	2	1.0	104,000	12	10	10	1.0	nc	nc	NA °	NA	No

Notes:

\* Ecological Benchmark Criterion selected based on the following hierarchy:

#### Table G-14 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 28

Northeast Cape, St. Lawrence Island, Alaska

	Maximum	Minimum	dra Data Number of	Detection	Maximum	Minimum	avel Data Number of Samples Detects	Detection	BUTL (mg/kg) Soil Tundra Soil Grave	Ecological Benchmark (mg/kg)	COPEC Screenin Benchmark <sup>b</sup> (mg/kg)	COPEC? (Yes/No)
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples Detects	Frequency	Detect (mg/kg)	Delect (ing/kg	) bampies betters					
1) ECO-SSLs Ecological Soil Screening Level Guid	lance - Draft. Offic	e of Emergency a	nd Remedial Respons	e. July 10. (EF	PA, 2000).							
<ol> <li>The lower of ORNL plant or soil inv Plant benchmarks derived from ORN Soil invertebrate benchmarks derived</li> </ol>	ertebrate benchma NL (1997), Toxicol d from ORNL (199	rks. ogical Benchmarl 97), Toxicologica	ts for Screening Conta Benchmarks for Screen	aminants of Po ening Contam	tential Concern for inants of Potential	Effects on Terre Concern for Effe	estrial Plants: 1997 Re ects on Soil and Litter	vision. Novem Invertebrates a	ber. (Table 1) nd Heterotrophic Process: 1	997 Revision. (	Table 1)	
<ol> <li>The lower of ORNL mammalian or Toxicological Benchmarks for Wildl</li> </ol>	life: 1996 Revision	n. June. (ORNL,	1996). (Appendix D	Table 12-NOA	EL-Based Benchm	nark for Food.)						
* Ecological risk-based screening criter	ia (ERBSC) is equ	al to one-tenth the	ecological benchman	k criterion.								
" TRPH is excluded as a COPEC due to									6 B			
NA - Not applicable.												

mg/kg - Milligrams per kilogram. BUTL - Background upper tolerance limit. COPEC - Chemical of potential ecological concern. na - Not available. nc - Not calculated. VOCs - Volatile Organic Compounds PCB - Polychlorinated Biphenyls PAH - Polynuclear Aromatic Hydrocarbons TRPH - Total Residual Petroleum Hydrocarbons

### Ta... - 15 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Freshwater Sediment Site 28 Northeast Cape, St. Lawrence Island, Alaska

					Detection	BUTL (mg/kg)	Ecological Benchmark <sup>a</sup>	COPEC Screening Benchmark <sup>b</sup>	COPEC?
Constituent	Sediment Conce Maximum Detect	ntration (mg/kg) Minimum Result	Numb Samples		Detection Frequency	Sediment	(mg/kg)	(mg/kg)	(Yes/No)
Constituent	Maximum Detect	Minimum Result	Sampica	Dettetts	Trequency	Countrat			
Inorganics									
Chromium	649	4.4	68	67	0.99	34	43.4	4.34	Yes
Copper	20	16	3	3	1.0	40	31.6	3.16	No
Lead	4,590	4.0	68	55	0.81	78	35.8	3.58	Yes
Nickel	13	13	3	1	0.33	126	22.7	2.27	No
Zinc	4,810	12	68	68	1.0	148	121	12.1	Yes
VOCs									
Benzene	0.050	0.050	8	1	0.13	nc	0.057	0.0057	No
Ethylbenzene	1.8	0.027	8	2	0.25	nc	3.6	0.36	Yes
Toluene	0.37	0.0038	8	3	0.38	nc	0.67	0.067	Yes
Xylenes	0.78	0.048	8	3	0.38	nc	0.025	0.0025	Yes
PCBs									
PCB-1242 (Aroclor 1242)	0.12	0.12	79	1	0.013	nc	0.0598	0.00598	Yes
PCB-1254 (Aroclor 1254)	2.8	0.038	79	14	0.18	nc	0.06	0.006	Yes
PCB-1260 (Aroclor 1260)	5.4	0.063	79	27	0.34	nc	0.005	0.0005	Yes
Pesticides									
4,4'-DDD	1.2	0.0072	13	6	0.46	nc	0.00488	0.000488	Yes
beta-BHC	0.012	0.0036	10	2	0.20	nc	0.006	0.0006	Yes
Endosulfan sulfate	0.0086	0.0086	10	1	0.10	nc	na	na	Yes
gamma-BHC (Lindane)	0.0065	0.0029	13	2	0.15	nc	0.00237	0.000237	Yes
Heptachlor	0.0046	0.0044	13	2	0.15	nc	0.00247	0.000247	Yes
Dioxins & Furans Dibenzofuran	5.6	0.026	68	26	0.38	nc	2	0.2	Yes
Diocuzoruran	5.0								
PAHs	· · · · · · · · ·	0.022	71	50	0.82	пс	0.07	0.007	Yes
2-Methylnaphthalene Acenaphthene	500 14	0.022 0.016	71 70	58 40	0.82	nc	0.62	0.062	Yes

#### Table G-15 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Freshwater Sediment Site 28 Northeast Cape, St. Lawrence Island, Alaska

							Ecological	COPEC Screening	5
	Sediment Conce	ntration (mg/kg)	Num	per of	Detection	BUTL (mg/kg)	<b>Benchmark</b> <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Sediment	(mg/kg)	(mg/kg)	(Yes/No)
Acenaphthylene	0.047	0.047	71	1	0.014	nc	0.044	0.0044	Yes
Anthracene	1.8	0.0092	71	7	0.10	nc	0.0572	0.00572	Yes
Benzo(a)anthracene	1.9	0.10	71	5	0.070	nc	0.108	0.0108	Yes
Benzo(a)pyrene	1.4	0.13	71	4	0.056	nc	0.15	0.015	Yes
Benzo(b)fluoranthene	1.6	0.10	71	5	0.070	nc	0.24	0.024	Yes
Benzo(g,h,i)perylene	0.91	0.037	71	2	0.028	nc	0.29	0.029	Yes
Benzo(k)fluoranthene	1.9	0.19	71	4	0.056	nc	0.24	0.024	Yes
Chrysene	2.6	0.031	71	7	0.10	nc	0.166	0.0166	Yes
Dibenzo(a,h)anthracene	0.015	0.015	71	1	0.014	nc	0.033	0.0033	Yes
Fluoranthene	14	0.0084	71	12	0.17	nc	0.423	0.0423	Yes
Fluorene	20	0.011	71	47	0.66	nc	0.0774	0.00774	Yes
Indeno(1,2,3-cd)pyrene	1.2	0.046	71	3	0.042	nc	0.078	0.0078	Yes
	220	0.024	71	55	0.77	nc	0.176	0.0176	Yes
Naphthalene	220	0.015	71	42	0.59	nc	0.204	0.0204	Yes
Phenanthrene	9.5	0.010	71	11	0.15	nc	0.195	0.0195	Yes
Pyrene	9.5	0.010							
Petroleum Hydrocarbons									Ver
Diesel Range Organics (DRO)	150,000	22	83	83	1.0	nc	na	na	Yes
DRO_Aromatic	60	60	3	1	0.33	nc	na	na	Yes
DRO_Aliphatic	150,000	26	5	5	1.0	nc	na	na	Yes
Gasoline Range Organics (GRO)	220	4.0	5	2	0.40	nc	na	na	Yes
Residual Range Organics (RRO)	14.000	69	69	66	0.96	nc	na	na	Yes
RRO_ Aliphatic	11,000	58	5	4	0.80	nc	na	na	Yes
RRO_Aromatic	500	64	5	5	1.0	nc	na	na	Yes
TRPH	127,000	21,500	5	5	1.0	nc	NA <sup>c</sup>	NA	No

#### Notes:

\* Ecological Benchmark Criterion selected based on the following hierarchy:

1) Consensus-based Freshwater Threshold Effect Concentrations.

MacDonald, D.D., Ingersoll, C.G., Berger, T.A. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. 2000. Table 2. Sediment quality guidelines for metals in freshwater ecosystems that reflect TECs (I.e., below which) harmful effects are unlikely to be observed).

#### Tab

Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Freshwater Sediment

Site 28

# Northeast Cape, St. Lawrence Island, Alaska

	Sediment Conce		Number of		BUTL (mg/kg)	Ecological Benchmark <sup>a</sup>	COPEC Screening Benchmark <sup>b</sup> (mg/kg)	COPEC? (Yes/No)
Constituent	Maximum Detect	Minimum Result	Samples Dete	cts Frequency	Sediment	(mg/kg)	(ing/kg)	(10)110)
<ol> <li>Assessment and Remediation of Conta ORNL, 1997. Toxicological Benchma Archives of Environmental Contamin Table 4. Summary of selected toxicity</li> </ol>	arks for Screening Con nation and Toxicology. y test - and screening le	taminants of Potential January.	Concern for Effects				ember.	
<ol> <li>Ontario Ministry of the Environment: I ORNL, 1997. Toxicological Benchma Table 4. Summary of selected toxicity</li> </ol>	arks for Screening Con	taminants of Potential evel concentration-base	Concern for Effects ed sediment quality	on Sediment - A benchmarks for f	Associated Biota: 199 Freshwater sediments	97 Revision. Nov 5.	ember.	
<ol> <li>EPA OSWER Value - ORNL, 1997. Toxicological Benchma Table 5. EPA Region IV and OSWER</li> </ol>	arks for Screening Con R sediment screening v	taminants of Potential alues.	Concern for Effects	on Sediment - A	Associated Biota: 199	97 Revision. Nov	rember.	
<ol> <li>NOAA ER-L ORNL, 1997. Toxicological Benchm. Table 1. Summary of selected integration</li> </ol>	arks for Screening Con tive sediment quality b	taminants of Potential enchmarks for marine	Concern for Effects and estuarine sedin	on Sediment - A ents	Associated Biota: 199	97 Revision. Nov	vember.	
<ol> <li>FDEP TEL Value</li> <li>ORNL, 1997. Toxicological Benchm Table 1. Summary of selected integra</li> </ol>	tive sediment quality b	enchmarks for marine	and estuarine sedin	ents	Associated Biota: 199	97 Revision. Nov	ember.	
<sup>b</sup> Ecological risk-based screening criteria	(ERBSC) is equal to o	ne-tenth the ecological	benchmark criterio	n.				
<sup>c</sup> TRPH is excluded as a COPEC due to o	utdated analysis metho	ods.						
NA - Not applicable. mg/kg - Milligrams per kilogram. BUTL - Background upper tolerance limit COPEC - Chemical of potential ecologica								
na - Not available. nc - Not calculated. VOCs - Volatile Organic Compounds PCB - Polychlorinated Biphenyls PAH - Polynuclear Aromatic Hydrocarbo TRPH - Total Residual Petroleum Hydroc								
#### Tal 6 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Site 28 Northeast Cape, St. Lawrence Island, Alaska

		Fresh Surfac	e Water Da	ata		BUTL	(mg/L)	Ecological	COPEC Screening	
	Maximum	Maximum	Numb	er of	Detection	<b>Fresh Surface</b>	Ephemeral	<b>Benchmark</b> <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Water	Surface Water	(mg/L)	(mg/L)	(Yes/No)
Inorganics, Total									0.0074	Vee
Chromium	0.015	0.015	3	1	0.33	nc	nc	0.074	0.0074	Yes
Copper	0.040	0.040	3	1	0.33	nc	0.083	0.009	0.0009	Yes
Lead	0.086	0.086	3	1	0.33	nc	0.014	0.003	0.00025	Yes
Zinc	0.62	0.62	3	1	0.33	nc	0.90	0.11	0.011	Yes
Inorganics, Dissolved								0.002	0.00025	Yes
Lead, Dissolved	0.011	0.011	3	1	0.33	nc	nc	0.003	0.00023	Yes
Zinc, Dissolved	0.23	0.23	3	1	0.33	nc	0.093	0.11	0.011	103
VOCs Ethylbenzene	0.0016	0.0016	5	1	0.20	nc	nc	3.2	0.32	No
PCBs PCB-1260 (Aroclor 1260)	0.0019	0.0015	15	2	0.13	nc	nc	1E-05	0.0000014	Yes
Petroleum Hydrocarbons					10		nc	na	na	Yes
Diesel Range Organics (DRO)	326	0.39	17			nc	nc	na	na	Yes
Gasoline Range Organics (GRO)	0.57	0.57	5		0.20	nc		NA c	NA	No
TRPH	19	2.3	5	2	0.40	nc	nc		1.1.1	

#### Notes:

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

- 1) USEPA National Ambient Water Quality Criteria Freshwater Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- 2) USEPA National Ambient Water Quality Criteria Marine Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- 3) USEPA National Ambient Water Quality Criteria Freshwater Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.
- 4) USEPA National Ambient Water Quality Criteria Marine Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

### Table G-16 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Site 28 Northeast Cape, St. Lawrence Island, Alaska

		Fresh Surfac	e Water D	ata		BUTL	(mg/L)	Ecological	COPEC Screening	
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)	Numl Samples		Detection Frequency	Fresh Surface Water	Ephemeral Surface Water	Benchmark <sup>a</sup> (mg/L)	Benchmark <sup>®</sup> (mg/L)	COPEC? (Yes/No)
5) Lowest Chronic Value observed in fi	eshwater daphnids	5								
ORNL, 1996. Toxicological Benchr Concern for Effects on Aquatic Biot	a: 1996 Revision.	November.								
Table 1. Summary of conventional b	enchmarks for price	ority contaminants	s in fresh w	ater.						
NA - Not applicable. mg/L - Milligrams per liter. BUTL - Background upper tolerance lim	it.									
COPEC - Chemical of potential ecologic na - Not available.	al concern.									
nc - Not calculated. VOCs - Volatile Organic Compounds SVOCs - Semivolatile Organic Compou	nds									
PCB - Polychlorinated Biphenyls TRPH - Total Residual Petroleum Hydro										

#### Tab Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Fish Tissue Site 28 Northeast Cape, St. Lawrence Island, Alaska

	Fish Tissue Conc	entration (mg/kg)	Numt	er of	Detection	BUTL (mg/kg)	Ecological Benchmark <sup>®</sup>	COPEC Screening Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Fish Tissue	(mg/kg)	(mg/kg)	(Yes/No)
Inorganics									
Antimony	0.0070	0.0050	3	3	1.00	nc	na	na	Yes
Arsenic	0.080	0.060	3	3	1.0	nc	na	na	Yes
Barium	1.1	1.0	3	3	1.0	nc	na	na	Yes
Cadmium	0.0080	0.0080	3	3	1.0	nc	na	na	Yes
	1.2	0.64	3	3	1.0	nc	na	na	Yes
Copper	0.028	0.011	3	3	1.0	nc	na	na	Yes
Lead	0.028	0.076	3	3	1.0	nc	na	na	Yes
Mercury	1.1	0.63	3	3	1.0	nc	na	na	Yes
Nickel	0.16	0.13	3	3	1.0	nc	na	na	Yes
Selenium	0.18	0.099	3	3	1.0	nc	na	na	Yes
Vanadium		43	3	3	1.0	nc	na	na	Yes
Zinc	51	43	5	5	1.0				
PAHs			7. 					na	Yes
2-Methylnaphthalene	0.19	0.0053	4	4	1.0	nc	na	na	Yes
Acenaphthene	0.026	0.0063	4	4	1.0	nc	na		Yes
Benzo(g,h,i)perylene	0.0043	0.0043	4	1	0.25	nc	na	na	Yes
Fluoranthene	0.0037	0.0015	4	2	0.50	nc	na	na	Yes
Fluorene	0.067	0.011	4	4	1.0	nc	na	na	
Naphthalene	0.068	0.016	4	3	0.75	nc	na	na	Yes
Phenanthrene	0.018	0.0062	4	4	1.0	nc	na	na	Yes
Pyrene	0.0023	0.0018	4	2	0.50	nc	na	na	Yes
•									
PCBs PCB-1260 (Aroclor 1260)	0.14	0.060	4	4	1.0	nc	na	na	Yes

#### Notes:

\*Regulatory screening criteria for this medium have not been adopted by ADEC.

<sup>b</sup> Ecological Benchmark Criterion is not currently available for this media.

NA - Not applicable.
BUTL - Background upper tolerance limit.
COPEC - Chemical of potential ecological concern.
mg/kg - Milligrams per kilogram.
na - Not available.
nc - Not calculated.
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
PCB - Polychlorinated Biphenyls
PAH - Polynuclear Aromatic Hydrocarbons

#### Tal 8 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Plant Tissue Site 28 Northeast Cape, St. Lawrence Island, Alaska

	Plant Tissue Con	entration (mg/kg)	Numb	er of	Detection	BUTL (mg/kg)	Ecological Benchmark <sup>a</sup>	COPEC Screening Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Detect	Minimum Result	Samples		Frequency	Plant Tissue	(mg/kg)	(mg/kg)	(Yes/No)
Constitution									
Inorganics					1.0	20	22	na	Yes
Antimony	0.0030	0.0030	1	1	1.0 0.59	nc	na na	na	Yes
Arsenic	2.4	0.060	17	10	1.0	nc	na	na	Yes
Barium	40	0.45	17	17		nc	na	na	Yes
Cadmium	1.1	0.0020	17	17	1.0	nc	na	na	Yes
Chromium	78	0.12	17	16	0.94	nc		na	Yes
Copper	6.9	0.54	17	17	1.0	nc	na	na	Yes
Lead	11	0.065	17	17	1.0	nc	na	na	Yes
Mercury	0.16	0.0030	17	16	0.94	nc	na	na	Yes
Nickel	8.6	0.060	17	17	1.0	nc	na	na	Yes
Selenium	0.99	0.020	17	11	0.65	nc	na	na	Yes
Silver	0.058	0.0070	17	8	0.47	nc	na	na	Yes
Vanadium	7.3	0.016	17	17	1.0	nc	na	na	Yes
Zinc	76	1.3	17	17	1.0	nc	na	na	105
PAHs								22	Yes
2-Methylnaphthalene	0.026	0.0028	17	12	0.71	nc	na	na	Yes
Acenaphthene	0.075	0.0017	17	13	0.76	nc	na	na	Yes
Anthracene	0.050	0.0019	17	11	0.65	nc	na	na	Yes
Benzo(a)anthracene	0.24	0.0028	17	11	0.65	nc	na	na	Yes
Benzo(a)pyrene	0.30	0.0022	17	9	0.53	nc	na	na	Yes
Benzo(b)fluoranthene	0.24	0.0018	17	14	0.82	nc	na	na	Yes
Benzo(g,h,i)perylene	0.15	0.0018	17	10	0.59	nc	na	na	Yes
Benzo(k)fluoranthene	0.34	0.0031	17	11	0.65	nc	na	na	Yes
Chrysene	0.42	0.0020	17	15	0.88	nc	na	na	Yes
Dibenz(a,h)anthracene	0.043	0.0017	17	7	0.41	nc	na	na	
	1.0	0.0072	17	16	0.94	nc	na	na	Yes
Fluoranthene	0.077	0.0020	17	16	0.94	nc	na	na	Yes
Fluorene	0.21	0.0013	17	13	0.76	nc	na	na	Yes
Indeno(1,2,3-cd)pyrene	0.042	0.0027	17	13	0.76	nc	na	na	Yes
Naphthalene	1.0	0.0027	17	17	1.0	nc	na	na	Yes
Phenanthrene Pyrene	0.93	0.0048	17	16	0.94	nc	na	na	Yes
· ·									
PCBs	9.3	0.0049	16	16	1.0	nc	na	na	Yes
PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260)	0.92	0.0049	16	15	0.94	nc	na	na	Yes

#### Table G-18 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Plant Tissue Site 28 Northeast Cape, St. Lawrence Island, Alaska

							Ecological	COPEC Screening	
×	Plant Tissue Conc	entration (mg/kg)	Numb	er of	Detection	BUTL (mg/kg)	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Plant Tissue	(mg/kg)	(mg/kg)	(Yes/No)
Notes:									

\* Regulatory screening criteria for this medium have not been adopted by ADEC.

<sup>b</sup> Ecological Benchmark Criterion is not currently available for this media.

NA - Not applicable.

BUTL - Background upper tolerance limit.

COPEC - Chemical of potential ecological concern.

mg/kg - Milligrams per kilogram.

na - Not available.

nc - Not calculated.

PAH - Polynuclear Aromatic Hydrocarbons

# Tab ) Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Freshwater Sediment Site 29

Northeast Cape, St. Lawrence Island, Alaska

					D. C. C.		Ecological Benchmark <sup>a</sup>	COPEC Screening Benchmark <sup>b</sup>	COPEC?
		ntration (mg/kg)	Numb		Detection	BUTL (mg/kg) Sediment	(mg/kg)	(mg/kg)	(Yes/No)
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Sediment	(ing/kg)	(Ing/kg)	(10)
norganics									
Aluminum	15,900	4,820	4	4	1.0	nc	25,500	2,550	Yes
Arsenic	5.7	2.8	4	4	1.0	nc	9.79	0.979	Yes
Barium	115	40	4	4	1.0	nc	na	na	Yes
Beryllium	1.3	0.20	5	4	0.8	9.8	na	na	Yes
Calcium	3,270	1,580	4	4	1.0	nc	NA °	NA	No
Chromium	27	2.6	17	17	1.0	34	43.4	4.34	No
Cobalt	7.0	2.0	4	4	1.0	nc	na	na	Yes
Copper	11	1.8	5	5	1.0	40	31.6	3.16	No
ron	14,900	8,720	4	4	1.0	nc	NA <sup>c</sup>	NA	No
ead	24	3.2	17	17	1.0	78	35.8	3.58	No
Magnesium	3,770	2,030	4	4	1.0	nc	NA °	NA	No
langanese	114	80	4	4	1.0	nc	1,673	167.3	Yes
Aercury	0.050	0.050	4	1	0.3	nc	0.18	0.018	Yes
Nickel	14	5.0	5	4	0.8	126	22.7	2.27	No
Potassium	1,360	930	4	4	1.0	nc	NA <sup>c</sup>	NA	No
Sodium	713	416	4	4	1.0	nc	NA <sup>c</sup>	NA	No
Vanadium	35	17	4	4	1.0	nc	na	na	Yes
Zinc	69	14	17	17	1.0	148	121	12.1	No
VOCs									
	0.0032	0.0032	4	1	0.25	nc	0.025	0.0025	Yes
n,p-Xylene °oluene	0.0097	0.0047	9	4	0.44	nc	0.67	0.067	No
ondene									
Dioxins & Furans					0.072		2	0.2	No
Dibenzofuran	0.0086	0.0086	16	1	0.063	nc	2	0.2	110
PAHs									
2-Methylnaphthalene	0.23	0.012	21	4	0.19	nc	0.07	0.007	Yes
Acenaphthene	0.014	0.014	21	1	0.048	nc	0.62	0.062	No
Acenaphthylene	0.010	0.010	21	1	0.048	nc	0.044	0.0044	Yes

#### Table G-19 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Freshwater Sediment Site 29 Northeast Cape, St. Lawrence Island, Alaska

	Sediment Conce	ntration (mg/kg)	Numb	per of	Detection	BUTL (mg/kg)	Ecological Benchmark <sup>a</sup>	COPEC Screening Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Sediment	(mg/kg)	(mg/kg)	(Yes/No)
Anthracene	0.023	0.023	21	1	0.048	nc	0.0572	0.00572	Yes
Benzo(b)fluoranthene	0.0042	0.0042	21	1	0.048	nc	0.24	0.024	No
Benzo(k)fluoranthene	0.0042	0.0042	21	1	0.048	nc	0.24	0.024	No
	0.0048	0.0048	21	1	0.048	nc	0.166	0.0166	No
Chrysene	0.022	0.010	21	3	0.14	nc	0.423	0.0423	No
Fluoranthene	0.022	0.013	21	3	0.14	nc	0.0774	0.00774	Yes
Fluorene	0.11	0.0098	21	3	0.14	nc	0.176	0.0176	Yes
Naphthalene	0.037	0.010	21	4	0.19	nc	0.204	0.0204	Yes
Phenanthrene Pyrene	0.02	0.011	21	2	0.10	nc	0.195	0.0195	Yes
.,									
Petroleum Hydrocarbons			24	24	0.92	nc	na	na	Yes
Diesel Range Organics (DRO)	25,000	9.3	26	24			na	na	Yes
Residual Range Organics (RRO)	1,000	10	18	17	0.94	nc		na	Yes
Residual Range Organics_Aromatic	137	53	6	6	1.0	nc	na NA <sup>d</sup>	NA	No
TRPH	67	67	1	1	1.0	nc	NA	NA	NO

#### Notes:

\* Ecological Benchmark Criterion selected based on the following hierarchy:

1) Consensus-based Freshwater Threshold Effect Concentrations.

MacDonald, D.D., Ingersoll, C.G., Berger, T.A. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater

Ecosystems. 2000. Archives of Environmental Contamination and Toxicology. January

Table 2. Sediment quality guidelines for metals in freshwater ecosystems that reflect TECs (I.e., below which) harmful effects are unlikely to be observed).

2) Assessment and Remediation of Contaminated Sediment Program - Threshold Effect Concentration.

ORNL, 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment - Associated Biota: 1997 Revision. November. Table 4. Summary of selected toxicity test - and screening level concentration-based sediment quality benchmarks for freshwater sediments.

3) Ontario Ministry of the Environment: Lowest effect level

ORNL, 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment - Associated Biota: 1997 Revision. November. Table 4. Summary of selected toxicity test - and screening level concentration-based sediment quality benchmarks for freshwater sediments.

4) EPA OSWER Value -

ORNL, 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment - Associated Biota: 1997 Revision. November. Table 5. EPA Region IV and OSWER sediment screening values.

5) NOAA ER-L

ORNL, 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment - Associated Biota: 1997 Revision. November.

### Tab Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Freshwater Sediment

Site 29

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Northeast Cape, St. Lawrence Island, Alaska

	Sediment Concer		Numb	per of Detects	Detection Frequency	BUTL (mg/kg) Sediment	Ecological Benchmark <sup>a</sup> (mg/kg)	COPEC Screening Benchmark <sup>b</sup> (mg/kg)	COPEC? (Yes/No)
Constituent Table 1. Summary of selected integra	Maximum Detect	Minimum Result				Stument	(	(	
6) FDEP TEL Value	live sediment quanty o	cheminarks for marine	and estuarme	seament	,				
ORNL, 1997. Toxicological Benchm Table 1. Summary of selected integra	arks for Screening Con tive sediment quality b	taminants of Potential enchmarks for marine	Concern for land estuarine	Effects on sediments	Sediment - A s	ssociated Biota: 199	7 Revision. Nov	ember.	
<sup>b</sup> Ecological risk-based screening criteria									
<sup>c</sup> Soil Screening Criteria are not available	for this essential nutrie	ent. This analyte is exc	luded as a C	OPEC base	ed on essentia	l nutrient status.			
<sup>d</sup> TRPH is excluded as a COPEC due to c									
NA Not conficable									
NA - Not applicable. BUTL - Background upper tolerance limit									
COPEC - Chemical of Potential Ecologica									
mg/kg - Milligrams per kilogram.									
na - Not available.									
nc - Not calculated.									
PAH - Polynuclear Aromatic Hydrocarbo	ns								
VOC - Volatile Organic Compounds									

TRPH - Total Residual Petroleum Hydrocarbons

#### Tal 0 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Site 29 Northeast Cape, St. Lawrence Island, Alaska

		Fresh Surfac	e Water Da	ata		BUTL	(mg/L)	Ecologi	cal	COPEC Screening	3
	Maximum	Maximum	Numb		Detection	Fresh Surface	Ephemeral	Benchma	ark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Water	Surface Water	(mg/L	.)	(mg/L)	(Yes/No)
Inorganics, Total											
Aluminum	0.040	0.040	4	4	1.0	nc	2.2	0.087		0.0087	Yes
Barium	0.0050	0.0050	4	4	1.0	nc	0.034	na		na	Yes
Calcium	7.6	6.9	4	4	1.0	nc	nc	NA	с	NA	No
Iron	0.38	0.31	4	4	1.0	nc	nc	NA		NA	No
Magnesium	2.6	2.0	4	4	1.0	nc	nc	NA	с	NA	No
Manganese	0.027	0.017	4	4	1.0	nc	0.12	1.1		0.11	No
Potassium	1.0	0.68	4	3	0.75	nc	nc	NA	С	NA	No
Sodium	29	14	4	4	1.0	nc	nc	NA	С	NA	No
Zinc	0.0080	0.0080	5	1	0.20	nc	0.90	0.11		0.011	No
Inorganics, Dissolved											
Silver, Dissolved	0.020	0.020	1	1	1.0	nc	nc	0.00012		0.000012	Yes
Petroleum Hydrocarbons											Vaa
Diesel Range Organics (DRO)	0.33	0.33	13	1	0.077	nc	nc	na		na	Yes
DRO_Aliphatic	0.33	0.33	1	1	1.0	nc	nc	na		na	Yes
Gasoline Range Organics (GRO)	0.41	0.33	11	2	0.18	nc	nc	na		na	Yes

#### Notes:

<sup>a</sup> Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

 USEPA National Ambient Water Quality Criteria - Freshwater Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

 USEPA National Ambient Water Quality Criteria - Marine Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

 USEPA National Ambient Water Quality Criteria - Freshwater Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

 USEPA National Ambient Water Quality Criteria - Marine Acute Value divided by 10 NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

 Lowest Chronic Value observed in freshwater daphnids ORNL, 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. November.

#### Table G-20 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Site 29 Northeast Cape, St. Lawrence Island, Alaska

		Fresh Surfac	e Water Da	ata	$= e_{\mu} \stackrel{\mathrm{der}}{=} e_{\mu}$	BUTL	(mg/L)	Ecological	COPEC Screening	
	Maximum	Maximum	Numb	er of	Detection	Fresh Surface	Ephemeral	Benchmark <sup>a</sup>	Benchmark <sup>b</sup>	COPEC?
Constituent	Detect (mg/L)	Detect (mg/L)	Samples	Detects	Frequency	Water	Surface Water	(mg/L)	(mg/L)	(Yes/No)

Table 1. Summary of conventional benchmarks for priority contaminants in fresh water.

° Soil Screening Criteria are not available for this essential nutrient. This analyte is excluded as a COPEC based on essential nutrient status.

NA - Not applicable.

BUTL - Background upper tolerance limit. COPEC - Chemical of Potential Ecological Concern. mg/kg - Milligrams per kilogram. na - Not available.

nc - Not calculated.

#### Tab Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Fish Tissue Site 29 Northeast Cape, St. Lawrence Island, Alaska

			Numb	or of	Detection	BUTL (mg/kg)	Ecological Benchmark <sup>a</sup>	COPEC Screening Benchmark <sup>b</sup>	COPEC?
	Fish Tissue Conc Maximum Detect	Minimum Result			Frequency	Fish Tissue	(mg/kg)	(mg/kg)	(Yes/No)
Constituent	Maximum Detect	Millimum Result	Gampies	Dettetts	riequility		0.0		
Inorganics									
Antimony	0.01	0.01	15	1	0.07	nc	na	na	Yes
Arsenic	0.78	0.21	15	15	1.0	nc	na	na	Yes
Barium	0.466	0.015	15	15	1.0	nc	na	na	Yes
Cadmium	0.044	0.0060	15	11	0.73	nc	na	na	Yes
Copper	3.01	0.55	15	15	1.0	nc	na	na	Yes
Lead	0.012	0.0030	15	10	0.67	nc	na	na	Yes
Mercury	0.022	0.0040	15	15	1.0	nc	na	na	Yes
Nickel	1.1	0.030	15	7	0.47	nc	na	na	Yes
Selenium	0.52	0.12	15	15	1.0	nc	na	na	Yes
Silver	0.036	0.011	15	5	0.33	nc	na	na	Yes
Vanadium	0.142	0.017	15	15	1.0	nc	na	na	Yes
Zinc	36.9	5.6	15	15	1.0	nc	na	na	Yes
PAHs									
2-Methylnaphthalene	0.0090	0.0026	16	4	0.25	nc	na	na	Yes
Acenaphthene	0.0092	0.0013	16	5	0.31	nc	na	na	Yes
Anthracene	0.011	0.0017	15	5	0.33	nc	na	na	Yes
Benzo(a)anthracene	0.012	0.0014	16	6	0.38	nc	na	na	Yes
Benzo(a)pyrene	0.0090	0.0021	16	4	0.25	nc	na	na	Yes
Benzo(b)fluoranthene	0.0073	0.0012	16	6	0.38	nc	na	na	Yes
Benzo(g,h,i)perylene	0.0089	0.0025	16	6	0.38	nc	na	na	Yes
	0.018	0.0024	16	6	0.38	nc	na	na	Yes
Benzo(k)fluoranthene	0.012	0.0019	16	6	0.38	nc	na	na	Yes
Chrysene	0.0068	0.0016	15	3	0.20	nc	na	na	Yes
Dibenz(a,h)anthracene	0.013	0.0017	16	6	0.38	nc	na	na	Yes
Fluoranthene	0.015	0.0012	15	6	0.40	nc	na	na	Yes
Fluorene	0.0043	0.00074	16	7	0.44	nc	na	na	Yes
Indeno(1,2,3-cd)pyrene		0.0018	16	7	0.44	nc	na	na	Yes
Naphthalene	0.0066	0.0018	15	9	0.60	nc	na	na	Yes
Phenanthrene	0.012	0.0014	15	7	0.44	nc	na	na	Yes
Pyrene	0.014	0.0020	10						
PCBs	0.000	0.0061	16	15	0.94	nc	na	na	Yes
PCB-1254 (Aroclor 1254)	0.030	0.0061 0.0041	16	3	0.19	nc	na	na	Yes
PCB-1260 (Aroclor 1260)	0.16	0.0041	10	5	0.17				

Notes:

\* Regulaory screening criteria for this medium have not been adopted by ADEC.

<sup>b</sup> Ecological Benchmark Criterion is not currently available for this media.

## Table G-21 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Fish Tissue Site 29 Northeast Cape, St. Lawrence Island, Alaska

	Fish Tissue Conc	entration (mg/kg)	Numb		Detection		Ecological Benchmark <sup>®</sup>	COPEC Screening Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Detect	Minimum Result	Samples	Detects	Frequency	Fish Tissue	(mg/kg)	(mg/kg)	(Yes/No)
NA - Not applicable.									
BUTL - Background upper tolerance limit.									
COPEC - Chemical of Potential Ecological	Concern.								
mg/kg - Milligrams per kilogram.									
na - Not available.									
nc - Not calculated.									
PCB - Polychlorinated Biphenyls									
PAH - Polynuclear Aromatic Hydrocarbon	S								

#### Tab Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 31 Northeast Cape, St. Lawrence Island, Alaska

		Soil Tun	dra Data		Dit	-	(ma/lra)	Ecological Benchmark <sup>a</sup>	COPEC Screenin Benchmark <sup>b</sup>	COPEC?
	Maximum	Minimum	Numb		Detection	BUTL				(Yes/No)
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(165/140)
VOCs										
m,p-Xylene	0.017	0.0066	4	2	0.50	nc	nc	4.162	0.4162	No
o-Xylene	0.0053	0.0053	4	1	0.25	nc	nc	4.162	0.4162	No
Toluene	0.024	0.0073	4	3	0.75	nc	nc	200	20	No
PCBs									0.0111	Yes
PCB-1260 (Aroclor 1260)	22	0.36	8	6	0.75	nc	nc	0.111	0.0111	105
Petroleum Hydrocarbons										Ves
Diesel Range Organics (DRO)	11,000	11	24	24	1.0	nc	nc	na	na	Yes
Residual Range Organics (RRO)	9,600	12	24	12	0.50	nc	nc	na	na	Yes

Notes:

<sup>a</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November. (Table 1)

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil.

Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.)

<sup>b</sup> Ecological risk-based screening criteria (ERBSC) is equal to one-tenth the ecological benchmark criterion.

NA - Not applicable.

BUTL - Background upper tolerance limit.

COPEC - Chemical of potential ecological concern.

mg/kg - Milligrams per kilogram.

na - Not available.

PCB - Polychlorinated Biphenyls

VOC - Volatile Organic Compounds

#### Table G-23 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Surface Water Location Site 31 Northeast Cape, St. Lawrence Island, Alaska

	Eph	emeral Surface V	Water Cond	centration		BUTL	(mg/L)	Ecological	COPEC Screening Benchmark <sup>b</sup>	COPEC?
Constituent	Maximum Detect (mg/L)	Maximum Detect (mg/L)	Numb Samples		Detection Frequency	Fresh Surface Water	Ephemeral Surface Water	Benchmark <sup>a</sup> (mg/L)	(mg/L)	(Yes/No)
Inorganics, Total Aluminum Barium Calcium Iron Magnesium Manganese Sodium	0.050 0.0030 2.2 0.030 0.85 0.0050 4.2	0.050 0.0030 2.1 0.030 0.80 0.0010 4.1	2 2 2 2 2 2 2 2 2	1 1 2 1 2 2 2	0.50 0.50 1.0 0.5 1.0 1.0 1.0	nc nc nc nc nc nc nc nc	2.2 0.034 nc nc nc 0.12 nc	0.087 na NA c NA c NA c 1.1 NA c	0.0087 na NA NA 0.11 NA	No Yes No No Yes No

Notes:

\* Please refer to Technical Memorandum-Background Determination for Risk Assessment, Derivation of Ambient Concentrations for Abiotic Media

Associated with the Northeast Cape, St. Lawrence Island, Alaska (MWH, 2003).

<sup>b</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

1) USEPA National Ambient Water Quality Criteria - Freshwater Chronic Value

NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

2) USEPA National Ambient Water Quality Criteria - Marine Chronic Value NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

3) USEPA National Ambient Water Quality Criteria - Freshwater Acute Value divided by 10

NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

4) USEPA National Ambient Water Quality Criteria - Marine Acute Value divided by 10

NOAA, 1999. Screening Quick Reference Tables (SQuiRT). September.

5) Lowest Chronic Value observed in freshwater daphnids

ORNL, 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. November. Table 1. Summary of conventional benchmarks for priority contaminants in fresh water.

° Soil Screening Criteria are not available for this essential nutrient. This analyte is excluded as a COPEC based on essential nutrient status.

NA - Not applicable.

BUTL - Background upper tolerance limit. COPEC - Chemical of potential ecological concern. mg/L - Milligrams per liter. na - Not available. PCB - Polychlorinated Biphenyls VOC - Volatile Organic Compounds

#### Tabl Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 32 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data					Ecological	COPEC Screenin Benchmark <sup>b</sup>	g COPEC?
	Maximum	Minimum	Numb		Detection	BUTL (n	0 0/	Benchmark <sup>a</sup>	(mg/kg)	(Yes/No)
Constituent	Detect (mg/kg)	Detect (mg/kg)	Samples	Detects	Frequency	Soil Tundra	Soll Gravel	(mg/kg)	(ing/kg)	(100110)
PCBs PCB-1260 (Aroclor 1260)	0.89	0.16	3	2	0.67	na	na	0.111	0.0111	Yes
Petroleum Hydrocarbons Diesel Range Organics (DRO) Residual Range Organics (RRO)	13,000 3,600	230 1,100	5 5	5 3	1.0 0.60	na na	na na	na na	na na	Yes Yes

Notes:

\* Ecological Benchmark Criterion selected based on the following hierarchy:

1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November. (Table 1)

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil.

Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.)

<sup>b</sup> Ecological risk-based screening criteria (ERBSC) is equal to one-tenth the ecological benchmark criterion.

NA - Not applicable.

BUTL - Background upper tolerance limit.

mg/kg - Milligram per kilogram.

na - Not available.

nc - Not calculated.

PCB - Polychlorinated Biphenyls

COPEC - Chemical of Potential Ecological Concern.

#### Table G-25 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 33 Northeast Cape, St. Lawrence Island, Alaska

Constituent	Maximum Detect (mg/kg)	Soil Gra Minimum Detect (mg/kg)	Numb	er of Detects	Detection Frequency	BUTL Soil Tundra	(mg/kg) Soil Gravel	Benchmark <sup>a</sup>	COPEC Screening Benchmark <sup>b</sup> (mg/kg)	COPEC? (Yes/No)
Petroleum Hydrocarbons Diesel Range Organics (DRO) Residual Range Organics (RRO)	660 2,100	150 270	3 3	3 3	1.0 1.0	nc nc	nc nc	na na	na na	Yes Yes

Notes:

\* Ecological Benchmark Criterion selected based on the following hierarchy:

1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November.

(Table 1)

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil. Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.)

<sup>b</sup> Ecological risk-based screening criteria (ERBSC) is equal to one-tenth the ecological benchmark criterion.

NA - Not applicable.

BUTL - Background upper tolerance limit.

COPEC - Chemical of potential ecological concern.

mg/kg - Milligrams per kilogram.

na - Not available.

nc - Not calculated.

#### Tał 6 Selection of Chemicals of Potential Ecological Concern for Tier I Screening - Soil Site 34 Northeast Cape, St. Lawrence Island, Alaska

		Soil Gra	vel Data		-			Ecological	COPEC Screenin	
	Maximum	Minimum	Numb	oer of	Detection	BUTL	(mg/kg)	Benchmark <sup>a</sup>		COPEC?
Constituent			Samples	Detects	Frequency	Soil Tundra	Soil Gravel	(mg/kg)	(mg/kg)	(Yes/No)
PCBs	0.59	0.050	8	5	0.63	nc	nc	0.111	0.0111	Yes
PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260)	0.39	0.063	8	4	0.50	nc	nc	0.111	0.0111	Yes
Petroleum Hydrocarbons									na	Yes
Diesel Range Organics (DRO) Residual Range Organics (RRO)	1,100 1,200	13 58	9 9	9 8	1.0 0.89	nc	nc	na na	na	Yes

Notes:

<sup>a</sup> Ecological Benchmark Criterion selected based on the following hierarchy:

1) ECO-SSLs

Ecological Soil Screening Level Guidance - Draft. Office of Emergency and Remedial Response. July 10. (EPA, 2000).

2) The lower of ORNL plant or soil invertebrate benchmarks.

Plant benchmarks derived from ORNL (1997), Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. November.

(Table 1)

3) The lower of ORNL mammalian or avian dietary wildlife benchmarks, assuming diet consists of 100% soil.

Toxicological Benchmarks for Wildlife: 1996 Revision. June. (ORNL, 1996). (Appendix D Table 12-NOAEL-Based Benchmark for Food.)

<sup>b</sup> Ecological risk-based screening criteria (ERBSC) is equal to one-tenth the ecological benchmark criterion.

COPEC - Chemical of potential ecological concern. mg/kg - Milligrams per kilogram. na - Not available. nc - Not calculated. PCB - Polychlorinated Biphenyls

# **APPENDIX H**

Ecological Hazard Calculations



## ТАВЬЕ п-1

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE SITE 3 - Fuel Line Corridor and Pumphouse NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
Lead	119	0	0.64	6.8E-01 7.2E-08	1.3E+01 8.0E+02	0.053 0.00000000089
Xylenes Anthracene	0 10.3	0.54 0	0.13	7.3E-02	8.7E+01	0.00084
Naphthalene PCB-1260 (Aroclor 1260)	50.8 0.75	0	2.7 0.00090	7.6E-01 3.7E-03	8.0E+01 2.9E-01	0.0094 0.013
Diesel Range Organics	2,587	14 11	135 108	na 3.1E+01	na 8.0E+01	na 0.38
Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic	2,070 1,035	0	54	1.5E+01	8.0E+01	0.19
Residual Range Organics Residual Range Organics, Aliphatic	0	8.1 7.3	0	na 9.69E-07	na 8.69E+01	na 0.000000011
Residual Range Organics, Aromatic	0	2.4	0	3.23E-07	8.69E+01 Max HQ	0.000000037 0.38

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX SITE 3 - Fuel Line Corridor and Pumphouse NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Lead Xylenes Anthracene Naphthalene PCB-1260 (Aroclor 1260) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	119 0 10.3 50.8 0.75 2,587 2,070 1,035 0 0 0	0 0.54 0 0 0 14 11 0 8.1 7.3 2.4	0.64 0 0.13 2.7 0.00090 135 108 54 0 0 0 0	0.036 0 0.0000027 0.0000024 0.000079 0.00012 0.000096 0.000048 0 0 0	3.1E-04 8.1E-11 2.8E-05 1.5E-04 1.9E-06 na 6.3E-03 3.2E-03 na 1.09E-09 3.63E-10	7.4E-01 4.6E+01 5.0E+00 4.6E+00 1.7E-02 na 4.6E+00 4.6E+00 na 5.01E+00 5.01E+00 Max HQ	0.00042 0.000000000017 0.0000055 0.000033 0.00011 na 0.0014 0.00068 na 0.0000000022 0.0000000022 0.00014

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

#### TAL\_\_\_-3

# ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

SITE 3 - Fuel Line Corridor and Pumphouse

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Lead Xylenes Anthracene Naphthalene PCB-1260 (Aroclor 1260) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics, Aliphatic Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	119 0 10.3 50.8 0.75 2,587 2,070 1,035 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	0 0.54 0 0 14 11 0 8.1 7.3 2.4	$\begin{array}{c} 0.64 \\ 0 \\ 0.13 \\ 2.7 \\ 0.00090 \\ 135 \\ 108 \\ 54 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{array}$	0 0 0 0 0 0 0 0 0 0 0 0 0	2.3E-08 3.5E-13 4.6E-09 9.4E-08 3.2E-11 na 3.8E-06 1.9E-06 na 4.73E-12 1.58E-12	2.1E+00 na 5.4E-01 4.3E-01 2.0E-01 na 4.3E-01 4.3E-01 na 5.41E-01 5.41E-01 5.41E-01	0.000000011 na 0.0000000084 0.00000022 0.00000000016 na 0.0000090 0.0000045 na 0.00000000087 0.000000000029 0.0000090

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

# SITE 4 - Subsistence Fishing and Hunting Camp NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
	0	0.0069	0	9.2E-10	8.0E+02	0.000000000011
Xylenes	14	0	0.17	9.8E-02	8.7E+01	0.0011
Anthracene	14	0	0.025	5.8E-02	8.7E+01	0.00066
Chrysene	13	0	0.23	1.1E-01	8.7E+01	0.0012
Fluorene	5,300	3.7	277	na	na	na
Diesel Range Organics	4,240	3.0	221	6.3E+01	8.0E+01	0.79
Diesel Range Organics, Aliphatic	2,120	0	111	3.2E+01	8.0E+01	0.39
Diesel Range Organics, Aromatic	3,420	6.5	4.5	na	na	na
Residual Range Organics	3,078	5.9	4.1	1.53E+01	8.69E+01	0.18
Residual Range Organics, Aliphatic	1,026	2.0	1.4	5.09E+00	8.69E+01	0.059
Residual Range Organics, Aromatic	1,020	2.0			Max HQ	0.79

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

### TAE\_\_\_-5

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

SITE 4 - Subsistence Fishing and Hunting Camp NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
	0	0.0069	0	0	2.9E-12	4.6E+01	0.000000000000063
Xylenes		0.0009	0.17	0.0000036	1.0E-04	5.0E+00	0.000021
Anthracene	14	0	0.025	0.000042	8.2E-05	5.0E+00	0.000016
Chrysene	11	-		0.0000042	9.9E-05	5.0E+00	0.000020
Fluorene	13	0	0.23				na
Diesel Range Organics	5,300	3.7	277	0.00025	na	na	
Diesel Range Organics, Aliphatic	4,240	3.0	221	0.00020	3.7E-02	4.6E+00	0.0079
Diesel Range Organics, Aromatic	2,120	0	111	0.000098	1.8E-02	4.6E+00	0.0039
Residual Range Organics	3,420	6.5	4.5	0	na	na	na
	3,078	5.9	4.1	0	2.25E-02	5.01E+00	0.0045
Residual Range Organics, Aliphatic	1,026	2.0	1.4	0	7.49E-03	5.01E+00	0.0015
Residual Range Organics, Aromatic	1,020	2.0	1.4			Max HQ	0.0079

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL SITE 4 - Subsistence Fishing and Hunting Camp NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Xylenes	0	0	0.0069	0	0	1.3E-14	na	na
Anthracene	14	0	0	0.17	0	1.7E-08	5.4E-01	0.00000032
	14	0	0	0.025	0	2.5E-09	5.4E-01	0.000000047
Chrysene	13	0	0	0.23	0	2.3E-08	5.4E-01	0.00000043
Fluorene Discul Bassa Oscarias	5,300	0	3.7	277	0	na	na	na
Diesel Range Organics	4,240	0	3.0	221	0	2.2E-05	4.3E-01	0.000052
Diesel Range Organics, Aliphatic	2,120	0	0	111	0	1.1E-05	4.3E-01	0.000026
Diesel Range Organics, Aromatic	· · · · · · · · · · · · · · · · · · ·	0	6.5	4.5	0	na	na	na
Residual Range Organics	3,420	0	5.9	4.1	0	4.12E-07	5.41E-01	0.0000076
Residual Range Organics, Aliphatic	3,078	-	2.0	1.4	0	1.37E-07	5.41E-01	0.0000025
Residual Range Organics, Aromatic	1,026	0	2.0	1.4	Ũ		Max HQ	0.000052

### Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

### TAI I-7

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

# Sites 3 & 4 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
			0.64	C 9E 01	1.3E+01	0.053
Lead	119	0	0.64	6.8E-01		0.00000000089
Xylenes	0	0.54	0	7.2E-08	8.0E+02	
Anthracene	14	0	0.17	1.0E-01	8.7E+01	0.0011
Chrysene	11	0	0	5.6E-02	8.7E+01	0.00065
Fluorene	13	0	0	1.1E-01	8.7E+01	0.0012
Naphthalene	50.8	0	2.7	7.6E-01	8.0E+01	0.0094
PCB-1260 (Aroclor 1260)	0.75	0	0.00090	3.7E-03	2.9E-01	0.013
Diesel Range Organics	5,300	14	277	na	na	na
Diesel Range Organics, Aliphatic	4,240	11	221	6.3E+01	8.0E+01	0.79
Diesel Range Organics, Amphatic	2,120	0	111	3.2E+01	8.0E+01	0.39
0 0	3,420	8.1	4.5	na	na	na
Residual Range Organics	3,078	7.3	4.1	1.53E+01	8.69E+01	0.18
Residual Range Organics, Aliphatic		2.4	1.4	5.09E+00	8.69E+01	0.059
Residual Range Organics, Aromatic	1,026	2.4	1.4	2.07.11.00	Max HQ	0.79

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

# Sites 3 & 4 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Lead Xylenes Anthracene Naphthalene PCB-1260 (Aroclor 1260) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics, Aliphatic Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	119 0 14 50.8 0.75 5,300 4,240 2,120 3,420 3,078 1,026	0 0.54 0 0 0 14 11 0 8.1 7.3 2.4	0.64 0 0.17 2.7 0.00090 277 221 111 4.5 4.1 1.4	0.036 0 0.0000037 0.000024 0.000079 0.00025 0.000197 0.000098 0 0 0	1.2E-03 3.1E-10 1.4E-04 5.9E-04 7.4E-06 na 4.9E-02 2.5E-02 na 3.04E-02 1.01E-02	7.4E-01 4.6E+01 5.0E+00 4.6E+00 1.7E-02 na 4.6E+00 4.6E+00 na 5.01E+00 5.01E+00 Max HQ	0.0016 0.000000000067 0.000029 0.00013 0.00044 na 0.011 0.0053 na 0.0061 0.0020 <b>0.011</b>

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

# ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

#### Sites 3 & 4 Combined

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard	
Nap PCB Dies Dies Dies Resi	1	119 0 14 51 0.75 5,300 4,240 2,120 3,420 3,078	0 0 0 0 0 0 0 0 0 0 0 0	0 0.54 0 0 14 11 0 8.1 7.3	0.64 0 0.17 2.7 0.00090 277 221 111 4.5 4.1		8.8E-08 1.3E-12 2.4E-08 3.6E-07 1.2E-10 na 3.0E-05 1.5E-05 na 5.58E-07	2.1E+00 na 5.4E-01 4.3E-01 2.0E-01 na 4.3E-01 4.3E-01 na 5.41E-01	0.000000041 na 0.000000044 0.000000061 na 0.000071 0.000035 na 0.0000010 0.0000034	
	idual Range Organics, Aromatic	1,026	0	2.4	1.4	0	1.86E-07	5.41E-01 Max HQ	0.0000034	

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

# SITE 6 - Cargo Beach Road Drum Field NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
				475.01	2 15.00	15
Aluminum	9,850	0	4.7	4.7E+01	3.1E+00	
Manganese	164	0	4.9	1.7E+00	1.4E+02	0.012
Zinc	106	0	0.000000000153	5.0E-01	9.0E+00	0.055
Diesel Range Organics	102,000	1.8	5,324	na	na	na
Diesel Range Organics, Aliphatic	81,600	1.4	4,259	1.2E+03	8.0E+01	15
Diesel Range Organics, Anomatic	40,800	0.58	2,130	6.1E+02	8.0E+01	7.6
Residual Range Organics	8,500	0	11	na	na	na
Residual Range Organics, Aliphatic	7,650	0	10	3.79E+01	8.69E+01	0.44
	2,550	0	3.4	1.26E+01	8.69E+01	0.15
Residual Range Organics, Aromatic	2,550	0	5.4		Max HQ	15

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

### ТАВСЕ п-11

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX SITE 6 - Cargo Beach Road Drum Field NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Aluminum	9,850	0	4.7	15	3.5E-02	1.8E-01	0.20
Manganese	164	0	4.9	0.07	6.2E-04	8.2E+00	0.000076
Zinc	106	0	0.00000000015	10.60	1.5E-03	5.2E-01	0.0029
Diesel Range Organics	102,000	1.8	5,324	0.00	na	na	na
Diesel Range Organics, Aliphatic	81,600	1.4	4,259	0.00	3.3E-01	4.6E+00	0.071
Diesel Range Organics, Aromatic	40,800	0.58	2,130	0.00	1.6E-01	4.6E+00	0.035
Residual Range Organics	8,500	0	11	0.08	na	na	na
Residual Range Organics, Aliphatic	7,650	0	10	0.07	2.60E-02	5.01E+00	0.0052
Residual Range Organics, Aromatic	2,550	0	3.4	0.02	8.67E-03	5.01E+00	0.0017
residual range organics, in onlare	-,					Max HQ	0.20

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL SITE 6 - Cargo Beach Road Drum Field NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
		0	0	4.7	0	2.2E-07	5.8E+01	0.000000039
Aluminum	9,850	0	0	4.9	0	2.3E-07	5.7E+02	0.0000000041
Manganese	164	0	0	0.00000000015	0	7.2E-19	1.4E+02	5.1E-21
Zinc	106	0	0		0	na	na	na
Diesel Range Organics	102,000	0	1.8	5,324		2.0E-04	4.3E-01	0.00047
Diesel Range Organics, Aliphatic	81,600	0	1.4	4,259	0			0.00023
Diesel Range Organics, Aromatic	40,800	0	0.58	2,130	0	1.0E-04	4.3E-01	
Residual Range Organics	8,500	0	0	11	0	na	na	na
0 0	7,650	0	0	10	0	4.77E-07	5.41E-01	0.0000088
Residual Range Organics, Aliphatic		0	0	3.4	0	1.59E-07	5.41E-01	0.0000029
Residual Range Organics, Aromatic	2,550	0	Ū	5.1			Max HQ	0.00047

#### Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

### ТАВин 11-13

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 7 - Cargo Beach Road Landfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
	15	0.017	0.063	8.1E-02	4.9E+00	0.016
Arsenic	0	0.017	0	1.6E-09	8.2E-01	0.000000019
Barium	3.4	0.012	0.15	4.5E-02	1.6E+00	0.028
Cadmium	3.4 43	0.016	0	2.0E-01	5.6E+00	0.036
Chromium	8.3	0.010	0.40	1.2E-01	2.5E+01	0.0047
Copper	8.5	0.065	1.1	1.1E+00	1.3E+01	0.088
Lead	0.31	0.005	0	1.5E-03	2.1E+00	0.00070
Mercury	0.31	0.00038	0	5.1E-11	2.1E+00	0.00000000024
Mercury, Dissolved	50	0.0038	0.19	2.7E-01	8.0E+01	0.0034
Nickel	2.0	0.041	0.096	2.8E-02	3.3E-01	0.086
Silver, Dissolved		0.0024	0.00000	3.2E-10	2.1E-02	0.00000015
Thallium	0	0.0012	0.00000	1.6E-10	2.1E-02	0.000000076
Thallium, Dissolved	0.18	0.0012	0.19	3.8E-02	4.3E+01	0.00087
Bromomethane	3.9	0	1.4	2.9E-01	4.6E+02	0.00062
4-Methylphenol (p-Cresol)		0	0.0019	7.9E-03	2.9E-01	0.027
PCB-1260 (Aroclor 1260)	1.6	0	0.00000041	2.5E-06	1.6E-02	0.00016
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00052	0.0000052	0.000013	9.7E-05	1.6E-03	0.060
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.020		0.0000013	7.8E-07	1.6E-04	0.0048
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.00016	0 0.00000071	0.00000074	5.3E-06	1.6E-04	0.033
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.0011		0.00000016	9.7E-08	1.6E-05	0.0060
1,2,3,4,7,8-Hexachlorodibenzofuran	0.000020	0	0.000000084	5.2E-08	1.6E-05	0.0033
1,2,3,6,7,8-Hexachlorodibenzofuran	0.000011	0	0.000000020	1.4E-07	1.6E-05	0.0090
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.000030	0	0.000000020	5.8E-09	1.6E-05	0.00036
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000012	0	0.0000000000000000000000000000000000000	4.3E-09	1.6E-05	0.0027
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0000089	0	0.0000000094	4.3E-08	3.2E-06	0.018
2,3,4,7,8-Pentachlorodibenzofuran 2,3,7,8-Tetrachlorodibenzofuran	0.000012 0.000029	0 0	0.000000094	1.4E-07	1.6E-06	0.088

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

# Site 7 - Cargo Beach Road Landfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
Total Heptachlorodibenzofurans (HpCDF)	0.00053	0 0.0000014	na na	na na	na na	na na
Total Heptachlorodibenzo-p-dioxins (HpCDD) Total Hexachlorodibenzofurans (HxCDF)	0.00019	0	na	na na	na na	na na
Total Hexachlorodibenzo-p-dioxins (HxCDD) Total Pentachlorodibenzofurans (PeCDF)	0.00034 0.00011	0 0	na na	na	na	na
Total Tetrachlorodibenzofurans (TCDF)	0.00015 0.000039	0	na na	na na	na na	na na
Total Tetrachlorodibenzo-p-dioxins (TCDD) Diesel Range Organics	32,000	12	1,670	na 3.8E+02	na 8.0E+01	na 4.8
Diesel Range Organics, Aliphatic	25,600 12,800	9.6 4.8	1,336 668	3.8E+02 1.9E+02	8.0E+01	2.4
Diesel Range Organics, Aromatic Residual Range Organics	3,448	0	4.6 4.1	na 1.5E+01	na 8.69E+01	na 0.18
Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	3,103 1,034	0 0	1.4	5.1E+00	8.69E+01 Max HQ	0.059 <b>4.8</b>

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

### ТАВин п-14

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Site 7 - Cargo Beach Road Landfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
			0.070	0.02	2.75.04	2.8E-01	0.0013
Arsenic	15	0.017	0.063	0.03	3.7E-04	4.7E-01	0.0000000034
Barium	0	0.012	0	0.00	1.6E-11 9.4E-05	4.7E-02 9.3E-02	0.0010
Cadmium	3.4	0	0.15	0.00	9.4E-03 1.2E-03	9.3E-02 3.2E-01	0.0036
Chromium	43	0.016	0	0.24	1.2E-03 2.9E-04	1.4E+00	0.00020
Copper	8.3	0	0	0.087	2.9E-04 4.7E-03	7.4E-01	0.0063
Lead	196	0.065	1.1	0.059		1.2E-01	0.00054
Mercury	0.3	0	0	0.078	6.6E-05 5.1E-13	1.2E-01 1.2E-01	0.000000000043
Mercury, Dissolved	0	0.00038	0	0.00	1.4E-03	4.6E+00	0.000304
Nickel	50	0.041	0.19	0.30		4.0E+00 1.9E-02	0.0032
Silver, Dissolved	2.0	0	0.10	0.006	5.9E-05	1.9E-02 1.2E-03	0.000000027
Thallium	0	0.0024	0.00000	0.00	3.2E-12	1.2E-03	0.0000000027
Thallium, Dissolved	0	0.001	0	0.00	1.6E-12		0.000000015
Bromomethane	0.18	0	0.19	0.00	2.0E-05	2.5E+00	0.0000077
4-Methylphenol (p-Cresol)	3.9	0	1.4	0.00	2.0E-04	2.7E+01	0.0022
PCB-1260 (Aroclor 1260)	1.6	0	0.0019	0.00	3.7E-05	1.7E-02	0.00013
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.0	0	0	0.00	1.2E-08	9.3E-04	0.0050
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.020	0.0000052	0.000013	0.00	4.7E-07	9.3E-05	0.0004
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0002	0	0.000000	0.00	3.7E-09	9.3E-06	0.0028
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.0011	0.0000071	0.0000074	0.00	2.6E-08	9.3E-06	0.00050
1,2,3,4,7,8-Hexachlorodibenzofuran	0.000020	0	0.00000016	0.00	4.7E-10	9.3E-07	0.00027
1,2,3,6,7,8-Hexachlorodibenzofuran	0.000011	0	0.000000084	0.00	2.5E-10	9.3E-07	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.000030	0	0.00000020	0.00	7.0E-10	9.3E-07	0.00076
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000012	0	0.0000000081	0.00	2.8E-11	9.3E-07	0.000030
2,3,4,6,7,8-Hexachlorodibenzofuran	0.000089	0	0.000000070	0.00	2.1E-10	9.3E-07	0.00022
2,3,4,7,8-Pentachlorodibenzofuran	0.000012	0	0.000000094	0.00	2.8E-10	1.9E-07	0.0015
2,3,7,8-Tetrachlorodibenzofuran	0.000029	0	0.00000023	0.00	6.8E-10	9.3E-08	0.0073
Total Heptachlorodibenzofurans (HpCDF)	0.00053	0	na	na	na	na	na
Total Heptachlorodibenzo-p-dioxins (HpCDD)	0.0022	0.0000014	na	na	na	na	na

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Site 7 - Cargo Beach Road Landfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
	0.00019	0	na	na	na	na	na
Total Hexachlorodibenzofurans (HxCDF)	0.00019	0	na	na	na	na	na
Total Hexachlorodibenzo-p-dioxins (HxCDD)	0.00011	0	na	na	na	na	na
Total Pentachlorodibenzofurans (PeCDF)	0.00011	0	na	na	na	na	na
Total Tetrachlorodibenzofurans (TCDF)	0.000039	0	na	na	na	na	na
Total Tetrachlorodibenzo-p-dioxins (TCDD)	32,000	12	1,670	0.00	na	na	na
Diesel Range Organics	25,600	9.6	1,336	0.00	7.1E-01	4.6E+00	0.15
Diesel Range Organics, Aliphatic	12,800	4.8	668	0.00	3.5E-01	4.6E+00	0.076
Diesel Range Organics, Aromatic	3,448	0	4.6	0.030	na	na	na
Residual Range Organics	3,103	0	4.1	0.027	7.27E-02	5.01E+00	0.014
Residual Range Organics, Aliphatic	1,034	0	1.4	0.009	2.42E-02	5.01E+00	0.0048
Residual Range Organics, Aromatic	1,054	v				Max HQ	0.15

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

#### TAB 15

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL Site 7 - Cargo Beach Road Landfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
8			0.017	0.00	0	2.0E-08	1.1E+00	0.00000019
Arsenic	15	0	0.017	0.06	0	7.1E-14	1.1E+00	0.0000000000000063
Barium	0	0	0.012	0 0.15	0	4.8E-08	1.3E+00	0.00000036
Cadmium	3.4	0	0	0.15	0	9.3E-14	9.7E-01	0.00000000000010
Chromium	43	0	0.016	0.40	0	1.3E-07	2.5E+01	0.000000051
Copper	8.3	0	0	1.1	0	3.4E-07	2.1E+00	0.00000016
Lead	196	0	0.065	0.0	0	0.0E+00	2.6E-01	0
Mercury	0.31	0	0	0.0	0	2.2E-15	2.6E-01	0.000000000000087
Mercury, Dissolved	0	0	0.00038	0.19	0	6.2E-08	7.1E+01	0.0000000087
Nickel	50	0	0.041	0.19	0	3.1E-08	1.6E+02	0.0000000019
Silver, Dissolved	2.0	0	0	0.10	0	1.4E-14	1.7E-01	0.0000000000083
Thallium	0	0	0.0024	0	0	7.1E-15	1.7E-01	0.00000000000042
Thallium, Dissolved	0	0	0.0012	0.19	0	6.1E-08	na	na
Bromomethane	0.18	0	0	1.4	0	4.4E-07	na	na
4-Methylphenol (p-Cresol)	3.9	0	0	0.0019	0	6.2E-10	2.0E-01	0.000000031
PCB-1260 (Aroclor 1260)	1.6	0	0	0.00000041	0	1.3E-13	1.1E-01	0.000000000012
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00052	0	0	0.0000041	0	4.4E-12	1.1E-01	0.00000000041
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.020	0	0.0000052	0.0000013	0	4.0E-14	1.1E-03	0.0000000004
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.00016	0	0	0.00000013	0	2.4E-13	1.1E-02	0.00000000022
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.0011	0	0.00000071	0.00000016	0	5.0E-15	1.1E-04	0.00000000047
1,2,3,4,7,8-Hexachlorodibenzofuran	0.000020	0	0	0.000000018	0	2.7E-15	1.1E-04	0.00000000025
1,2,3,6,7,8-Hexachlorodibenzofuran	0.000011	0	0	0.0000000000000000000000000000000000000	0	6.5E-15	1.1E-03	0.000000000061
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.000030	0	0	0.000000020	0	2.6E-16	1.1E-04	0.000000000024
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000012	0	0	0.0000000000000000000000000000000000000	0	2.2E-15	1.1E-04	0.00000000021
2,3,4,6,7,8-Hexachlorodibenzofuran	0.000089	0	0		0	3.0E-15	1.1E-05	0.0000000028
2,3,4,7,8-Pentachlorodibenzofuran	0.000012	0	0	0.000000094	0	7.3E-15	1.1E-05	0.0000000068
2,3,7,8-Tetrachlorodibenzofuran	0.000029	0	0	0.00000023		na	na	na
Total Heptachlorodibenzofurans (HpCDF)	0.00053	0	0	na	na	na	na	na
Total Heptachlorodibenzo-p-dioxins (HpCDD)	0.0022	0	0.0000014	na	na	na	na	na
Total Hexachlorodibenzofurans (HxCDF)	0.00019	0	0	na	na	na	na	na
Total Hexachlorodibenzo-p-dioxins (HxCDD)	0.00034	0	0	na	na	na	na	na
Total Pentachlorodibenzofurans (PeCDF)	0.00011	0	0	na	na na	na	na	na
Total Tetrachlorodibenzofurans (TCDF)	0.00015	0	0	na		na	na	na
Total Tetrachlorodibenzo-p-dioxins (TCDD)	0.000039	0	0	na	na O	na	na	na
Diesel Range Organics	32,000	0	12	1,670	0	na	110	

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL Site 7 - Cargo Beach Road Landfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

СОРЕС	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	25,600 12,800 3,448 3,103 1,034	0 0 0 0	9.6 4.8 0 0 0	1,336 668 4.6 4.1 1.4	0 0 0 0	4.3E-04 2.2E-04 na 1.33E-06 4.44E-07	4.3E-01 4.3E-01 na 5.41E-01 5.41E-01 Max HQ	0.0010 0.00050 na 0.0000025 0.0000082 0.0010

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable
#### TABL. .. 16

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 6 & 7 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
			17	4 75 . 01	3.1E+00	15
Aluminum	9,850	0	4.7	4.7E+01 8.1E-02	4.9E+00	0.016
Arsenic	15	0.017	0.063	8.1E-02 1.6E-09	4.9E+00 8.2E-01	0.000000019
Barium	0	0.012	0	4.5E-09	1.6E+00	0.028
Cadmium	3.4	0	0.15	4.5E-02 2.0E-01	5.6E+00	0.028
Chromium	43	0.016	0	1.1E+00	1.3E+00	0.088
Lead	196	0.065	1.1		1.4E+01	0.012
Manganese	164	0	5	1.7E+00	2.1E+02	0.00070
Mercury	0.31	0	0	1.5E-03 5.1E-11	2.1E+00 2.1E+00	0.00000000024
Mercury, Dissolved	0	0.00038	0		2.1E+00 8.0E+01	0.0034
Nickel	50	0.041	0.19	2.7E-01	3.3E-01	0.086
Silver, Dissolved	2.0	0	0.096	2.8E-02	2.1E-02	0.000000015
Thallium	0	0.0024	0	3.2E-10	2.1E-02 2.1E-02	0.0000000076
Thallium, Dissolved	0	0.0012	0	1.6E-10		0.022
Zinc	42	0	0.000000000060	2.0E-01	9.0E+00	0.0022
Bromomethane	0.18	0	0.19	3.8E-02	4.3E+01	0.00062
4-Methylphenol (p-Cresol)	3.9	0	1.4	2.9E-01	4.6E+02	0.0002
PCB-1260 (Aroclor 1260)	1.6	0	0.0019	7.9E-03	2.9E-01	0.00016
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00052	0	0.00000041	2.5E-06	1.6E-02	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.020	0.0000052	0.000013	9.7E-05	1.6E-03	0.060
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.00016	0	0.0000013	7.8E-07	1.6E-04	0.0048
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.0011	0.00000071	0.0000074	5.3E-06	1.6E-04	0.033
1,2,3,4,7,8-Hexachlorodibenzofuran	0.000020	0	0.00000016	9.7E-08	1.6E-05	0.0060
1,2,3,6,7,8-Hexachlorodibenzofuran	0.000011	0	0.000000084	5.2E-08	1.6E-05	0.0033
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.000030	0	0.00000020	1.4E-07	1.6E-05	0.0090
1,2,3,7,8,9-Hexachlorodibenzofuran	0.0000040	0	0.0000000031	1.9E-09	1.6E-05	0.00012
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.000031	0	0.00000021	1.5E-07	1.6E-05	0.0093

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# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

#### Site 6 & 7 Combined

# NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
2,3,4,6,7,8-Hexachlorodibenzofuran 2,3,4,7,8-Pentachlorodibenzofuran 2,3,7,8-Tetrachlorodibenzofuran Total Heptachlorodibenzofurans (HpCDF) Total Heptachlorodibenzo-p-dioxins (HpCDD) Total Hexachlorodibenzo-p-dioxins (HxCDD) Total Hexachlorodibenzofurans (HxCDD) Total Pentachlorodibenzofurans (PeCDF) Total Tetrachlorodibenzofurans (TCDF) Total Tetrachlorodibenzo-p-dioxins (TCDD) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aliphatic Residual Range Organics, Aromatic Residual Range Organics, Aromatic	0.0000089 0.000012 0.000029 0.00053 0.0022 0.00019 0.00034 0.00011 0.00015 0.000039 102,000 81,600 40,800 8,500 7,650 2,550	$\begin{array}{c} 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ 0\\ $	0.000000070 0.000000094 0.000000023 na na na na na s,324 4,259 2,130 11.3 10.2 3.4	4.3E-08 5.8E-08 1.4E-07 na na na na na na 1.2E+03 6.1E+02 na 3.8E+01 1.3E+01	1.6E-05 3.2E-06 1.6E-06 na na na na na na 8.0E+01 8.0E+01 8.69E+01 8.69E+01 8.69E+01	0.0027 0.018 0.088 na na na na na na na 15 7.6 na 0.44 0.15 <b>15</b>

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

#### TABI 17

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

#### Site 6 & 7 Combined

# NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
				1.5	0.05.01	1.8E-01	1.5
Aluminum	9,850	0	4.7	15	2.8E-01	2.8E-01	0.0015
Arsenic	15	0.017	0.063	0.029	4.2E-04	4.7E-01	0.0000000039
Barium	0	0.012	0	0	1.9E-11	4.7E-02 9.3E-02	0.0012
Cadmium	3.4	0	0.15	0.0020	1.1E-04	9.3E-02 3.2E-01	0.0012
Chromium	43	0.016	0	0.24	1.3E-03	7.4E-01	0.0073
Lead	196	0.065	1.1	0.059	5.4E-03	8.2E+00	0.00060
Manganese	164	0	5	0.068	4.9E-03	8.2E+00 1.2E-01	0.00062
Mercury	0.3	0	0	0.078	7.5E-05	1.2E-01 1.2E-01	0.0000000000049
Mercury, Dissolved	0	0.00038	0	0	5.9E-13	4.6E+00	0.00035
Nickel	50	0.041	0.19	0.30	1.6E-03	4.0E+00 1.9E-02	0.0036
Silver, Dissolved	2.0	0	0.10	0.0063	6.8E-05	1.9E-02 1.2E-03	0.000000031
Thallium	0	0.0024	0.00000	0	3.7E-12	1.2E-03	0.0000000015
Thallium, Dissolved	0	0.001	0	0	1.9E-12	5.2E-03	0.00000015
Zinc	42	0	0.000000000060	4.2	4.7E-03	2.5E+00	0.0000091
Bromomethane	0.18	0	0.19	0	2.3E-05		0.0000091
4-Methylphenol (p-Cresol)	3.9	0	1.4	0	2.3E-04	2.7E+01 1.7E-02	0.0025
PCB-1260 (Aroclor 1260)	1.6	0	0.0019	0	4.3E-05		0.000015
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00052	0	0	0	1.4E-08	9.3E-04	0.0058
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.020	0.0000052	0.000013	0	5.4E-07	9.3E-05	0.00046
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.00016	0	0.000000	0	4.3E-09	9.3E-06	0.0032
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.0011	0.0000071	0.0000074	0	2.9E-08	9.3E-06	0.00058
1,2,3,4,7,8-Hexachlorodibenzofuran	0.000020	0	0.00000016	0	5.4E-10	9.3E-07	0.00031
1,2,3,6,7,8-Hexachlorodibenzofuran	0.000011	0	0.000000084	0	2.9E-10	9.3E-07	0.00087
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.000030	0	0.00000020	0	8.0E-10	9.3E-07	0.000012
1,2,3,7,8,9-Hexachlorodibenzofuran	0.00000040	0	0.000000003	0	1.1E-11	9.3E-07	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.000031	0	0.00000021	0	8.3E-10	9.3E-07	0.00090
2,3,4,6,7,8-Hexachlorodibenzofuran	0.000089	0	0.000000070	0	2.4E-10	9.3E-07	0.00026

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

# Site 6 & 7 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
2,3,4,7,8-Pentachlorodibenzofuran 2,3,7,8-Tetrachlorodibenzofuran Total Heptachlorodibenzofurans (HpCDF) Total Heptachlorodibenzo-p-dioxins (HpCDD) Total Hexachlorodibenzo-p-dioxins (HxCDD) Total Hexachlorodibenzo-p-dioxins (HxCDD) Total Pentachlorodibenzofurans (PeCDF) Total Tetrachlorodibenzofurans (TCDF) Total Tetrachlorodibenzo-p-dioxins (TCDD) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	0.000012 0.000029 0.00053 0.0022 0.00019 0.00034 0.00011 0.00015 0.000039 102,000 81,600 40,800 8,500 7,650 2,550	0 0 0 0.0000014 0 0 0 0 0 0 0 0 12 9.6 4.8 0 0 0 0	0.000000094 0.000000023 na na na na na na na s,324 4,259 2,130 11 10 3.4	0 0 na na na na na na 0 0 0 0.075 0.068 0.023	3.2E-10 7.8E-10 na na na na na a 2.6E+00 1.3E+00 na 2.05E-01 6.84E-02	1.9E-07 9.3E-08 na na na na na na 4.6E+00 4.6E+00 4.6E+00 na 5.01E+00 5.01E+00 Max HQ	0.0017 0.0084 na na na na na na na 0.56 0.28 na 0.041 0.014 1.5

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

#### TABLE 11-18

#### ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

Site 6 & 7 Combined

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
CONDO	(8/	(86/	(					
Aluminum	9,850	0	0	4.7	0	1.7E-06	5.8E+01	0.00000030
Arsenic	15	0	0.017	0.06	0	2.3E-08	1.1E+00	0.00000022
Barium	0	0	0.012	0	0	8.1E-14	1.1E+01	0.000000000000072
Cadmium	3.4	0	0	0.15	0	5.5E-08	1.3E+00	0.00000042
Chromium	43	0	0.016	0	0	1.1E-13	9.7E-01	0.0000000000011
Lead	196	0	0.065	1.1	0	3.9E-07	2.1E+00	0.0000018
Manganese	164	0	0	4.9	0	1.8E-06	5.7E+02	0.000000032
Mercury	0.31	0	0	0.0	0	0.0E+00	2.6E-01	0
Mercury, Dissolved	0	0	0.00038	0	0	2.6E-15	2.6E-01	0.00000000000010
Nickel	50	0	0.041	0.19	0	7.1E-08	7.1E+01	0.000000010
Silver, Dissolved	2.0	0	0	0.10	0	3.5E-08	1.6E+02	0.0000000022
Thallium	0	0	0.0024	0	0	1.6E-14	1.7E-01	0.000000000
Thallium, Dissolved	0	0	0.0012	0	0	8.1E-15	1.7E-01	0.00000000000048
Zinc	42	0	0	0.0000000000000	0	2.2E-18	1.4E+02	0.00000000000000000016
Bromomethane	0.18	0	0	0.19	0	7.0E-08	na	na
4-Methylphenol (p-Cresol)	3.9	0	0	1.4	0	5.1E-07	na	na
PCB-1260 (Aroclor 1260)	1.6	0	0	0.0019	0	7.1E-10	2.0E-01	0.000000036
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00052	0	0	0.0000041	0	1.5E-13	1.1E-01	0.000000000014
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.020	0	0.0000052	0.000013	0	5.0E-12	1.1E-01	0.00000000047
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.00016	0	0	0.0000013	0	4.6E-14	1.1E-03	0.00000000043
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.0011	0	0.0000071	0.0000074	0	2.7E-13	1.1E-02	0.00000000026
1,2,3,4,7,8-Hexachlorodibenzofuran	0.000020	0	0	0.00000016	0	5.8E-15	1.1E-04	0.00000000054
1,2,3,6,7,8-Hexachlorodibenzofuran	0.000011	0	0	0.000000084	0	3.1E-15	1.1E-04	0.00000000029
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.000030	0	0	0.00000020	0	7.5E-15	1.1E-03	0.000000000070
1,2,3,7,8,9-Hexachlorodibenzofuran	0.00000040	0	0	0.0000000031	0	1.2E-16	1.1E-04	0.000000000011
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.000031	0	0	0.00000021	0	7.7E-15	1.1E-04	0.00000000072
2,3,4,6,7,8-Hexachlorodibenzofuran	0.0000089	0	0	0.000000070	0	2.6E-15	1.1E-04	0.00000000024
2,3,4,7,8-Pentachlorodibenzofuran	0.000012	0	0	0.000000094	0	3.5E-15	1.1E-05	0.0000000032
2,3,7,8-Tetrachlorodibenzofuran	0.000029	0	0	0.00000023	0	8.4E-15	1.1E-05	0.0000000078
Total Heptachlorodibenzofurans (HpCDF)	0.00053	0	0	na	na	na	na	na
Total Heptachlorodibenzo-p-dioxins (HpCDD)	0.0022	0	0.0000014	na	na	na	na	na
Total Hexachlorodibenzofurans (HxCDF)	0.00019	0	0	na	na	na	na	na
Total Hexachlorodibenzo-p-dioxins (HxCDD)	0.00034	0	0	na	na	na	na	na
Total Pentachlorodibenzofurans (PeCDF)	0.00011	0	0	na	na	na	na	na

# ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

Site 6 & 7 Combined

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Total Tetrachlorodibenzofurans (TCDF) Total Tetrachlorodibenzo-p-dioxins (TCDD) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	0.00015 0.000039 102,000 81,600 40,800 8,500 7,650 2,550	0 0 0 0 0 0 0	0 0 12 9.6 4.8 0 0 0	na na 5,324 4,259 2,130 11.3 10.2 3.4	na na 0 0 0 0 0 0 0	na na 1.6E-03 7.9E-04 na 3.76E-06 1.25E-06	na na 4.3E-01 4.3E-01 na 5.41E-01 5.41E-01 <b>Max HQ</b>	na na na 0.0037 0.0018 na 0.0000070 0.0000023 0.0037

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

#### TAB -19

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 9 - Housing and Operations Lanfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
Antimony	14	0	0.34	1.3E-01	4.2E+00	0.031
Arsenic	17	0	0.073	9.4E-02	4.9E+00	0.019
Barium	0	0.015	0	2.0E-09	8.2E-01	0.000000024
Cadmium	4.1	0	0	5.4E-02	1.6E+00	0.034
Chromium	29	0	0.026	1.4E-01	5.6E+00	0.025
Copper	98	0	4.7	1.4E+00	2.5E+01	0.055
Lead	276	0	1.5	1.6E+00	1.3E+01	0.12
Mercury	0.21	0	0.00095	1.2E-03	2.1E+00	0.00056
Nickel	27	0	0.10	1.5E-01	8.0E+01	0.0018
Selenium	1.0	0	0.0019	5.1E-03	6.6E-02	0.077
Zinc	459	0.0600	0.00000000066	2.2E+00	9.0E+00	0.24
1,2-Dibromoethane	0.000010	0	na	na	na	na
1,2-Dichlorobenzene	0.025	0	na	na	na	na
1,3-Dichlorobenzene	0.068	0	na	na	na	na
1,3-Dichloropropane	0.000097	0	na	na	na	na
2,2-Dichloropropane	0.00000092	0	na	na	na	na
2-Chloroethyl vinyl ether	0.0000026	0	na	na	na	na
2-Chlorotoluene	0.0000045	0	na	na	na	na
2-Hexanone	0.0000087	0	0.0000064	1.3E-06	4.0E+01	0.00000032
4-Bromophenyl phenyl ether	0.0000024	0	na	na	na	na
4-Chlorophenyl phenyl ether	0.0000029	0	na	na	na	na
	0.0000047	0	na	na	na	na
4-Isopropyltoluene Bromomethane	0.36	0	0	7.6E-02	4.3E+01	0.0017
	0.0000015	0	na	na	na	na
2,4-Dichlorophenol	0.0000013	0	na	na	na	na
2,4-Dimethylphenol 2,4-Dinitrotoluene	0.0000014	0	na	na	na	na

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

### Site 9 - Housing and Operations Lanfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

2,6-Dinitrotoluene 2-Methyl-4,6-dinitrophenol 3,3-Dichlorobenzidine 3-Nitroaniline 4-Chlorotoluene 4-Methylphenol (o-Cresol) 4-Nitroaniline PCB-1260 (Aroclor 1260) 1,2,3,4,6,7,8,9-Octachlorodibenzofuran 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.0000016 0.0000037 0.0000068	0			(mg/kg-day)	HQ
2-Methyl-4,6-dinitrophenol 8,3-Dichlorobenzidine 8-Nitroaniline 4-Chlorotoluene 4-Chlorotoluene 4-Methylphenol (o-Cresol) 4-Nitroaniline PCB-1260 (Aroclor 1260) 1,2,3,4,6,7,8,9-Octachlorodibenzofuran 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.0000037	0	na	na	na	na
<ul> <li>B.3-Dichlorobenzidine</li> <li>B-Nitroaniline</li> <li>I-Chlorotoluene</li> <li>I-Chlorotoluene</li> <li>I-Methylphenol (o-Cresol)</li> <li>I-Nitroaniline</li> <li>PCB-1260 (Aroclor 1260)</li> <li>I.2,3,4,6,7,8,9-Octachlorodibenzofuran</li> <li>I.2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin</li> </ul>		0	na	na	na	na
B-Nitroaniline H-Chloroaniline H-Chlorotoluene H-Methylphenol (o-Cresol) H-Nitroaniline PCB-1260 (Aroclor 1260) I,2,3,4,6,7,8,9-Octachlorodibenzofuran I,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin		0	na	na	na	na
H-Chloroaniline H-Chlorotoluene H-Methylphenol (o-Cresol) H-Nitroaniline PCB-1260 (Aroclor 1260) I.2,3,4,6,7,8,9-Octachlorodibenzofuran I.2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.0000019	0	na	na	na	na
H-Chlorotoluene H-Methylphenol (o-Cresol) H-Nitroaniline PCB-1260 (Aroclor 1260) I.2.3.4.6.7.8.9-Octachlorodibenzofuran I.2.3.4.6.7.8.9-Octachlorodibenzo-p-dioxin		0	0.000012	2.5E-06	1.7E+00	0.0000015
A-Methylphenol (o-Cresol) A-Nitroaniline PCB-1260 (Aroclor 1260) 1,2,3,4,6,7,8,9-Octachlorodibenzofuran 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.000030 0.025	0	na	na	na	na
4-Nitroaniline PCB-1260 (Aroclor 1260) 1,2,3,4,6,7,8,9-Octachlorodibenzofuran 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.025	0	0.00000012	2.6E-08	4.6E+02	0.000000000056
PCB-1260 (Aroclor 1260) 1,2,3,4,6,7,8,9-Octachlorodibenzofuran 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin		-		na	na	na
1,2,3,4,6,7,8,9-Octachlorodibenzofuran 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.00013	0	na O	6.4E-04	2.9E-01	0.0022
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.13	0	0	5.8E-07	1.6E-02	0.000036
	0.00012	0		5.3E-07	1.6E-02	0.0033
	0.0011	0.0000000037	0	1.5E-07	1.6E-04	0.00091
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.000030	0	75.0	5.8E-07	1.6E-04	0.0036
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.00012	0	0	3.2E-07	1.6E-05	0.0020
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0000066	0	0	3.2E-08	1.6E-05	0.0024
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000079	0	0	3.8E-08 3.2E-08	1.6E-06	0.020
2,3,7,8-Tetrachlorodibenzofuran	0.0000066	0	0	6.7E-08	1.6E-06	0.0041
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0000014	0	0		na	na
Total Heptachlorodibenzofurans (HpCDF)	0.000095	0	na	na	na	na
Total Heptachlorodibenzo-p-dioxins (HpCDD)	0.00018	0	na	na	na	na
Total Tetrachlorodibenzofurans (TCDF)	0.000010	0	na	na	na	na
Diesel Range Organics	462	0	24	na	8.0E+01	0.069
Diesel Range Organics, Aliphatic	370	0	19	5.5E+00	8.0E+01 8.0E+01	0.034
Diesel Range Organics, Aromatic	185	0	10	2.8E+00		na
Residual Range Organics	1,539	0	2	na	na	
Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	1,385		2	6.9E+00	8.69E+01	0.079

#### TABL ... 19

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 9 - Housing and Operations Lanfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
				a	Max HQ	0.24
Notes: HQ - Hazard Quotient mg/kg - Milligrams per kilogram.						
mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day.						
na - not applicable PCB - Polychlorinated Biphenyls.						

#### TA] I-20

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Site 9 - Housing and Operations Lanfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	С <sub>некв</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
				0.24	0.014	1.6E-04	2.4E-01	0.00064
Antimony		14	0	0.34	0.014	1.8E-04	2.8E-01	0.00064
Arsenic		17	0	0.073	0.034	8.6E-12	4.7E-02	0.0000000018
Barium		0	0.015	0	0.0024	4.8E-05	9.3E-02	0.00052
Cadmium		4.1	0	0	0.160	4.8E-03 3.4E-04	3.2E-01	0.00105
Chromium		29	0	0.026	1.0	1.5E-04	1.4E+00	0.0010
Copper		98	0	4.7	0.083	2.8E-03	7.4E-01	0.0038
Lead		276	0	1.5		1.9E-05	1.2E-01	0.00016
Mercury		0.21	0	0.00095	0.053		4.6E+00	0.000070
Nickel		27	0	0.10	0.16	3.2E-04	4.0E+00 3.8E-03	0.0039
Selenium		1.0	0	0.0019	0.015	1.5E-05		0.037
Zinc		459	0.060	0.00000000066	46	1.9E-02	5.2E-01	
.2-Dibromoethane		0.000010	0	na	na	na	na	na
1,2-Dichlorobenzene		0.025	0	na	na	na	na	na
1,3-Dichlorobenzene		0.068	0	na	na	na	na	na
1,3-Dichloropropane		0.000097	0	na	na	na	na	na
2,2-Dichloropropane		0.0000092	0	na	na	na	na	na
2-Chloroethyl vinyl		0.0000026	0	na	na	na	na	na
2-Chlorotoluene	ether	0.0000045	0	na	na	na	na	na
2-Hexanone		0.000087	0	0.0000064	0.000000000000041	3.1E-10	2.3E+00	0.0000000014
4-Bromophenyl pher	aul athar	0.0000024	0	na	na	na	na	na
		0.0000029	0	na	na	na	na	na
4-Chlorophenyl pher	iyi ether	0.0000047	0	na	na	na	na	na
4-Isopropyltoluene		0.36	0	0.38	0.000000013	1.7E-05	2.5E+00	0.0000068
Bromomethane		0.0000015	0	na	na	na	na	na
2,4-Dichlorophenol		0.0000013	0	na	na	na	na	na
2,4-Dimethylphenol			0	na	na	na	па	na
2,4-Dinitrotoluene		0.0000016	0	na	na	na	na	na
2,6-Dinitrotoluene		0.0000016	0	na	na	na	na	na
2-Methyl-4,6-dinitro		0.000037			na	na	na	na
3,3-Dichlorobenzidin 3-Nitroaniline	ne	0.00000068 0.0000019	0 0	па	na	na	na	na

#### ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

#### Site 9 - Housing and Operations Lanfill

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	С <sub>негв</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
							0.00000075
4-Chloroaniline	0.000030	0	0.000012	0.0000000000023	7.3E-10	9.7E-02	0.000000075
4-Chlorotoluene	0.0250	0	na	na	na	na	na
4-Methylphenol (o-Cresol)	0.0000035	0	0.00000012	0.000000000000030	7.8E-12	2.7E+01	0.0000000000030
4-Nitroaniline	0.00013	0	na	na	na	na	na
PCB-1260 (Aroclor 1260)	0.13	0	0.00016	0.0000014	1.3E-06	1.7E-02	0.000077
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00012	0	0.00000094	0.000000026	1.2E-09	9.3E-04	0.0000013
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.0011	0.0000000037	0.0000074	0.00000031	1.1E-08	9.3E-05	0.00012
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.000030	0	0.00000023	0.0000000065	3.0E-10	9.3E-06	0.000032
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.00012	0	0.00000081	0.000000033	1.2E-09	9.3E-06	0.00013
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0000066	0	0.000000052	0.0000000014	6.6E-11	9.3E-07	0.000071
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000079	0	0.000000053	0.0000000022	7.8E-11	9.3E-07	0.000084
2,3,7,8-Tetrachlorodibenzofuran	0.0000066	0	0.000000052	0.0000000014	6.6E-11	9.3E-08	0.00071
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0000014	0	0.000000011	0.00000000030	1.4E-11	9.3E-08	0.00015
Total Heptachlorodibenzofurans (HpCDF)	0.000095	0	па	na	na	na	na
Total Heptachlorodibenzo-p-dioxins (HpCDD)	0.00018	0	na	na	na	na	na
Total Tetrachlorodibenzofurans (TCDF)	0.000010	0	na	na	na	na	na
	462	0	24	0.000021	na	na	na
Diesel Range Organics	370	0	19	0.000017	4.3E-03	4.6E+00	0.00094
Diesel Range Organics, Aliphatic	185	0	10	0.0000086	2.2E-03	4.6E+00	0.00047
Diesel Range Organics, Aromatic		0	2.0	0.014	na	na	na
Residual Range Organics	1,539	0	1.8	0.012	1.38E-02	5.01E+00	0.0028
Residual Range Organics, Aliphatic	1,385	0	0.61	0.0041	4.60E-03	5.01E+00	0.00092
Residual Range Organics, Aromatic	462	0	0.01	0.0041		Max HQ	0.037

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

#### TAB -20

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

# Site 9 - Housing and Operations Lanfill NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
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#### TABL L

# ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

Site 9 - Housing and Operations Lanfill

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
				0.04	0	4.6E-08	1.1E+00	0.00000044
Antimony	14	0	0	0.34	0	4.6E-08 1.0E-08	1.1E+00	0.000000010
Arsenic	17	0	0	0.073	0		1.1E+00	0.000000000000033
Barium	0	0	0.015	0	0	3.8E-14		0.0000000000000000000000000000000000000
Cadmium	4.1	0	0	0.18	0	2.5E-08	1.3E+00	0.000000019
Chromium	29	0	0	0.026	0	3.6E-09	9.7E-01 2.5E+01	0.0000000370
Copper	98	0	0	4.7	0	6.5E-07	2.5E+01 2.1E+00	0.00000010
Lead	276	0	0	1.5	0	2.0E-07		0.0000000000000000000000000000000000000
Mercury	0.21	0	0	0.00095	0	1.3E-10	2.6E-01	0.0000000000000000000000000000000000000
Nickel	27	0	0	0.10	0	1.4E-08	7.1E+01	0.00000000020
Selenium	1.0	0	0	0.0019	0	2.6E-10	4.6E-01	0.0000000000000000000000000000000000000
Zinc	459	0	0.060	0.00000000066	0	1.5E-13	1.4E+02	
1,2-Dibromoethane	0.000010	0	0	na	0	na	na	na
1,2-Dichlorobenzene	0.025	0	0	na	0	na	na	na
1,3-Dichlorobenzene	0.068	0	0	na	0	na	na	na
1,3-Dichloropropane	0.000097	0	0	na	0	na	na	na
2,2-Dichloropropane	0.0000092	0	0	na	0	na	na	na
2-Chloroethyl vinyl ether	0.0000026	0	0	na	0	na	na	na
2-Chlorotoluene	0.0000045	0	0	na	0	na	na	na
2-Hexanone (MIBK)	0.0000087	0	0	0.0000064	0	8.9E-13	na	na
4-Bromophenyl phenyl ether	0.0000024	0	0	na	0	na	na	na
4-Chlorophenyl phenyl ether	0.0000029	0	0	na	0	na	na	na
4-Isopropyltoluene	0.0000047	0	0	na	0	na	na	na
2,4-Dichlorophenol	0.0000015	0	0	na	0	na	na	na
2,4-Dimethylphenol	0.0000014	0	0	na	0	na	na	na
2,4-Dinitrotoluene	0.0000016	0	0	na	0	na	na	na
	0.0000016	0	0	na	0	na	na	na
2,6-Dinitrotoluene	0.0000037	0	0	na	0	na	na	na
2-Methyl-4,6-dinitrophenol	0.00000068	0	0	na	0	na	na	na
3,3-Dichlorobenzidine	0.0000019	0	0	na	0	na	na	na
3-Nitroaniline	0.000030	Ő	0	0.000012	0	1.7E-12	1.9E-01	0.00000000087
4-Chloroaniline	0.00050	0	0	na	0	na	na	na
4-Chlorotoluene 4-Methylphenol (o-Cresol)	0.00000035	0	0	0.00000012	0	1.7E-14	na	na

# ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL Site 9 - Housing and Operations Lanfill

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

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COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
COADC					0	na	na	na
4-Nitroaniline	0.000130	0	0	na	0	2.1E-11	2.0E-01	0.0000000011
PCB-1260 (Aroclor 1260)	0.13	0	0	0.00016	0		1.1E-01	0.00000000000012
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	0.00012	0	0	0.00000094	0	1.3E-14	1.1E-01	0.00000000000012
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	0.0011	0	0.0000000037	0.0000074	0	1.0E-13		0.0000000000000000000000000000000000000
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.000030	0	0	0.00000023	0	3.2E-15	1.1E-03	0.0000000000000000000000000000000000000
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.00012	0	0	0.00000081	0	1.1E-14	1.1E-02	0.00000000000066
1,2,3,4,7,8-Hexachlorodibenzofuran	0.0000066	0	0	0.000000052	0	7.1E-16	1.1E-04	0.0000000000000000000000000000000000000
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.0000079	0	0	0.000000053	0	7.3E-16	1.1E-04	
2,3,7,8-Tetrachlorodibenzofuran	0.0000066	0	0	0.000000052	0	7.1E-16	1.1E-05	0.00000000066
2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.0000014	0	0	0.000000011	0	1.5E-16	1.1E-05	0.00000000014
	0.000095	0	0	na	na	na	na	na
Total Heptachlorodibenzofurans (HpCDF)	0.00018	0	0	na	na	na	na	na
Total Heptachlorodibenzo-p-dioxins (HpCDD)		0	0	na	na	na	na	na
Total Tetrachlorodibenzofurans (TCDF)	0.000010	0	0	24	0	na	na	na
Diesel Range Organics	462	0	0	19	0	2.7E-06	4.3E-01	0.0000062
Diesel Range Organics, Aliphatic	370	0	0	9.6	0	1.3E-06	4.3E-01	0.0000031
Diesel Range Organics, Aromatic	185	0		2.0	0	na	na	na
Residual Range Organics	1,539	0	0	1.8	0	2.53E-07	5.41E-01	0.00000047
Residual Range Organics, Aliphatic	1,385	0	0		0	8.44E-08	5.41E-01	0.0000016
Residual Range Organics, Aromatic	462	0	0	0.61	0	0.442-00	Max HQ	0.0000062

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

#### TAB.... 22

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 21 - Wastewater Treatment Facility NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
		0	10	1.0E+02	3.1E+00	34
Aluminum	21,708	0	0.23	9.1E-02	4.2E+00	0.022
Antimony	9.7	0	0.12	9.1E-02 1.6E-01	4.9E+00	0.031
Arsenic	28	0.0020		1.2E+00	4.9E+00 8.2E-01	1.4
Barium	141	0.010	2.5 0.22	6.6E-02	1.6E+00	0.041
Cadmium	5	0		0.0E-02 2.1E-01	5.6E+00	0.038
Chromium	44	0	0.040	2.1E-01 8.9E-01	2.5E+01	0.035
Copper	63	0	3.0		1.4E+02	0.0000000065
Manganese	0	0.69	0	9.2E-08		0.0021
Mercury	0.80	0	0.004	4.5E-03	2.1E+00	0.0021
Selenium	2.0	0	0.0038	1.0E-02	6.6E-02	0.091
Silver	2.1	0	0.10	3.0E-02	3.3E-01	0.091
Vanadium	56	0	0.10	2.8E-01	3.4E+00	
Zinc	480	0	0.00	2.3E+00	9.0E+00	0.25
4-Chloroaniline	5.5	0	2.2	4.6E-01	1.7E+00	0.27
PCB-1254 (Aroclor 1254)	0.14	0	0	6.9E-04	2.9E-01	0.0024
PCB-1260 (Aroclor 1260)	2.4	0	0	1.2E-02	2.9E-01	0.040
Diesel Range Organics	3,800	0.47	198	na	na	na
Diesel Range Organics, Aliphatic	3,040	0.38	159	4.5E+01	8.0E+01	0.56
	1,520	0.19	79	2.3E+01	8.0E+01	0.28
Diesel Range Organics, Aromatic	2,384	0	3.2	na	na	na
Residual Range Organics	2,146	0	2.9	1.06E+01	8.69E+01	0.12
Residual Range Organics, Aliphatic	715	0	1.0	3.55E+00	8.69E+01	0.041
Residual Range Organics, Aromatic	/15	, i i i i i i i i i i i i i i i i i i i			Max HQ	34

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

#### Site 21 - Wastewater Treatment Facility NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Exposure Point Concentration	Exposure Point Concentration	Exposure Point Concentration	Ingestion	Toxicity Reference	
	Concentration	C <sub>water</sub>	C <sub>PLANT</sub>	Dose	Value	Ecological Hazard
COPEC	(mg/kg)	(mg/L)	(mg/kg)	(mg/kg)	(mg/kg-day)	HQ

mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

#### TAB\_\_\_\_-23

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Site 21 - Wastewater Treatment Facility NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazaro
			10	33	1.2E-01	1.8E-01	0.65
Aluminum	21,708	0	10		5.5E-05	2.4E-01	0.00023
Antimony	9.7	0	0.23	0.010		2.4E-01 2.8E-01	0.00023
Arsenic	28	0.0020	0.12	0.056	1.5E-04	4.7E-02	0.00054
Barium	141	0.010	2.5	0.022	7.7E-04		0.0003
Cadmium	5	0	0.22	0.0029	3.0E-05	9.3E-02	0.00081
Chromium	44	0	0.040	0.24	2.6E-04	3.2E-01	
Copper	63	0	3.0	0.66	4.8E-04	1.4E+00	0.00033
Manganese	0	0.69	0	0	2.0E-10	8.2E+00	0.00000000025
Mercury	0.80	0	0.004	0.20	3.7E-05	1.2E-01	0.00031
Selenium	2.0	0	0.0038	0.030	1.5E-05	3.8E-03	0.0040
Silver	2.1	0	0.10	0.0066	1.4E-05	1.9E-02	0.00072
Vanadium	56	0	0.10	0.14	3.1E-04	1.9E-01	0.0016
Zinc	480	0	0	48	1.0E-02	5.2E-01	0.020
4-Chloroaniline	5.5	0	2.2	0.00000041	6.8E-05	9.7E-02	0.00070
	0.14	0	0.00017	0.0000015	7.1E-07	1.7E-02	0.000042
PCB-1254 (Aroclor 1254)	2.4	0	0.0029	0.00003	1.2E-05	1.7E-02	0.00073
PCB-1260 (Aroclor 1260)	3,800	0.47	198	0.00018	na	na	na
Diesel Range Organics		0.38	159	0.00014	1.8E-02	4.6E+00	0.0040
Diesel Range Organics, Aliphatic	3,040	0.38	79	0.000071	9.2E-03	4.6E+00	0.0020
Diesel Range Organics, Aromatic	1,520		3.2	0.021	na	na	na
Residual Range Organics	2,384	0	2.9	0.021	1.10E-02	5.01E+00	0.0022
Residual Range Organics, Aliphatic	2,146	0	1.0	0.0063	3.65E-03	5.01E+00	0.00073
Residual Range Organics, Aromatic	715	0	1.0	0.0003	5.051-05	Max HQ	0.65

Notes:

DRO -Diesel Range Organics.

GRO - Gasoline Range Organics.

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

Site 21 - Wastewater Treatment Facility NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
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HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

PCB - Polychlorinated Biphenyls.

RRO - Residual Range Organics.

#### TAI .24

### ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

Site 21 - Wastewater Treatment Facility

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
A l	21,708	0	0	10	0	7.3E-07	5.8E+01	0.00000013
Aluminum	9.7	0	0	0.23	0	1.6E-08	1.1E+00	0.00000015
Antimony	28	0	0.0020	0.12	0	8.5E-09	1.1E+00	0.00000008
Arsenic Barium	141	0	0.010	2.5	0	1.8E-07	1.1E+01	0.00000016
	5	0	0.010	0.22	0	1.5E-08	1.3E+00	0.00000012
Cadmium	44	0	0	0.040	0	2.8E-09	9.7E-01	0.000000029
Chromium	63	0	0	3.0	0	2.1E-07	2.5E+01	0.000000084
Copper	0	0	0.69	0	0	8.8E-13	5.7E+02	0.000000000000016
Manganese Mercury	0.80	0	0	0.0036	0	2.5E-10	2.6E-01	0.000000010
Selenium	2.0	0	0	0.0038	0	2.7E-10	4.6E-01	0.0000000059
Silver	2.0	0	0	0.10	0	7.1E-09	1.6E+02	0.0000000004
	56	0	0	0.10	0	7.1E-09	1.0E+01	0.0000000070
Vanadium	480	0	0	0.00000000069	0	4.9E-18	1.4E+02	0.00000000000000000035
Zinc 4-Chloroaniline	5.5	0	0	2.2	0	1.6E-07	1.9E-01	0.0000081
	0.14	0	0	0.00017	0	1.2E-11	1.6E-01	0.00000000076
PCB-1254 (Aroclor 1254)	2.4	0	0	0.0029	0	2.0E-10	2.0E-01	0.000000010
PCB-1260 (Aroclor 1260)	3,800	0	0.47	198	0	na	na	na
Diesel Range Organics	3,040	0	0.38	159	0	1.1E-05	4.3E-01	0.000026
Diesel Range Organics, Aliphatic	1,520	0	0.19	79	0	5.6E-06	4.3E-01	0.000013
Diesel Range Organics, Aromatic	2,384	0	0	3.2	0	na	na	na
Residual Range Organics		0	0	2.9	0	2.01E-07	5.41E-01	0.0000037
Residual Range Organics, Aliphatic	2,146	0	0	1.0	0	6.70E-08	5.41E-01	0.00000012
Residual Range Organics, Aromatic	715	U	U				Max HQ	0.000026

Notes:

DRO -Diesel Range Organics.

GRO - Gasoline Range Organics.

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

#### ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL Site 21 - Wastewater Treatment Facility NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	Exposure Point	<b>Exposure</b> Point	<b>Exposure</b> Point	<b>Exposure</b> Point	<b>Exposure Point</b>		Toxicity	
	Concentration	-	Concentration			Ingestion	Reference	
	CSOIL	CSEDIMENT	CWATER	CPLANT	C <sub>FISH</sub>	Dose	Value	Ecological Hazard
COPEC	(mg/kg)	(mg/kg)	(mg/L)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg-day)	

RRO - Residual Range Organics.

#### TAB\_\_\_\_-25

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 22 - Water Wells and Water Supply Building

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
Antimony	34	0	0.82	3.2E-01	4.2E+00	0.076
Antimony Lead	497	0	2.7	2.9E+00	1.3E+01	0.22
Zinc	160	0	0.000000000023	7.5E-01	9.0E+00	0.083
Di-n-butyl phthalate	3.5	0	0.030	2.2E-02	4.8E+02	0.000047
Benzo(a)pyrene	0.079	0	0.00011	3.9E-04	8.7E+01	0.0000045
Benzo(b)fluoranthene	0.20	0	0.00024	9.9E-04	8.7E+01	0.000011
Chrysene	0.20	0	0.0017	4.0E-03	8.7E+01	0.000045
Naphthalene	1.2	0	0.063	1.8E-02	8.0E+01	0.00022
Phenanthrene	0.21	0	0.0023	1.4E-03	8.7E+01	0.000016
	4,070	0	212	na	na	na
Diesel Range Organics	3,256	0	170	4.9E+01	8.0E+01	0.60
Diesel Range Organics, Aliphatic	1,628	0	85	2.4E+01	8.0E+01	0.30
Diesel Range Organics, Aromatic Gasoline Range Organics	38	0	10	na	na	na
Gasoline Range Organics, Aliphatic	27	0	7.2	1.53E+00	2.30E+01	0.067
Gasoline Range Organics, Anomatic	19	0	5.1	1.09E+00	2.30E+01	0.048
Residual Range Organics	3,815	0	5.1	na	na	na
Residual Range Organics, Aliphatic	3,434	0	4.6	1.70E+01	8.69E+01	0.20
Residual Range Organics, Anomatic	1,145	0	1.5	5.67E+00	8.69E+01	0.065
Residual Range Organics, Alomatic	1,145	Ū			Max HQ	0.60

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day.

na - not applicable

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

Site 22 - Water Wells and Water Supply Building NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
				0.025	2.05.05	2.4E-01	0.000082
Antimony	34	0	0.82	0.035	2.0E-05	7.4E-01	0.00036
Lead	497	0	2.7	0.15	2.7E-04	5.2E-01	0.00068
Zinc	160	0	0.00000000023	16	3.5E-04		0.00000068
Di-n-butyl phthalate	3.5	0	0.030	0.0000016	1.9E-06	2.8E+01	0.000000083
Benzo(a)pyrene	0.08	0	0.00011	0.0000070	4.2E-08	5.0E+00	0.000000021
Benzo(b)fluoranthene	0.20	0	0.00024	0.0000021	1.1E-07	5.0E+00	0.000000021
Chrysene	0.77	0	0.0017	0.000029	4.1E-07	5.0E+00	
Naphthalene	1.2	0	0.063	0.00000056	7.4E-07	4.6E+00	0.0000016
Phenanthrene	0.21	0	0.0023	0.00000067	1.1E-07	5.0E+00	0.00000023
Diesel Range Organics	4,070	0	212	0.00019	na	na	na
Diesel Range Organics, Aliphatic	3,256	0	170	0.00015	2.0E-03	4.6E+00	0.00044
Diesel Range Organics, Aromatic	1,628	0	85	0.000076	1.0E-03	4.6E+00	0.00022
Gasoline Range Organics	38	0	10	0.00000040	na	na	na
Gasoline Range Organics, Aliphatic	27	0	7.2	0.0000028	2.73E-05	1.32E+00	0.000021
	19	0	5.1	0.0000020	1.95E-05	1.32E+00	0.000015
Gasoline Range Organics, Aromatic	3,815	0	5.1	0.034	na	na	na
Residual Range Organics	3,434	0	4.6	0.030	1.80E-03	5.01E+00	0.00036
Residual Range Organics, Aliphatic		0	1.5	0.010	6.01E-04	5.01E+00	0.00012
Residual Range Organics, Aromatic	1,145	0	1.5	0.010		Max HQ	0.00068

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

#### TAB 27

#### ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL Site 22 - Water Wells and Water Supply Building NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
			0	0.82	0	5.9E-09	1.1E+00	0.000000056
Antimony	34	0	0	2.7	0	1.9E-08	2.1E+00	0.000000092
Lead	497	0	0	0.00000000023	0	1.7E-19	1.4E+02	0.0000000000000000000000000000000000000
Zinc	160	0	0	0.0000000023	0	2.2E-10	6.3E-02	0.000000035
Di-n-butyl phthalate	3.5	0	0	0.00011	0	7.6E-13	5.4E-01	0.000000000014
Benzo(a)pyrene	0.079	0	0	0.00024	0	1.8E-12	5.4E-01	0.000000000032
Benzo(b)fluoranthene	0.20	0	0	0.0017	0	1.2E-11	5.4E-01	0.00000000023
Chrysene	0.77	0	0	0.063	0	4.5E-10	4.3E-01	0.000000011
Naphthalene	1.2	0	0	0.0023	0	1.7E-11	5.4E-01	0.00000000031
Phenanthrene	0.21	0	0	212	0	na	na	na
Diesel Range Organics	4,070	0	0	170	0	1.2E-06	4.3E-01	0.0000029
Diesel Range Organics, Aliphatic	3,256	0	0	85	0	6.2E-07	4.3E-01	0.0000014
Diesel Range Organics, Aromatic	1,628	0	0	10	0	na	na	na
Gasoline Range Organics	38	0	0	7.2	0	5.2E-08	4.3E-01	0.00000012
Gasoline Range Organics, Aliphatic	27	0	0	5.1	0	3.7E-08	4.3E-01	0.00000087
Gasoline Range Organics, Aromatic	19	0	0	5.1	0	na	na	na
Residual Range Organics	3,815	0	0	4.6	0	3.31E-08	5.41E-01	0.00000061
Residual Range Organics, Aliphatic	3,434	0	0	1.5	0	1.10E-08	5.41E-01	0.00000020
Residual Range Organics, Aromatic	1,145	0	0	1.5	0		Max HQ	0.0000029

#### Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

#### **TALLE 1-28**

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 28 - Drainage Basin

# NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
				с.		1
Antimony	0	0	0.0030	5.9E-04	4.2E+00	0.00014
Arsenic	0	0	1.6	3.1E-01	4.9E+00	0.064
Barium	0	0	40	7.8E+00	8.2E-01	9.6
Beryllium	1.5	0	0.0018	7.4E-03	1.1E+00	0.0070
Cadmium	0	0	0.47	9.2E-02	1.6E+00	0.057
Chromium	0	0.015	24	4.6E+00	5.6E+00	0.82
Copper	0	0.040	3.6	7.0E-01	2.5E+01	0.028
Lead or Lead Dissolved	0	0.86	11	2.2E+00	1.3E+01	0.17
Mercury or Mercury Dissolved	0	0	0.11	2.1E-02	2.1E+00	0.010
Nickel	0	0	3.4	6.7E-01	8.0E+01	0.0083
Selenium	0	0	0.23	4.5E-02	6.6E-02	0.68
Silver	0	0	0.033	6.4E-03	3.3E-01	0.020
Vanadium	0	0	6.8	1.3E+00	3.4E+00	0.39
Zinc	0	0.62	58	1.1E+01	9.0E+00	1.3
Zinc, Dissolved	0	0.23	0	3.1E-08	9.0E+00	0.000000034
2-Methylnaphthalene	0	0	0.012	2.3E-03	8.7E+01	0.000027
Acenaphthene	0	0	0.029	5.7E-03	8.7E+01	0.000065
Anthracene	1.1	0	0.013	7.7E-03	8.7E+01	0.000089
	4.4	0	0.088	3.8E-02	1.5E+02	0.00026
Benzo(a)anthracene	2.3	0	0.11	3.2E-02	8.7E+01	0.00037
Benzo(a)pyrene	2.6	0	0.089	3.0E-02	8.7E+01	0.00034
Benzo(b)fluoranthene	0	0	0.055	1.1E-02	8.7E+01	0.00012
Benzo(g,h,i)perylene	2.7	0	0.20	5.2E-02	8.7E+01	0.00060
Benzo(k)fluoranthene	5.5	0	0.18	6.1E-02	8.7E+01	0.00070
Chrysene	0.89	0	0.73	1.5E-01	8.7E+01	0.0017
Fluoranthene Fluorene	0.89	0	0.027	5.3E-03	8.7E+01	0.000061

### ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

### Site 28 - Drainage Basin NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
Indepation 2.2 addression	0	0	0.11	2.2E-02	8.7E+01	0.00025
Indeno(1,2,3-cd)pyrene Naphthalene	0	0	0.015	2.9E-03	8.0E+01	0.000037
Phenanthrene	4.1	0	0.59	1.3E-01	8.7E+01	0.0015
	7.5	0	0.53	1.4E-01	8.7E+01	0.0016
Pyrene PCB-1254 (Aroclor 1254)	0.47	0	3.0	5.9E-01	2.9E-01	2.0
PCB-1260 (Aroclor 1260)	0	0.00081	0.61	1.2E-01	2.9E-01	0.41
Diesel Range Organics	92,650	46	4,836	na	na	na
Diesel Range Organics, Aliphatic	74,120	37	3,869	1.1E+03	8.0E+01	14
Diesel Range Organics, Aromatic	29,648	15	1,548	4.4E+02	8.0E+01	5.5
Gasoline Range Organics	120	0.57	32	na	na	na
Gasoline Range Organics, Aliphatic	84	0.40	23	4.84E+00	2.30E+01	0.21
Gasoline Range Organics, Aromatic	60	0.28	16	3.46E+00	2.30E+01	0.15
Residual Range Organics	2,073	0	2.8	na	na	na
Residual Range Organics, Aliphatic	1,866	0	2.5	9.25E+00	8.69E+01	0.11
Residual Range Organics, Anomatic	622	0	0.83	3.08E+00	8.69E+01	0.035
Residual Range Organics, Aromatic	522	-		3	Max HQ	14

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

#### TABL ... 29

### ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Site 28 - Drainage Basin

# NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Antimony	0	0	0.0030	0.0000030	4.0E-07	2.4E-01	0.0000017
Antimony Arsenic	0	0	1.6	0.0032	2.2E-04	2.8E-01	0.00076
Barium	0	0	40	0.0060	5.3E-03	4.7E-02	0.11
Beryllium	1.5	Ő	0.0018	0.0015	5.8E-05	6.1E-02	0.00095
Cadmium	0	Ő	0.47	0.00026	6.3E-05	9.3E-02	0.00068
Chromium	0	0.015	24	0.13	3.3E-03	3.2E-01	0.010
Copper	0	0.040	3.6	0.036	5.2E-04	1.4E+00	0.00036
Lead/Dissolved	0	0.86	11	0.0033	1.5E-03	7.4E-01	0.0020
Mercury/Dissolved	0	0	0.11	0.027	4.7E-05	1.2E-01	0.00039
Nickel	0	0	3.4	0.020	4.8E-04	4.6E+00	0.00010
Selenium	0	0	0.23	0.0035	3.5E-05	3.8E-03	0.0091
Silver	0	0	0.033	0.00010	4.5E-06	1.9E-02	0.00024
Vanadium	0	0	6.8	0.017	9.3E-04	1.9E-01	0.0048
Zinc	0	0.62	58	5.8	1.5E-02	5.2E-01	0.028
Zinc/Dissolved	0	0.23	0	0	5.0E-10	5.2E-01	0.000000010
2-Methylnaphthalene	0	0	0.012	0	1.6E-06	5.0E+00	0.0000032
Acenaphthene	0	0	0.029	0.00000062	3.9E-06	5.0E+00	0.0000077
Anthracene	1.1	0	0.013	0.0000029	4.3E-05	5.0E+00	0.000085
Benzo(a)anthracene	4.4	0	0.088	0.000024	1.8E-04	8.4E+00	0.000021
Benzo(a)pyrene	2.3	0	0.11	0.000058	1.0E-04	5.0E+00	0.000020
Benzo(b)fluoranthene	2.6	0	0.089	0.000062	1.1E-04	5.0E+00	0.000022
	0	0	0.055	0.000071	7.4E-06	5.0E+00	0.0000015
Benzo(g,h,i)perylene	2.7	0	0.20	0.00011	1.3E-04	5.0E+00	0.000025
Benzo(k)fluoranthene	5.5	0	0.18	0.00004	2.3E-04	5.0E+00	0.000046
Chrysene	0.89	0	0.73	0.000023	1.3E-04	5.0E+00	0.000026
Fluoranthene	0.89	0	0	0.00000010	3.6E-06	5.0E+00	0.0000072
Fluorene Indeno(1,2,3-cd)pyrene	0	0	0.11	0.00023	1.5E-05	5.0E+00	0.000030

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

### Site 28 - Drainage Basin NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Naphthalene Phenanthrene Pyrene PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Gasoline Range Organics, Aromatic Gasoline Range Organics, Aliphatic Gasoline Range Organics, Aromatic Residual Range Organics, Aliphatic Residual Range Organics, Aliphatic Residual Range Organics, Aliphatic	0 4.1 7.5 0.47 0 92,650 74,120 29,648 120 84 60 2,073 1,866 622	0 0 0 0.00081 46 37 15 0.57 0.40 0.28 0 0 0	$\begin{array}{c} 0.015\\ 0.59\\ 0.53\\ 3.0\\ 0.61\\ 4,836\\ 3,869\\ 1,548\\ 32\\ 23\\ 16\\ 2.8\\ 2.5\\ 0.83\end{array}$	0 0.0000063 0.00018 0.0013 0.00025 0.0043 0.0034 0.0014 0.000012 0.00000087 0.00000087 0.00000062 0.018 0.016 0.0055	2.0E-06 2.3E-04 3.5E-04 4.2E-04 8.2E-05 na 3.3E+00 1.3E+00 na 6.16E-03 4.40E-03 na 6.99E-02 2.33E-02	4.6E+00 5.0E+00 1.7E-02 1.7E-02 na 4.6E+00 4.6E+00 na 1.32E+00 na 5.01E+00 5.01E+00 <b>Max HQ</b>	0.00000043 0.000046 0.000070 0.025 0.0048 na 0.71 0.28 na 0.0047 0.0033 na 0.014 0.014 0.0046 <b>0.71</b>

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

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#### ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

#### Site 28 - Drainage Basin NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
	0	0	0	0.0030	0.0070	7.0E-08	1.1E+00	0.00000066
Antimony	0	0	0	1.6	0.080	1.6E-06	1.1E+00	0.0000015
Arsenic Barium	0	0	0	40	1.1	3.1E-05	1.1E+01	0.0000028
Beryllium	1.5	0	0	0.0018	0	9.3E-10	1.1E+01	0.00000000083
Cadmium	0	0	0	0.47	0.0080	3.2E-07	1.3E+00	0.00000024
Chromium	0	28	0.015	24	0	4.0E-05	9.7E-01	0.000041
	0	0	0.040	3.6	1.2	1.4E-05	2.5E+01	0.00000054
Copper Lead/Dissolved	0	7.4	0.86	11	0.028	1.3E-05	2.1E+00	0.0000063
	0	0	0.00	0.11	0.098	1.0E-06	2.6E-01	0.0000040
Mercury/Dissolved	0	0	0	3.4	1.1	1.3E-05	7.1E+01	0.0000018
Nickel	0	0	0	0.23	0.16	1.7E-06	4.6E-01	0.0000037
Selenium	0	0	0	0.033	0	1.7E-08	1.6E+02	0.0000000010
Silver, Dissolved	•	0	0	6.8	0.11	4.6E-06	1.0E+01	0.00000046
Vanadium	0		0.62	58	51	5.6E-04	1.4E+02	0.0000040
Zinc	0	26 0	0.23	0	0	2.2E-12	1.4E+02	0.00000000000015
Zinc/Dissolved	0		0.23	0	0	1.8E-06	na	na
Ethylbenzene	0	1.8	0	0	0	3.7E-07	na	na
Toluene	0	0.37		0	0	7.7E-07	na	na
Xylenes	0	0.78	0	0	0	4.5E-06	1.1E-01	0.000042
Dibenzofuran	0	4.5	0	0.012	0.19	5.0E-04	5.4E-01	0.00092
2-Methylnaphthalene	0	500	0	0.029	0.026	1.4E-05	5.4E-01	0.000026
Acenaphthene	0	14	0	0.029	0.020	4.6E-08	5.4E-01	0.00000085
Acenaphthylene	0	0.047	0	0.013	0	1.8E-06	5.4E-01	0.0000033
Anthracene	1.1	1.8	0	0.088	0	1.6E-06	4.3E-01	0.0000037
Benzo(a)anthracene	4.4	1.5	0	0.11	0	1.4E-06	5.4E-01	0.0000026
Benzo(a)pyrene	2.3	1.4	0		0	1.5E-06	5.4E-01	0.0000028
Benzo(b)fluoranthene	2.6	1.5	0	0.089	0.0043	9.7E-07	5.4E-01	0.0000018
Benzo(g,h,i)perylene	0	0.91	0	0.055	0.0043	1.6E-06	7.6E-02	0.000021
Benzo(k)fluoranthene	2.7	1.5	0	0.20		1.9E-06	5.4E-01	0.0000035
Chrysene	5.5	1.8	0	0.18	0	1.96-00	5.46-01	0.0000000

# ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

#### Site 28 - Drainage Basin NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
			-		0	2.2E-08	2.1E-01	0.00000010
Dibenzo(a,h)anthracene	0	0.015	0	0.014	0		2.1E-01 5.4E-01	0.0000058
Fluoranthene	0.89	2.8	0	0.73	0.0037	3.1E-06		0.000038
Fluorene	0	20	0	0.027	0.067	2.0E-05	5.4E-01	0.0000023
Indeno(1,2,3-cd)pyrene	0	1.2	0	0.11	0	1.2E-06	5.4E-01	
Naphthalene	0	175	0	0.015	0.068	1.7E-04	4.3E-01	0.00041
Phenanthrene	4.1	21	0	0.59	0.018	2.1E-05	5.4E-01	0.000039
Pyrene	7.5	9.5	0	0.53	0.0023	9.7E-06	5.4E-01	0.000018
PCB-1242 (Aroclor 1242)	0	0.10	0	0	0	9.8E-08	2.6E-01	0.0000038
PCB-1254 (Aroclor 1254)	0.47	0.16	0	3.0	0	1.7E-06	1.6E-01	0.000011
PCB-1260 (Aroclor 1260)	0	0.52	0.0	0.61	0.14	2.2E-06	2.0E-01	0.000011
4,4'-DDD	0	1.2	0	0	0	1.1E-06	4.8E+02	0.000000024
beta-BHC	0	0.010	0	0	0	9.9E-09	5.2E+00	0.000000019
Endosulfan sulfate	0	0.0086	0	0	0	8.5E-09	7.3E+00	0.000000012
	0	0.0065	0	0	0	6.4E-09	5.2E+00	0.000000012
gamma-BHC (Lindane)	0	0.0046	0	0	0	4.5E-09	3.7E+01	0.0000000012
Heptachlor	92,650	98,654	46	4,836	0	na	na	na
Diesel Range Organics	74,120	78,923	37	3,869	0	8.0E-02	4.3E-01	0.19
Diesel Range Organics, Aliphatic		31,569	15	1,548	0	3.2E-02	4.3E-01	0.075
Diesel Range Organics, Aromatic	29,648	220	0.57	32	0	na	na	na
Gasoline Range Organics	120	154	0.40	23	0	1.6E-04	4.3E-01	0.00038
Gasoline Range Organics, Aliphatic	84		0.28	16	0	1.2E-04	4.3E-01	0.00027
Gasoline Range Organics, Aromatic	60	110	0.28	2.8	0	na	na	na
Residual Range Organics	2,073	3,634		2.5	0	3.23E-03	5.41E-01	0.0060
Residual Range Organics, Aliphatic	1,866	3,271	0	2.5	0	1.08E-03	5.41E-01	0.0020
Residual Range Organics, Aromatic	622	1,090	0	I	0	1.001 05	Max HQ	0.19

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

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#### ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

Site 28 - Drainage Basin

#### NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

	<b>Exposure Point</b>	<b>Exposure</b> Point	<b>Exposure</b> Point	<b>Exposure Point</b>	<b>Exposure Point</b>		Toxicity	
	Concentration	Concentration	Concentration	Concentration	Concentration	Ingestion	Reference	
	C <sub>SOIL</sub>	CSEDIMENT	CWATER	CPLANT	CFISH	Dose	Value	Ecological Hazard
COPEC	(mg/kg)	(mg/kg)	(mg/L)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg-day)	

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

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### ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 29 - Suqitughneq River

# NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

СОРЕС	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
Aluminum	0	0.040	0	5.3E-09	3.1E+00	0.000000017
Barium	0	0.0050	0	6.6E-10	8.2E-01	0.0000000081
Silver/Dissolved	0	0.020	0	2.7E-09	3.3E-01	0.000000082
Diesel Range Organics	0	0.16	0	na	na	na
Diesel Range Organics, Aliphatic	0	0.13	0	1.7E-08	8.0E+01	0.0000000021
Diesel Range Organics, Aromatic	0	0.064	0	8.5E-09	8.0E+01	0.0000000011
Gasoline Range Organics	0	0.29	0	na	na	na
Gasoline Range Organics, Aliphatic	0	0.20	0	2.70E-08	2.30E+01	0.000000012
Gasoline Range Organics, Aromatic	0	0.15	0	1.93E-08	2.30E+01	0.0000000084
Custome runge - Bunnes, i Fernande					Max HQ	0.000000082

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

# ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

#### Site 29 - Suqitughneq River NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Aluminum	0	0.040	0	0	8.7E-11	1.8E-01	0.0000000048
Barium	0	0.0050	0	0	1.1E-11	4.7E-02	0.0000000023
Silver/Dissolved	0	0.020	0	0	4.3E-11	1.9E-02	0.000000023
Diesel Range Organics	0	0.160	0	0	na	na	na
Diesel Range Organics, Aliphatic	0	0.13	0	0	2.8E-10	4.6E+00	0.00000000060
Diesel Range Organics, Aromatic	0	0.064	0	0	1.4E-10	4.6E+00	0.00000000030
Gasoline Range Organics	0	0.29	0	0	na	na	na
Gasoline Range Organics, Aliphatic	0	0.20	0	0	4.40E-10	1.32E+00	0.0000000033
Gasoline Range Organics, Aromatic	0	0.15	0	0	3.14E-10	1.32E+00	0.0000000024
Customer range of Bantos, radiante						Max HQ	0.000000023

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable

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#### ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

#### Site 29 - Suqitughneq River

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
	0	15 000	0.040	0	0	1.6E-02	5.8E+01	0.00027
Aluminum	0	15,900	0.040	0	0.0083	8.1E-02	1.1E+00	0.000000077
Antimony	0	0 5.7	0	0	0.65	1.2E-05	1.1E+00	0.000011
Arsenic	0	115	0.0050	0	0.22	1.2E-03	1.1E+01	0.000010
Barium	0	1.1	0.0050	0	0.22	1.1E-06	1.1E+01	0.00000010
Beryllium	0	0	0	0	0.021	2.1E-07	1.3E+00	0.00000016
Cadmium			0	0	0.021	6.9E-06	1.1E+00	0.0000062
Cobalt	0	7.0 0	0	0	1.7	1.7E-05	2.5E+01	0.00000066
Copper		0	0	0	0.0069	6.8E-08	2.1E+00	0.000000032
Lead	0	114	0	0	0.0005	1.1E-04	5.7E+02	0.00000020
Manganese	0	0.050	0	0	0.017	2.2E-07	2.6E-01	0.00000084
Mercury, Dissolved	0		0	0	0.49	4.8E-06	7.1E+01	0.000000068
Nickel	0	0	0	0	0.28	2.7E-06	4.6E-01	0.0000060
Selenium	0	0	0.020	0	0.021	2.1E-07	1.6E+02	0.0000000013
Silver/Dissolved	0	0	0.020	0	0.082	3.5E-05	1.0E+01	0.0000035
Vanadium	0	35 0	0	0	24	2.4E-04	1.4E+02	0.0000017
Zinc	0	-		0	0	3.2E-09	na	na
m,p-Xylene (Sum of Isomers)	0	0.0032	0	0	0.0038	1.1E-07	5.4E-01	0.00000020
2-Methylnaphthalene	0	0.072	0	0	0.0038	3.7E-08	5.4E-01	0.000000069
Acenaphthylene	0	0	0	0	0.0038	5.6E-08	5.4E-01	0.000000103
Anthracene	0	0.016	0	0	0.0041	4.2E-08	4.3E-01	0.00000010
Benzo(a)anthracene	0	0	0	0	0.0043	3.6E-08	5.4E-01	0.000000067
Benzo(a)pyrene	0	0	0	0	0.0032	3.1E-08	5.4E-01	0.000000058
Benzo(b)fluoranthene	0	0	0	0	0.0032	3.9E-08	5.4E-01	0.000000073
Benzo(g,h,i)perylene	0	0	0	0	0.0040	5.6E-08	7.6E-02	0.00000074
Benzo(k)fluoranthene	0	0	0		0.0037	4.3E-08	5.4E-01	0.000000080
Chrysene	0	0	0	0	0.0032	4.3E-08	2.1E-01	0.00000015
Dibenzo(a,h)anthracene	0	0	0	0	0.0032	4.6E-08	5.4E-01	0.000000085
Fluoranthene	0	0	0	0		6.2E-08	5.4E-01	0.000000115
Fluorene	0	0.020	0	0	0.0043	0.2E-08	J.4E-01	0.00000115

### ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

Site 29 - Suqitughneq River

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
	0	0	0	0	0.0026	2.6E-08	5.4E-01	0.00000047
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.0032	6.2E-08	4.3E-01	0.00000014
Naphthalene	0	0.031	0	0	0.0048	7.2E-08	5.4E-01	0.00000013
Phenanthrene	0	0.025	0	0	0.0050	6.5E-08	5.4E-01	0.00000012
Pyrene	0	0.016	0	0	0.019	1.9E-07	1.6E-01	0.0000012
PCB-1254 (Aroclor 1254)	0	0	0	0		1.9E-07	2.0E-01	0.00000059
PCB-1260 (Aroclor 1260)	0	0	0	0	0.012			na
Diesel Range Organics	0	1,859	0.16	0	0	na	na	0.0034
Diesel Range Organics, Aliphatic	0	1,487	0.13	0	0	1.5E-03	4.3E-01	
Diesel Range Organics, Aromatic	0	744	0.064	0	0	7.3E-04	4.3E-01	0.0017
Gasoline Range Organics	0	0	0.29	0	0	na	na	na
Gasoline Range Organics, Aliphatic	0	0	0.20	0	0	1.9E-12	4.3E-01	0.000000000045
• •	0	0	0.15	0	0	1.4E-12	4.3E-01	0.000000000032
Gasoline Range Organics, Aromatic	0	1,000	0	0	0	na	na	na
Residual Range Organics	0	900	0	0	0	8.88E-04	5.41E-01	0.0016
Residual Range Organics, Aliphatic	0	300	0	0	0	2.96E-04	5.41E-01	0.0005
Residual Range Organics, Aromatic	0	500	0			4. 112	Max HQ	0.0034

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable PCB - Polychlorinated Biphenyls.

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# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Sites 28 & 29 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
A	0	0	0.0030	5.9E-04	4.2E+00	0.00014
Antimony	0	0	1.6	3.1E-01	4.9E+00	0.064
Arsenic Barium	0	0.0050	40	7.8E+00	8.2E-01	9.6
	1.5	0.0050	0.0018	7.4E-03	1.1E+00	0.0070
Beryllium Cadmium	0	0	0.47	9.2E-02	1.6E+00	0.057
Chromium	0	0.015	24	4.6E+00	5.6E+00	0.82
	0	0.040	3.6	7.0E-01	2.5E+01	0.028
Copper Lead or Lead Dissolved	0	0.86	11	2.2E+00	1.3E+01	0.17
Mercury or Mercury Dissolved	0	0.00	0.11	2.1E-02	2.1E+00	0.010
	0	0	3.4	6.7E-01	8.0E+01	0.0083
Nickel	0	0	0.23	4.5E-02	6.6E-02	0.68
Selenium	0	0.020	0.033	6.4E-03	3.3E-01	0.020
Silver		0.020	6.8	1.3E+00	3.4E+00	0.39
Vanadium	0	0.62	58	1.1E+01	9.0E+00	1.3
Zinc	0	0.02	0.00	3.1E-08	9.0E+00	0.000000034
Zinc, Dissolved		0.23	0.012	2.3E-03	8.7E+01	0.000027
2-Methylnaphthalene	0	0	0.012	5.7E-03	8.7E+01	0.000065
Acenaphthene	0		0.023	7.7E-03	8.7E+01	0.000089
Anthracene	1.1	0	0.013	3.8E-02	1.5E+02	0.00026
Benzo(a)anthracene	4.4	0	0.11	3.2E-02	8.7E+01	0.00037
Benzo(a)pyrene	2.3	0	0.089	3.0E-02	8.7E+01	0.00034
Benzo(b)fluoranthene	2.6	0		1.1E-02	8.7E+01	0.00012
Benzo(g,h,i)perylene	0	0	0.055	5.2E-02	8.7E+01 8.7E+01	0.00060
Benzo(k)fluoranthene	2.7	0	0.20	5.2E-02 6.1E-02	8.7E+01 8.7E+01	0.00070
Chrysene	5.5	0	0.18	6.1E-02 1.5E-01	8.7E+01 8.7E+01	0.0017
Fluoranthene	0.89	0	0.73	1.5E-01 5.3E-03	8.7E+01 8.7E+01	0.000061
Fluorene	0	0	0.027	5.3E-03	0./E+01	0.00001

# ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

### Sites 28 & 29 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
Indeno(1,2,3-cd)pyrene Naphthalene Phenanthrene Pyrene PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Gasoline Range Organics, Aliphatic Gasoline Range Organics, Aromatic Residual Range Organics Residual Range Organics	0 0 4.1 7.5 0.47 0 92,650 74,120 37,060 120 84 60 2,073 1,866	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	$\begin{array}{c} 0.11\\ 0.015\\ 0.59\\ 0.53\\ 3.0\\ 0.61\\ 4,836\\ 3,869\\ 1,934\\ 32\\ 23\\ 16\\ 2.8\\ 2.5\end{array}$	2.2E-02 2.9E-03 1.3E-01 1.4E-01 5.9E-01 1.2E-01 na 1.1E+03 5.5E+02 na 4.84E+00 3.46E+00 na 9.25E+00	8.7E+01 8.0E+01 8.7E+01 8.7E+01 2.9E-01 2.9E-01 na 8.0E+01 8.0E+01 na 2.30E+01 2.30E+01 2.30E+01 na 8.69E+01	0.00025 0.000037 0.0015 0.0016 2.0 0.41 na 14 6.9 na 0.21 0.15 na 0.11
Residual Range Organics, Aromatic	622	0	0.83	3.08E+00	8.69E+01 Max HQ	0.035 14

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable
## 

## ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

## Sites 28 & 29 Combined

## NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Concentration C <sub>SOIL</sub>	Exposure Point Concentration C <sub>WATER</sub>	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
COPEC	(mg/kg)	(mg/L)	(mg/kg)	(ing/kg)	(ing/kg)	(Ing/kg-uay)	
Antimony	0	0	0.0030	0.0000030	8.1E-07	2.4E-01	0.0000033
Arsenic	0	0	1.6	0.0032	4.3E-04	2.8E-01	0.0015
Barium	0	0.0050	40	0.0060	1.1E-02	4.7E-02	0.23
Beryllium	1.5	0	0.0018	0.0015	1.2E-04	6.1E-02	0.0019
Cadmium	0	0	0.47	0.00026	1.3E-04	9.3E-02	0.0014
Chromium	0	0.015	24	0.13	6.6E-03	3.2E-01	0.020
Copper	0	0.040	3.6	0.036	1.0E-03	1.4E+00	0.00072
Lead/Dissolved	0	0.86	11	0.0033	2.9E-03	7.4E-01	0.0040
Mercury/Dissolved	0	0	0.11	0.027	9.4E-05	1.2E-01	0.00078
Nickel	0	0	3.4	0.020	9.5E-04	4.6E+00	0.00021
Selenium	0	0	0.23	0.0035	7.0E-05	3.8E-03	0.018
Silver	0	0.020	0.033	0.00010	9.0E-06	1.9E-02	0.00048
Vanadium	0	0	6.8	0.017	1.9E-03	1.9E-01	0.0095
Zinc	0	0.62	58	5.8	2.9E-02	5.2E-01	0.056
Zinc/Dissolved	0	0.23	0	0	1.0E-09	5.2E-01	0.000000019
2-Methylnaphthalene	0	0	0.012	0.00000042	3.2E-06	5.0E+00	0.0000064
Acenaphthene	0	0	0.029	0.00000062	7.7E-06	5.0E+00	0.0000015
Anthracene	1.1	0	0.013	0.0000029	8.6E-05	5.0E+00	0.000017
Benzo(a)anthracene	4.4	0	0.088	0.000024	3.5E-04	8.4E+00	0.000042
	2.3	0	0.11	0.000058	2.0E-04	5.0E+00	0.0000
Benzo(a)pyrene	2.6	0	0.089	0.000062	2.2E-04	5.0E+00	0.000043
Benzo(b)fluoranthene	0	0	0.055	0.000071	1.5E-05	5.0E+00	0.0000030
Benzo(g,h,i)perylene		0	0.20	0.00011	2.5E-04	5.0E+00	0.000051
Benzo(k)fluoranthene	2.7	0	0.18	0.000044	4.6E-04	5.0E+00	0.000091
Chrysene	5.5	0	0.014	0.000013	3.8E-06	1.9E-01	0.000020
Dibenzo(a,h)anthracene	0		0.73	0.000013	2.6E-04	5.0E+00	0.000052
Fluoranthene	0.89	0	0.027	0.0000023	7.2E-06	5.0E+00	0.0000014
Fluorene	0	0		0.0000010	3.0E-05	5.0E+00	0.0000060
Indeno(1,2,3-cd)pyrene	0	0	0.11	0.00025	3.0E-03	5.015+00	0.000000

## ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Sites 28 & 29 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Naphthalene Phenanthrene Pyrene PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Gasoline Range Organics, Aliphatic Gasoline Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic	0 4.1 7.5 0.5 0 92,650 74,120 37,060 120 84 60 2,073 1,866	0 0 0 0.00081 46 37 18 0.57 0.40 0.28 0 0	$\begin{array}{c} 0.015\\ 0.59\\ 0.53\\ 3.0\\ 0.61\\ 4,836\\ 3,869\\ 1,934\\ 32\\ 23\\ 16\\ 2.8\\ 2.5\end{array}$	0.00000009 0.000063 0.00018 0.0013 0.00025 0.0043 0.0034 0.0017 0.0000012 0.00000087 0.00000087 0.00000062 0.018 0.016	4.0E-06 4.6E-04 7.0E-04 8.4E-04 1.6E-04 na 6.6E+00 3.3E+00 na 1.23E-02 8.80E-03 na 1.40E-01	4.6E+00 5.0E+00 1.7E-02 1.7E-02 na 4.6E+00 4.6E+00 na 1.32E+00 1.32E+00 na 5.01E+00	0.00000086 0.000092 0.00014 0.050 0.0097 na 1.4 0.71 na 0.0093 0.0066 na 0.028
Residual Range Organics, Aromatic	622	0	0.83	0.0055	4.66E-02	5.01E+00 Max HQ	0.0093 1.4

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## **ТАВ**LE п-36

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

## Sites 28 & 29 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
		15 000	0.040	0	0	3.1E-02	5.8E+01	0.00055
Aluminum	0	15,900	0.040	0	0.0083	3.1E-02 1.7E-07	1.1E+00	0.0000016
Antimony	0	0	0	0.0030 1.6	0.65	2.6E-05	1.1E+00	0.000024
Arsenic	0	5.7	0	40	1.1	2.9E-03	1.1E+00	0.000024
Barium	0	115	0.0050	0.0018	0	2.9E-04 1.9E-09	1.1E+01	0.0000000017
Beryllium	1.5	0	0			6.4E-07	1.3E+00	0.000000048
Cadmium	0	0	0	0.47	0.0080	8.0E-07	9.7E-01	0.000082
Chromium	0	28	0.015	24	0	8.0E-05	9.7E-01 1.1E+00	0.0000123
Cobalt	0	7.0	0	0	0		2.5E+01	0.0000125
Copper	0	0	0.040	3.6	1.7	3.7E-05	2.3E+01 2.1E+00	0.0000140
Lead/Dissolved	0	7.4	0.86	11	0.028	2.7E-05		0.00000125
Manganese	0	114	0.11	0	0	2.2E-04	5.7E+02	0.0000083
Mercury/Dissolved	0	0.050	0	0.11	0.098	2.1E-06	2.6E-01	0.00000035
Nickel	0	0	0	3.4	1.1	2.5E-05	7.1E+01	
Selenium	0	0	0	0.23	0.28	5.7E-06	4.6E-01	0.000012
Silver, Dissolved	0	0	0.020	0.033	0.02	4.5E-07	1.6E+02	0.000000027
Vanadium	0	35	0	6.8	0.11	7.8E-05	1.0E+01	0.000078
Zinc	0	26	0.62	58	51	1.1E-03	1.4E+02	0.0000079
Zinc/Dissolved	0	0	0.23	0	0	4.3E-12	1.4E+02	0.00000000000031
Ethylbenzene	0	1.8	0	0	0	3.6E-06	na	na
m,p-Xylene (Sum of Isomers)	0	0.0032	0	0	0	6.3E-09	na	na
Toluene	0	0.050	0	0	0	9.9E-08	na	na
Xylenes	0	0.78	0	0	0	1.5E-06	na	na
Dibenzofuran	0	4.5	0	0	0	9.0E-06	1.1E-01	0.000084
2-Methylnaphthalene	0	500	0	0.012	0.19	9.9E-04	5.4E-01	0.0018
	0	14	0	0.029	0.026	2.8E-05	5.4E-01	0.000052
Acenaphthene	0	0.047	0	0	0	9.2E-08	5.4E-01	0.00000017
Acenaphthylene	1.1	1.8	0	0.013	0.0041	3.6E-06	5.4E-01	0.0000067
Anthracene	4.4	1.5	0	0.088	0.0043	3.2E-06	4.3E-01	0.0000075
Benzo(a)anthracene Benzo(a)pyrene	4.4	1.4	0	0.11	0.0047	2.9E-06	5.4E-01	0.0000053

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

## Sites 28 & 29 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
							5 (F 01	0.0000057
Benzo(b)fluoranthene	2.6	1.5	0	0.089	0.0032	3.1E-06	5.4E-01	
Benzo(g,h,i)perylene	0	0.9	0	0.055	0.0043	1.9E-06	5.4E-01	0.000036
Benzo(k)fluoranthene	2.7	1.5	0	0.20	0.0057	3.3E-06	7.6E-02	0.000043
Chrysene	5.5	1.8	0	0.18	0.0044	3.8E-06	5.4E-01	0.0000071
Dibenzo(a,h)anthracene	0	0.015	0	0.014	0.0032	1.1E-07	2.1E-01	0.00000051
Fluoranthene	0.89	2.8	0	0.73	0.0047	6.3E-06	5.4E-01	0.000012
Fluorene	0	20	0	0.027	0.067	4.1E-05	5.4E-01	0.000075
Indeno(1,2,3-cd)pyrene	0	1.2	0	0.11	0.0026	2.5E-06	5.4E-01	0.0000047
Naphthalene	0	175	0	0.015	0.068	3.5E-04	4.3E-01	0.00081
Phenanthrene	4.1	21	0	0.59	0.018	4.2E-05	5.4E-01	0.000078
	7.5	9.5	0	0.53	0.0050	1.9E-05	5.4E-01	0.000036
Pyrene	0	0.10	0	0	0	2.0E-07	2.6E-01	0.0000076
PCB-1242 (Aroclor 1242)	0.47	0.16	0	3.0	0.0050	3.5E-06	1.6E-01	0.000023
PCB-1254 (Aroclor 1254)	0.47	0.52	0.0	0.61	0.14	4.4E-06	2.0E-01	0.000022
PCB-1260 (Aroclor 1260)	0	1.2	0	0	0	2.3E-06	4.8E+02	0.000000048
4,4'-DDD	0	0.010	0	0	0	2.0E-08	5.2E+00	0.000000038
beta-BHC	0	0.0086	0	0	0	1.7E-08	7.3E+00	0.000000023
Endosulfan sulfate	0	0.0065	0	0	0	1.3E-08	5.2E+00	0.000000025
gamma-BHC (Lindane)	0	0.0046	0	0	0	9.1E-09	3.7E+01	0.0000000024
Heptachlor	•	98,654	46	4,836	0	na	na	na
Diesel Range Organics	92,650	78,923	37	3,869	0	1.6E-01	4.3E-01	0.37
Diesel Range Organics, Aliphatic	74,120		18	1,934	0	8.0E-02	4.3E-01	0.19
Diesel Range Organics, Aromatic	37,060	39,462	0.57	32	0	na	na	na
Gasoline Range Organics	120	220	0.40	23	0	3.3E-04	4.3E-01	0.00077
Gasoline Range Organics, Aliphatic	84	154		16	0	2.3E-04	4.3E-01	0.00055
Gasoline Range Organics, Aromatic	60	110	0.28	2.8	0	na	na	na
Residual Range Organics	2,073	3,634	0	2.8	0	6.46E-03	5.41E-01	0.012
Residual Range Organics, Aliphatic	1,866	3,271	0	0.83	0	2.15E-03	5.41E-01	0.0040
Residual Range Organics, Aromatic	622	1,090	0	0.85	0	2.102 00	Max HQ	0.37

#### TAB1 36

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

## Sites 28 & 29 Combined

## NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

F	voosure Point	Exposure Point	<b>Exposure</b> Point	<b>Exposure Point</b>	<b>Exposure</b> Point		Toxicity	
	Concentration	Concentration		Concentration	Concentration		Reference	
	C <sub>SOIL</sub>	CSEDIMENT	CWATER	CPLANT	CFISH	Dose	Value	Ecological Hazard
COPEC	(mg/kg)	(mg/kg)	(mg/L)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg-day)	

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## TAE \_\_\_\_-37

## ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 31 - White Alice Site

## NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
Barium	0	0.0030	0	4.0E-10	8.2E-01	0.0000000049
Manganese	0	0.0050	0	6.6E-10	1.4E+02	0.000000000047
PCB-1260 (Aroclor 1260)	22	0	0.026	1.1E-01	2.9E-01	0.37
Diesel Range Organics	8,307	0	434	na	na	na
Diesel Range Organics, Aliphatic	6,646	0	347	9.9E+01	8.0E+01	1.2
Diesel Range Organics, Aromatic	3,323	0	173	5.0E+01	8.0E+01	0.62
Residual Range Organics	2,165	0	2.9	na	na	na
Residual Range Organics, Aliphatic	1,949	0	2.6	9.66E+00	8.69E+01	0.11
Residual Range Organics, Aniphatic	650	0	0.86	3.22E+00	8.69E+01	0.04
Residual Range Organics, Alomatic	000			1	Max HQ	1.2

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Site 31 - White Alice Site

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Barium	0	0.0030	0	0	8.7E-13	4.7E-02	0.00000000018
Manganese	0	0.0050	0	0	1.5E-12	8.2E+00	0.0000000000018
PCB-1260 (Aroclor 1260)	22	0	0.026	0.00023	1.1E-04	1.7E-02	0.0065
Diesel Range Organics	8,307	0	434	0.00039	na	na	na
Diesel Range Organics, Aliphatic	6,646	0	347	0.00031	3.9E-02	4.6E+00	0.0085
Diesel Range Organics, Aromatic	3,323	0	173	0.00015	2.0E-02	4.6E+00	0.0043
Residual Range Organics	2,165	0	2.9	0.019	na	na	na
Residual Range Organics, Aliphatic	1,949	0	2.6	0.017	9.78E-03	5.01E+00	0.0020
Residual Range Organics, Aromatic	650	0	0.86	0.0057	3.26E-03	5.01E+00	0.00065
Residual Range Organies, Monatie	500					Max HQ	0.0085

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

#### 

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL Site 31 - White Alice Site NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
Barium	0	0	0.0030	0	0	3.8E-15	1.1E+01	0.0000000000000034
	0	0	0.0050	0	0	6.3E-15	5.7E+02	0.00000000000000011
Manganese PCB-1260 (Aroclor 1260)	22	0	0	0.026	0	1.8E-09	2.0E-01	0.000000091
Diesel Range Organics	8,307	0	0	434	0	na	na	na
Diesel Range Organics, Aliphatic	6,646	0	0	347	0	2.4E-05	4.3E-01	0.000056
Diesel Range Organics, Aromatic	3,323	0	0	173	0	1.2E-05	4.3E-01	0.000028
Residual Range Organics	2,165	0	0	2.9	0	na	na	na
Residual Range Organics, Aliphatic	1,949	0	0	2.6	0	1.79E-07	5.41E-01	0.0000033
Residual Range Organics, Aromatic	650	0	0	0.86	0	5.98E-08	5.41E-01	0.00000011
Residual Range Organics, Aromatic	000						Max HQ	0.000056

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter. mg/kg - d - Milligrams per kilogram per day. na - not applicable

## ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

## Site 32 - Lower Tram Terminal NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
	1 a 44					
PCB-1260 (Aroclor 1260)	0.89	0	0.0011	4.4E-03	2.9E-01	0.015
Diesel Range Organics	13,000	0	679	na	na	na
Diesel Range Organics, Aliphatic	10,400	0	543	1.6E+02	8.0E+01	1.9
Diesel Range Organics, Aromatic	5,200	0	271	7.8E+01	8.0E+01	0.97
Residual Range Organics	3,600	0	4.8	na	na	na
Residual Range Organics, Aliphatic	3,240	0	4.3	1.61E+01	8.69E+01	0.18
Residual Range Organics, Aromatic	1,080	0	1.4	5.35E+00	8.69E+01	0.062
Residual Range Organics, Aloniate	1,000		1		Max HQ	1.9

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## TABI 41

## ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX

## Site 32 - Lower Tram Terminal NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

СОРЕС	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
DCB 1260 (Acceler 1260)	0.89	0	0.0011	0.0000093	1.7E-06	1.7E-02	0.00010
PCB-1260 (Aroclor 1260) Diesel Range Organics	13,000	0	679	0.00060	na	na	na
Diesel Range Organics, Aliphatic	10,400	0	543	0.00048	2.4E-02	4.6E+00	0.0051
Diesel Range Organics, Aromatic	5,200	0	271	0.00024	1.2E-02	4.6E+00	0.0026
Residual Range Organics	3,600	0	4.8	0.032	na	na	na
Residual Range Organics, Aliphatic	3,240	0	4.3	0.029	6.29E-03	5.01E+00	0.0013
Residual Range Organics, Aromatic	1,080	0	1.4	0.010	2.10E-03	5.01E+00	0.00042
residual range significo, rasinano						Max HQ	0.0051

### Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL Site 32 - Lower Tram Terminal

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
PCB-1260 (Aroclor 1260) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	0.89 13,000 10,400 5,200 3,600 3,240 1,080	0 0 0 0 0 0 0	0 0 0 0 0 0 0	0.0011 679 543 271 4.8 4.3 1.4	0 0 0 0 0 0 0	2.9E-11 na 1.5E-05 7.3E-06 na 1.15E-07 3.84E-08	2.0E-01 na 4.3E-01 4.3E-01 na 5.41E-01 5.41E-01 Max HQ	0.0000000014 na 0.000034 0.000017 na 0.00000021 0.000000071 0.0000034

#### Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## TAB\_\_\_\_-43

## ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE Site 33 - Upper Tram Terminal NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
Diesel Range Organics	660	0	34	na	na	na
Diesel Range Organics, Aliphatic	528	0	28	7.9E+00	8.0E+01	0.098
Diesel Range Organics, Aromatic	264	0	14	3.9E+00	8.0E+01	0.049
Residual Range Organics	2,100	0	2.8	na	na	na
Residual Range Organics, Aliphatic	1,890	0	2.5	9.37E+00	8.69E+01	0.11
Residual Range Organics, Aromatic	630	0	0.84	3.12E+00	8.69E+01	0.04
					Max HQ	0.11

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Site 33 - Upper Tram Terminal NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
			45 <sup>54</sup>				
Diesel Range Organics	660	0	34	0.00	na	na	na
	528	0	28	0.00	1.3E-03	4.6E+00	0.00029
Diesel Range Organics, Aliphatic	264	0	14	0.00	6.7E-04	4.6E+00	0.00015
Diesel Range Organics, Aromatic		0	2.8	0.02	na	na	na
Residual Range Organics	2,100	0				5.01E+00	0.00081
Residual Range Organics, Aliphatic	1,890	0	2.5	0.02	4.08E-03		
Residual Range Organics, Aromatic	630	0	0.84	0.01	1.36E-03	5.01E+00	0.00027
Residual Range Organies, Aromatie						Max HQ	0.00081

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

#### 

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL Site 33 - Upper Tram Terminal NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
		e						
Diesel Range Organics	660	0	0	34	0	na	na	na
Diesel Range Organics, Aliphatic	528	0	0	28	0	8.2E-07	4.3E-01	0.0000019
Diesel Range Organics, Aromatic	264	0	0	14	0	4.1E-07	4.3E-01	0.0000010
Residual Range Organics	2,100	0	0	2.8	0	na	na	na
Residual Range Organics, Aliphatic	1,890	0	0	2.5	0	7.49E-08	5.41E-01	0.0000014
Residual Range Organics, Aromatic	630	0	0	0.84	0	2.50E-08	5.41E-01	0.00000046
Residual Range Organies, Aronane	550	2					Max HQ	0.0000019

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

## Site 34 - Upper Camp NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
				÷.		
PCB-1254 (Aroclor 1254)	0.59	0	0.00071	2.9E-03	2.9E-01	0.010
PCB-1260 (Aroclor 1260)	0.47	0	0.00056	2.3E-03	2.9E-01	0.008
Diesel Range Organics	1,100	0	57	na	na	na
Diesel Range Organics, Aliphatic	880	0	46	1.3E+01	8.0E+01	0.16
Diesel Range Organics, Aromatic	440	0	23	6.6E+00	8.0E+01	0.082
Residual Range Organics	1,162	0	1.5	na	na	na
Residual Range Organics, Aliphatic	1,046	0	1.4	5.18E+00	8.69E+01	0.060
Residual Range Organics, Aromatic	349	0	0.46	1.73E+00	8.69E+01	0.020
Residual Range Organies, Monaute	2.02				Max HQ	0.16

Notes:

HQ - Hazard Quotient mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## TADLE H-47

## ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Site 34 - Upper Camp NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Reference Value (mg/kg-day)	Ecological Hazard
	0.50		0.00071	0.0000062	4 25 06	1.7E-02	0.00026
PCB-1254 (Aroclor 1254)	0.59	0	0.00071	0.0000062	4.3E-06		
PCB-1260 (Aroclor 1260)	0.47	0	0.00056	0.0000049	3.4E-06	1.7E-02	0.00020
Diesel Range Organics	1,100	0	57	0.00005	na	na	na
Diesel Range Organics, Aliphatic	880	0	46	0.0000	7.6E-03	4.6E+00	0.0016
Diesel Range Organics, Aromatic	440	0	23	0.000020	3.8E-03	4.6E+00	0.00082
Residual Range Organics	1,162	0	1.5	0.010	na	na	na
Residual Range Organics, Aliphatic	1,046	0	1.4	0.0092	7.68E-03	5.01E+00	0.0015
Residual Range Organics, Aromatic	349	0	0.46	0.0031	2.56E-03	5.01E+00	0.00051
Rosidua Rango Organios, Monado						Max HQ	0.0016

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL Site 34 - Upper Camp NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics	0.59 0.47 1,100 880 440 1,162	0 0 0 0 0	0 0 0 0 0 0	0.00071 0.00056 57 46 23 1.5	0 0 0 0 0 0	7.2E-11 5.7E-11 na 4.6E-06 2.3E-06 na	1.6E-01 2.0E-01 na 4.3E-01 4.3E-01 na	0.0000000046 0.0000000029 na 0.000011 0.0000054 na
Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	1,046 349	0 0	0 0	1.4 0.46	0 0	1.41E-07 4.69E-08	5.41E-01 5.41E-01 Max HQ	0.00000026 0.00000009 0.000011

### Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## TAE [-49

## ECOLOGICAL HAZARD CALCULATIONS FOR TUNDRA VOLE

### Sites 33 & 34 Combined

## NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard HQ
			0.00071	0.05.02	2.05.01	0.010
PCB-1254 (Aroclor 1254)	0.59	0	0.00071	2.9E-03	2.9E-01	0.010
PCB-1260 (Aroclor 1260)	0.47	0	0.00056	2.3E-03	2.9E-01	0.008
Diesel Range Organics	1,100	0	57	na	na	na
Diesel Range Organics, Aliphatic	880	0	46	1.3E+01	8.0E+01	0.16
Diesel Range Organics, Aromatic	440	0	23	6.6E+00	8.0E+01	0.082
Residual Range Organics	2,100	0	2.8	na	na	na
Residual Range Organics, Aliphatic	1,890	0	2.5	9.37E+00	8.69E+01	0.108
Residual Range Organics, Aromatic	630	0	0.84	3.12E+00	8.69E+01	0.036
,					Max HQ	0.16

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram. mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## ECOLOGICAL HAZARD CALCULATIONS FOR CROSS FOX Sites 33 & 34 Combined NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	C <sub>HERB</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260) Diesel Range Organics Diesel Range Organics, Aliphatic Diesel Range Organics, Aromatic Residual Range Organics Residual Range Organics, Aliphatic Residual Range Organics, Aromatic	0.59 0.47 1,100 880 440 2,100 1,890 630	0 0 0 0 0 0 0 0	$\begin{array}{c} 0.00071 \\ 0.00056 \\ 57 \\ 46 \\ 23 \\ 2.8 \\ 2.5 \\ 0.84 \end{array}$	0.0000062 0.000049 0.00005 0.0000 0.000020 0.019 0.0167 0.0056	5.6E-06 4.5E-06 na 9.9E-03 4.9E-03 na 1.80E-02 5.99E-03	1.7E-02 1.7E-02 na 4.6E+00 4.6E+00 na 5.01E+00 5.01E+00 Max HQ	0.00033 0.00026 na 0.0021 0.0011 na 0.0036 0.0012 0.0036

Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

### TAB 51

## ECOLOGICAL HAZARD CALCULATIONS FOR GLAUCOUS-WINGED GULL

Sites 33 & 34 Combined

NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

COPEC	Exposure Point Concentration C <sub>SOIL</sub> (mg/kg)	Exposure Point Concentration C <sub>SEDIMENT</sub> (mg/kg)	Exposure Point Concentration C <sub>WATER</sub> (mg/L)	Exposure Point Concentration C <sub>PLANT</sub> (mg/kg)	Exposure Point Concentration C <sub>FISH</sub> (mg/kg)	Ingestion Dose (mg/kg)	Toxicity Reference Value (mg/kg-day)	Ecological Hazard
DCD 1254 (Another 1254)	0.59	0	0	0.00071	0	9.3E-11	1.6E-01	0.00000000060
PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260)	0.39	0	0	0.00056	0	7.4E-11	2.0E-01	0.0000000037
Diesel Range Organics	1,100	0	0	57	0	na	na	na
Diesel Range Organics, Aliphatic	880	0 0	0	46	0	6.0E-06	4.3E-01	0.000014
Diesel Range Organics, Aromatic	440	0	0	23	0	3.0E-06	4.3E-01	0.0000070
Residual Range Organics	2,100	0	0	2.8	0	na	na	na
Residual Range Organics, Aliphatic	1,890	0	0	2.5	0	3.29E-07	5.41E-01	0.0000061
Residual Range Organics, Aromatic	630	0	0	0.84	0	1.10E-07	5.41E-01	0.0000020
				51			Max HQ	0.000014

#### Notes:

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

mg/kg - d - Milligrams per kilogram per day.

na - not applicable

## **APPENDIX I**

Exposure Point Concentrations for Environmental Media



## Table I-1 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska

Site 3

	Num	iber of								Z-sco	ore Plots	4		
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	cv	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
oil COPC												3		
Lead	3	3	119	27	na *	na "	na *	na "	na *	na "	na *	na *	na *	119
Methylene chloride	1	1	0.0093	0.0093	na *	na *	na *	na *	na *	na "	na *	na *	na *	0.009
Naphthalene	4	1	51	< 0.005	na *	na *	na *	na *	na *	na *	na *	na *	na *	51
DRO	6	5	3,760	<0.0549	1,420	1,419	1.0	Normal	na	0.92	0.66	Normal	2,587	2,587
ubsurface Water COI	PC													
DRO	4	4	14	1.8	na *	na *	na "	na *	na *	na "	na *	na *	na "	14
RRO	3	3	8.1	1.3	na *	na *	na *	na *	na *	na "	na "	na *	na *	8.1

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

na - Not applicable.

mg/kg - milligrams per kilogram

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

#### Table I-2 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 4

	Num	nber of									ore Plots			2 2
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	cv	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPC Lead DRO RRO	2 4 1	2 3 1	160 5,300 3,420	7.4 150 3,420	na " na " na "	na * na * na *	na " na " na "	na " na " na "	na " na " na "	na * na * na *	na " na "	na * na *	na * na * na *	160 5,300 3,420
Subsurface Water COPC DRO RRO	4 3	4 3	3.7 6.5	0.96 2.6	na " na "	na • na •	na * na *	na " na "	na * na *	na * na *	na " na "	na * na *	na " na "	3.7 6.5

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

\* Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

#### Table I-3 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 6

	Nun	ber of							*	Z-sco	ore Plots			
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	cv	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPC														
Aluminum	2	2	9,850	7,790	na *	na ª	na "	na ª	na "	na "	na *	na *	na "	9,850
Beryllium	13	3	1.3	0.60	0.64	1.1	0.55	Inconclusive	na	0.60	0.80	Normal	1.4	1.3
Cobalt	2	2	5.1	2.0	na *	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	5.1
Manganese	2	2	164	72.7	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	164
m,p-Xylene	5	2	0.044	< 0.005	0.018	0.011	1.7	Inconclusive	na <sup>a</sup>	0.70	0.77	Lognormal	0.52	0.044
Methylene chloride	3	3	0.0079	0.0044	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.0079
o-Xylene	5	2	0.014	< 0.005	0.0054	0.0045	1.2	Lognormal	na ª	0.66	0.84	Lognormal	0.049	0.014
DRO	17	17	102,000	12	27,008	16,359	1.7	Lognormal	na	0.66	0.94	Lognormal	14,716,131	102,000
RRO	6	6	8,500	220	3,127	3,200	1.0	Inconclusive	na	0.90	0.96	Lognormal	122,317	8,500

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration
COPC - Chemical of Potential Concern.
CV - coefficient of variation
DRO - Diesel range organics.
EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal  $r^2$  - Correlation coefficient for the normal plot RRO - Residual range organics.

Stdev - standard deviation

<sup>a</sup> Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

#### Table I-4 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska

Site 7

	Nur	nber of								Z-sc	ore Plots			
			Max Detect	Min Result				Shapiro-Wilkes	-			Assumed	95% UCL	EPC
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Test	Test	r2	r2	Distribution	95% UCL	Erc
coil COPC														
Aluminum	5	5	12,000	3,640	3,522	9,888	0.36	Inconclusive	na	0.65	0.61	Normal	13,246	12,000
Arsenic	18	18	50	2.0	12.32	9.3	1.3	Lognormal	na	0.58	0.84	Lognormal	15	15
Cadmium	19	9	4.1	1.0	2.5	2.5	1.0	Inconclusive	na	0.61	0.78	Lognormal	3.4	3.4
Chromium	19	18	100	5.0	27	27	1.0	Lognormal	na	0.70	0.91	Lognormal	43	43
Cobalt	5	5	19	2.0	8.3	12	0.71	Inconclusive	na	0.83	0.83	Lognormal	258	19
Lead	20	20	460	10	143	96	1.5	Inconclusive	na	0.62	0.86	Lognormal	196	196
Manganese	5	5	694	55	294	382	0.77	Inconclusive	na	0.87	0.82	Normal	662	662
Mercury	18	4	0.56	0.10	0.18	0.17	1.1	Inconclusive	na	0.80	0.82	Lognormal	0.31	0.31
Nickel	19	16	280	5.0	62	30.0	2.1	Lognormal	na	0.39	0.90	Lognormal	50	50
	2	2	1.2	0.28	na ª	na ª	na ª	na <sup>a</sup>	1.2					
Thallium	10	2	0.28	<0.0053	0.10	0.072	1.4	Inconclusive	na	0.79	0.86	Lognormal	4.7	0.28
1,1,1-Trichloroethane	10	4	1.4	<0.011	0.50	0.36	1.4	Lognormal	na	0.77	0.90	Lognormal	105	1.4
Acetone	10	5	0.40	<0.0053	0.13	0.11	1.3	Inconclusive	na	0.82	0.81	Normal	0.18	0.18
Bromoethane	10	1	0.13	<0.0053	0.047	0.039	1.2	Inconclusive	na	0.84	0.85	Normal	0.066	0.066
m,p-Xylene	9	4	0.013	<0.0058	0.11	0.086	1.3	Lognormal	na	0.79	0.92	Lognormal	2.7	0.13
Methylene chloride	14	3	3.9	<0.33	6.4	2.7	2.4	Inconclusive	na	0.41	0.86	Lognormal	13	3.9
4-Methylphenol (p-Cresol)	22	4	13	<0.05	2.8	0.8	3.5	Inconclusive	na	0.30	0.81	Lognormal	1.6	1.6
PCB-1260 (Aroclor 1260)	13	4	0.00052	0.0000011	0.00019	0.000084	2.3	Inconclusive	na	0.46	0.88	Lognormal	0.031	0.0005
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	13	12	0.020	0.00000091	0.0055	0.0016	3.4	Lognormal	na	0.30	0.96	Lognormal	1.54	0.020
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	13	4	0.00016	0.00000043	0.000046	0.000016	2.9	Inconclusive	na	0.37	0.80	Lognormal	0.00094	0.0001
1,2,3,4,6,7,8-Heptachlorodibenzofuran	12	8	0.0011	0.00000047	0.00030	0.00010	3.2	Lognormal	na	0.33	0.88	Lognormal	0.017	0.0011
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin 1,2,3,4,7,8,9-Heptachlorodibenzofuran	13	1	0.0000013	0.0000013	0.0000019	0.0000011	1.7	Lognormal	na	0.58	0.88	Lognormal	0.000004	0.00000
1,2,3,4,7,8,9-Heptachlorodibenzofuran	13	4	0.000027	0.00000012	0.0000002	0.00000012	2.6	Inconclusive	na	0.40	0.85	Lognormal	0.00002	0.0000
1.2.3.4.7.8-Hexachlorodibenzo-p-dioxin	13	1	0.0000020	<0.00000015	0.0000016	0.0000011	1.5	Lognormal	na	0.66	0.90	Lognormal	0.000015	0.00000
1,2,3,4,7,8-Hexachlorodibenzofuran	13	· ·	0.000011	<0.00000075	0.0000033	0.0000016	2.0	Inconclusive	na	0.54	0.88	Lognormal	0.000015	0.00001
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	13	4	0.000046	< 0.000000145	0.000013	0.0000043	2.9	Inconclusive	na	0.35	0.84	Lognormal	0.00003	0.00003
1,2,3,7,8,9-Hexachlorodibenzofuran	13	1	0.00000040	<0.00000085	0.00000057	0.00000043	1.3	Lognormal	na	0.68	0.95	Lognormal	0.0000012	0.00000
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	13	2	0.000031	0.0000051	0.000088	0.000036	2.5	Lognormal	na	0.43	0.88	Lognormal	0.000041	0.00003
1,2,3,7,8-Pentachlorodibenzofuran	13	í.	0.0000045	<0.0000001	0.0000016	0.0000010	1.6	Inconclusive	na	0.66	0.87	Lognormal	0.0000056	0.000004
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	13	1	0.0000015	<0.0000015	0.0000010	0.0000007	1.4	Inconclusive	na	0.67	0.92	Lognormal	0.0000020	0.00000
2.3.4.6.7.8-Hexachlorodibenzofuran	13	. 8	0.000019	0.00000041	0.0000052	0.0000026	2.0	Inconclusive	na	0.50	0.83	Lognormal	0.0000089	0.00000
2.3.4.7.8-Pentachlorodibenzofuran	13	1	0.000012	<0.0000008	0.0000035	0.0000018	2.0	Inconclusive	na	0.58	0.87	Lognormal	0.000016	0.00001
2,3,7,8-Tetrachlorodibenzofuran	13	6	0.000029	<0.000002	0.0000086	0.0000037	2.3	Inconclusive	na	0.49	0.88	Lognormal	0.000031	0.00002
2,3,7,8-Tetrachlorodibenzo-p-dioxins (TEQ) <sup>b</sup>	na	па	na	na	na	na	na	na	na	na	na	na	na	0.00004
			0.00053	<0.00001	na ª	na "	na ª	na "	na ª	na ª	na <sup>a</sup>	na ª	na ª	0.0005
Total Heptachlorodibenzofurans (HpCDF)	3	1					na ª	na <sup>a</sup>	na *	na ª	na *	na ª	na "	0.0022
Total Heptachlorodibenzo-p-dioxins (HpCDD)	3	2	0.0022	<0.0000185	na <sup>a</sup>					na *	na ª	na <sup>a</sup>	na <sup>a</sup>	0.0001
Total Hexachlorodibenzofurans (HxCDF)	3	1	0.00019	<0.00004	na *	na "	na ª	na ª	na "			na <sup>a</sup>	na <sup>a</sup>	0.0003
Total Hexachlorodibenzo-p-dioxins (HxCDD)	3	1	0.00034	<0.0000061	na <sup>a</sup>	na "	na "	na ª	na "	na "	na *			
Total Pentachlorodibenzofurans (PeCDF)	3	1	0.00011	<0.000088	na <sup>a</sup>	na <sup>a</sup>	naª	na <sup>a</sup>	na ª	na *	na "	na "	na <sup>a</sup>	0.0001
Total Tetrachlorodibenzofurans (TCDF)	3		0.00015	0.00015	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	0.0001

#### Table 1-4 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska

Site 7

	Nun	nber of							2	Z-sco	ore Plots			
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	cv	Shapiro-Wilkes Test	D'Agostino's Test	Normal r2	Lognormal r2	Assumed Distribution	95% UCL	EPC
Soil COPC (continued)														
Total Tetrachlorodibenzo-p-dioxins (TCDD)	3	1	0.000039	<0.000069	na a	na ª	na ª	na "	na ª	na "	na *	na <sup>a</sup>	na <sup>a</sup>	0.000039
Diesel Range Organics (DRO)	24	21	32,000	11	6,454	1,826	3.5	Lognormal	na	0.25	0.92	Lognormal	32,222	32,000
Residual Range Organics (RRO)	7	7	3,900	620	1,396	2,423	0.58	Inconclusive	na	0.91	0.86	Normal	3,448	3,448
Subsurface Water COPC														
Aluminum	3	3	26	11	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	26
Barium	3	3	0.13	0.13	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	0.13
Cobalt	3	3	0.064	0.004	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	0.064
Lead	4	4	0.04	0.005	na ª	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na ª	0.040
Manganese	3	3	0.593	0.060	na ª	na "	na ª	na ª	na ª	na ª	na ª	na "	na "	0.59
Nickel		1	3.5	3.5	na *	na *	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	3.5
	4	2	2.5	0.02	na ª	na *	na ª	na ª	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	2.5
Zinc Benzene	4	1	0.0021	0.0021	0.00072	0.00082	0.87	Inconclusive	na	na	na	na	na	0.0021
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	1	1	0.00000023	0.00000023	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na "	na ª	na <sup>a</sup>	0.0000023
2,3,7,8-Tetrachlorodibenzo-p-dioxins (TEQ) <sup>b</sup>	na	na	na	na	na	na	na	na	na	na	na	na	na	0.0000000002
DRO	4	3	0.66	0.39	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	0.66
RRO	3	2	2.7	1.1	na <sup>a</sup>	na ª	na <sup>a</sup>		na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	2.7

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPC - Chemical of Potential Concern.
CV - coefficient of variation DRO - Diesel range organics.
EPC - Exposure point concentration
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - Not applicable.
Normal r<sup>2</sup> - Correlation coefficient for the normal plot RRO - Residual range organics.
Stdev - standard deviation

Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

<sup>b</sup> Toxicity Equivalent Factors (TEFs) and subsequent Toxicity Equivalent Quotients (TEQs) derived from Draft Dioxin Reassessment, USEPA 2000c (Table 9-2).

#### Table I-5 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 9

	N	nber of								Z-sco	ore Plots			1
	Nun	iber of		Ma Deceli				Shapiro-	D'Agostino's			Assumed	. 2	
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r <sup>2</sup>	r <sup>2</sup>	Distribution	95% UCL	EPC
oil COPC														
Aluminum	5	1	0.000036	0.000036	3.5	4.9	0.72	Normal	na	0.88	0.57	Normal	8.3	0.000003
	15	1	14	<10	8.7	13	0.68	Inconclusive	na	0.93	0.96	Lognormal	20	14
Antimony Arsenic	15	7	20	<0.6	5.2	4.0	1.3	Lognormal	na	0.69	0.91	Lognormal	17	17
Cadmium	15	4	7.0	0.75	2.1	2.2	0.98	Lognormal	na	0.78	0.94	Lognormal	4.1	4.1
Chromium	15	14	60	5.0	14	19	0.70	Lognormal	na	0.77	0.93	Lognormal	29	29
Cobalt	5	4	38	<2	15	11	1.4	Lognormal	na	0.65	0.91	Lognormal	717	38
	15	15	429	6.0	106	53	2.0	Lognormal	na	0.40	0.89	Lognormal	98	98
Copper Lead	15	14	630	<10	160	105	1.5	Lognormal	na	0.57	0.92	Lognormal	276	276
	5	5	970	51	380	302	1.3	Lognormal	na	0.67	0.93	Lognormal	1,626	970
Manganese	15	1	0.60	<0.1	0.15	0.13	1.1	Inconclusive	na	0.73	0.98	Lognormal	0.21	0.21
Mercury	15	11	110	5	26	17	1.57	Inconclusive	na	0.40	0.82	Lognormal	27	27
Nickel	15	1	1.0	5	9.0	6.0	1.49	Inconclusive	na	0.80	0.94	Lognormal	73	1.0
Selenium					na "	na *	na *	na *	na "	na *	na *	na "	na *	0.28
Thallium	2	1	0.28	0.28		218	na 2.1	Inconclusive	na	0.44	0.84	Lognormal	459	459
Zinc	15	15	1,790	15	463	0.084	1.1	Normal	na	0.95	0.88	Normal	0.14	0.14
1,1,1-Trichloroethane	8	1	0.2	<0.005	0.088				na	0.68	0.92	Lognormal	2.06E+08	0.00001
1,2-Dibromoethane	8	2	0.000010	0.0000097	0.078	0.045	1.7	Lognormal	na	0.74	0.94	Normal	0.12	0.068
1,3-Dichlorobenzene	15	7	0.068	0.0000025	0.074	0.055	1.3	Inconclusive	na	0.43	0.97	Lognormal	87,851	0.00009
1,3-Dichloropropane	8	5	0.000097	0.0000070	0.031	0.012	2.6	Lognormal		0.43	0.83	Lognormal	8.76E+09	0.000000
2,2-Dichloropropane	8	1	0.0000092	0.0000092	0.078	0.059	1.3	Inconclusive	na	0.82	0.78	Normal	0.86	0.000002
2-Chloroethyl vinyl ether	5	2	0.0000026	0.0000054	0.46	0.42	1.1	Normal	na		nc	nc	nc	0.000004
2-Chlorotoluene	8	2	0.000045	0.0000013	0.045	0.031	1.5	Lognormal	na	nc 0.87	0.75	Normal	0.45	0.000008
2-Hexanone	5	2	0.000087	0.0000078	0.23	0.23	1.0	Normal	na	0.75	0.64	Normal	0.55	0.000002
4-Bromophenyl phenyl ether	10	2	0.000024	0.0000012	0.38	0.33	1.1	Inconclusive	na	0.79	0.72	Normal	0.64	0.000002
4-Chlorophenyl phenyl ether	10	2	0.000029	0.00000064	0.44	0.39	1.1	Inconclusive		0.64	0.92	Lognormal	1.19E+15	0.000004
4-Isopropyltoluene	8	3	0.0000047	0.00000077	0.046	0.026	1.8	Lognormal	na na	0.91	0.92	Lognormal	56	0.36
Bromomethane	8	1	0.36	< 0.005	0.13	0.10	1.2	Inconclusive	na	0.30	0.89	Normal	1.1	1.1
Toluene	16	2	6.0	<0.0025	1.5	0.42	3.5 1.3	Inconclusive	na	0.76	0.80	Lognormal	4.9E+26	0.000003
2-Methyl-4,6-dinitrophenol	10	3	0.000037	0.00000022	1.5	1.2	1.5	Inconclusive	na	0.85	0.70	Normal	2.3	0.000001
3-Nitroaniline	10	2	0.0000019	0.0000008	1.5	1.5 0.032	2.4	Lognormal	na	0.47	0.94	Lognormal	5.76E+13	0.025
4-Chlorotoluene	8	4	0.025	0.00000043	0.077		0.92	Inconclusive	na	0.91	0.60	Normal	3.0	0.00003
4-Nitroaniline	10	1	0.000030	0.000030	1.8	2.0	1.3	Inconclusive	na	0.76	0.80	Lognormal	1.18E+14	0.00013
4-Nitrophenol	10	3	0.00013	0.0000088	1.5	1.2			na	0.71	0.96	Lognormal	0.00099	0.00012
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	10	6	0.00012	0.0000038	0.000043	0.000030	1.4	Lognormal	na	0.79	0.96	Lognormal	0.015	0.0011
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	10	9	0.0011	0.0000070	0.00036	0.00028	1.3	Lognormal		0.73	0.96	Lognormal	0.00021	0.00003
1,2,3,4,6,7,8-Heptachlorodibenzofuran	10	7	0.000030	0.0000025	0.000011	0.0000080	1.4	Lognormal	na	0.76	0.95	Lognormal	0.0016	0.00012
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	10	8	0.00012	0.0000059	0.000045	0.000035	1.3	Lognormal	na	0.76	0.97	Lognormal	0.0000018	0.000001
1,2,3,4,7,8,9-Heptachlorodibenzofuran	9	1	0.000023	0.0000023	0.0000069			Lognormal	na	0.70	0.97	Lognormal	0.0000067	0.000006
1,2,3,4,7,8-Hexachlorodibenzofuran	10	4	0.0000066	0.0000023	0.0000020	0.0000015	1.4	Lognormal	na		0.97	Normal	0.0000017	0.000001
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	10	4	0.000029		0.0000078			Inconclusive	na	0.88	0.87	Lognormal	0.0000028	0.000001
1.2.3.6.7.8-Hexachlorodibenzofuran	10	2	0.0000016	0.0000014	0.0000066	0.0000071		Inconclusive	na		0.98	Lognormal	0.0000068	0.000004
1.2.3.6.7.8-Hexachlorodibenzofuran-p-dioxin	9	2	0.0000045		0.00000150			Inconclusive	na	0.78	0.97	Lognormal	0.0000013	0.000000
1,2,3,7,8,9-Hexachlorodibenzofuran	10	1	0.0000038	<0.0000008				Inconclusive	na	0.58 0.70	0.92	Lognormal	0.0000079	0.000007
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	10	4	0.000083		0.0000025		1.2	Lognormal	na	0.70	0.97	Lognormal	0.0000019	0.00000
1,2,3,7,8-Pentachlorodibenzofuran	10	3	0.0000021		0.0000063			Lognormal	na		0.95	Lognormal	0.00000045	0.000000
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	9	1	0.0000035		0.00000013			Inconclusive	na	0.94	0.98	Lognormal	0.0000029	0.000002
2,3,4,6,7,8-Hexachlorodibenzofuran	10	4	0.000032		0.0000010		1.0	Lognormal	na	0.84	0.97	Lognormal	0.0000020	0.00000
2.3.4.7.8-Pentachlorodibenzofuran	10	3	0.0000025		0.0000074			Lognormal	na	0.75	0.97	Lognormal	0.000015	0.00001
2,3,7,8-Tetrachlorodibenzofuran	10	7	0.0000066	0.0000026	0.0000024	0.0000019	1.3	Lognormal	na	0.77	0.93	Lognorman	0.000010	0.00031

#### Table I-5 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 9

		nber of Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test		Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPC (continued) 2,3,7,8-Tetrachlorodibenzo-p-dioxin	10	3	0.0000017	< 0.0000001	0.00000057	0.00000045	1.3	Lognormal	na	0.66	0.90	Lognormal	0.0000014	0.000001
2,3,7,8- Tetrachlorodibenzo-p-dioxins (TEQ) <sup>b</sup>	na	na	na	na	na	na	na	па	na	na	na	na	na	0.000085
Total Heptachlorodibenzofurans (HpCDF)	3	1	0.000095	na *	na *	na *	na *	na "	na "	na ª	na *	na *	na *	0.0001
Total Heptachlorodibenzo-p-dioxins (HpCDD)	3	2	0.00018	na *	na *	na *	na *	na *	na *	na *	na *	na *	na *	0.00018
	3	2	0.000010	na "	na *	na *	na "	na "	na *	na ª	na "	na *	na *	0.00001
Total Tetrachlorodibenzofurans (TCDF) Diesel Range Organics (DRO)	16	16	510	8.9	150	170	0.88	Inconclusive	па	0.89	0.95	Lognormal	462	462
Residual Range Organics (DRO)	6	6	2,100	53	705	959	0.74	Inconclusive	na	0.97	0.82	Normal	1,539	1,539
Subsurface Water COPC														
Aluminum	2	2	164	49	na *	na *	na *	na *	na *	na *	na	na *	na * 0.15	164 0.12
Antimony	5	1	0.12	<0.05	0.036	0.059	0.61	Inconclusive	na	0.88	0.99	Lognormal na *	na"	1.2
Barium	2	2	1.2	0.27	na *	na *	na *	na *	na "	na *	na	na na *	na "	0.037
Cobalt	2	2	0.037	0.12	na *	na *	na *	na "	na *	na * 0.64	na <sup>*</sup> 0.87	na Lognormal	1.2	0.30
Lead	5	5	0.30	0.019	0.12	0.092	1.3	Lognormal	na	0.04 na *	na *	na	na*	2.2
Manganese	2	2	2.2	0.33	na *	na !	na "	na	na *	na - 0.79	na 0.77	Normal	0.091	0.091
Nickel	5	2	0.11	<0.05	0.040	0.053	0.75	Normal	na	na ª	na *	na *	na*	0.15
Vanadium	2	2	0.15	0.10	na *	na	na * 0.42	na <sup>*</sup> Inconclusive	na na	na nc	na nc	nc	nc	0.00075
Benzene	8	1	0.0012	<0.001	0.00025	0.00059		na *	na "	na *	na "	na	na *	0.0000000
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	2	2	0.00000060	0.00000044	na *	na	na "		na "	na "	na •	na *	na *	0.0000010
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	2	2	0.0000010	0.00000031	na *	na	na -	na "			na "	na *	na*	0.0000000
1,2,3,4,6,7,8-Heptachlorodibenzofuran	2	1	0.00000037	<0.00000019		na *	na "	na *	na "	na			na*	0.0000001
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2	2	0.0000013	0.00000048	na *	na *	na *	na *	na "	na "	na *	na *	na na	0.0000000
2,3,7,8-Tetrachlorodibenzofuran	2	1	0.00000036	< 0.0000002	na *	na *	na "	na *	na *	na *	na *	na "		0.0000000
2,3,7,8-Tetrachlorodibenzo-p-dioxins (TEQ) <sup>b</sup>	па	na	na	na	na	na	na	na	na	na	na	na	na 49	7.7
DRO	6	5	7.7	<0.25	2.9	1.8	1.6	Lognormal	na	0.57	0.89	Lognormal na	na *	4.2
GRO	2	1	4.2	4.2	na *	na *	na "	na *	na *	na "	na *	na	na	4.2

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPC - Chemical of Potential Concern. CV - coefficient of variation DRO - Diesel range organics. EPC - Exposure point concentration Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - not applicable nc - not calculated due to low variance in values. Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

\* Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

<sup>b</sup> Toxicity Equivalent Factors (TEFs) and subsequent Toxicity Equivalent Quotients (TEQs) derived from Draft Dioxin Reassessment, USEPA 2000c (Table 9-2).

#### Table I-6 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 10

	Nur	nber of									ore Plots			
			Max Detect	Min Result				Shapiro-	D'Agostino's	Normal	Lognormal	Assumed	AF CI LICI	EPC
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r	r	Distribution	95% UCL	EFC
oil COPC														
Thallium	1	1	0.34	0.34	na ª	na "	na ª	na "	na "	na "	na "	na "	na "	0.34
DRO	11	11	26,500	59	11,129	8,952	1.2	Lognormal	na	0.71	0.92	Lognormal	730,658	26,50
DRO_Aromatic	1	1	38	38.0	na ª	na "	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	38

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

Stdev - standard deviation

<sup>a</sup> Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

#### Ta Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 11

	Num	ber of								Z-sco	ore Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPC														
Ethylbenzene	9	1	0.85	0.85	0.28	0.096	3.0	Inconclusive	na	na	na	na	na	0.85
DRO	9	9	69,100	11	23,195	10,306	2.3	Lognormal	na	0.54	0.91	Lognormal	276,668,758	69,100
GRO	9	1	192	192	64	22	2.9	Inconclusive	na	na	na	na	na	192
Subsurface Water COPC														
Benzene	4	1	0.010	0.010	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	0.010
Methylene chloride	2	1	0.011	0.011	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.011
n-Propylbenzene	2	1	0.016	0.016	na "	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na ª	na ª	na "	na ª	0.016
Naphthalene	2	1	0.39	0.39	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na	0.39
DRO	4	4	45	0.34	na ª	na ª	na ª	na ª	na ª	na <sup>a</sup>	na ª	na "	na "	45
GRO	2	1	1.1	1.1	na a	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	naª	1.1

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration GRO - Gasoline Range Organics

Lognormal  $r^2$  - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics. Stdev - standard deviation

<sup>a</sup> Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

#### Table I-8 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 13

	Norm	nber of								Z-sco	re Plots			
æ, "		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPO
oil COPC													1 m. 1.	
Benzene	29	3	0.043	0.018	0.0075	0.0089	0.85	Inconclusive	na	0.60	0.81	Lognormal	0.012	0.01
Ethylbenzene	29	12	1.4	0.11	0.46	0.30	1.5	Inconclusive	na	0.69	0.95	Lognormal	2.7	1.4
	24	13	4.0	0.13	1.2	0.72	1.6	Lognormal	na	0.67	0.92	Lognormal	6.0	4.0
m,p,-Xylene	24	13	1.5	0.010	0.41	0.24	1.7	Inconclusive	na	0.61	0.89	Lognormal	0.80	0.8
o-Xylene	24	7	0.86	0.018	0.029	0.028	1.0	Inconclusive	na	0.65	0.86	Lognormal	0.80	0.8
Toluene		23	115	0.0065	29	14	2.1	Inconclusive	na	0.54	0.94	Lognormal	586	115
PCB-1260 (Aroclor 1260)	33	19	15	0.0037	4.4	2.9	1.5	Inconclusive	na	0.71	0.84	Lognormal	4,196	15
Naphthalene	24	29	12,000	21	3.620	3,096	1.2	Lognormal	na	0.82	0.95	Lognormal	17,222	12,0
DRO	29	29	294	3.0	81	68	1.2	Inconclusive	na	0.83	0.90	Lognormal	1,001	294
GRO	29 24	20	3,400	7.4	767	379	2.0	Lognormal	na	0.47	0.98	Lognormal	1,072	1,07
RRO	24	24	3,400	/.4	101	017								8
ubsurface Water COPC														0.05
Arsenic	2	2	0.073	0.036	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na "	0.07
	2	2	0.21	0.14	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na ª	na "	0.2
Copper					na *	na ª	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	0.4
Lead	2	2	0.45	0.33					na "	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.01
Lead, dissolved	2	1	0.015	0.015	na <sup>a</sup>	na "	na "	na "				na "	na "	0.1
Nickel	2	2	0.17	0.12	na ª	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na ª	na ª		21	0.1
Benzene	8	5	0.12	0.0012	0.041	0.020	2.1	Lognormal	na	0.53	0.95	Lognormal	0.14	0.1
Ethylbenzene	8	8	0.15	0.018	0.041	0.068	0.61	Inconclusive	na	0.92	0.98	Lognormal	946	0.1
Toluene	8	5	0.17	0.00011	0.068	0.037	1.8	Lognormal	na	0.61		Lognormal Lognormal	117	10
DRO	8	8	100	6.1	33	35	0.92	Lognormal	na	0.81	0.97	Lognormal	7.4	4.0
GRO	6	6	4.0	0.52	1.4	2.0	0.72	Inconclusive	na	0.86			518	2.
RRO	5	4	2.3	0.18	0.18	2.2	2.2	Inconclusive	na	0.16	0.00029	Lognormal	510	2.

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

GRO - Gasoline range organics.

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL.

#### Table 1-5 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 13

Nur	nber of									ore Plots			
		Max Detect	Min Result				Shapiro-	D'Agostino's	Normal	Lognormal	Assumed		
Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r <sup>2</sup>	r <sup>2</sup>	Distribution	95% UCL	EPC
	1.00					· .							

In this case, the maximum concentration was used for the EPC value.

#### Table I-9 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 15

	Num	ber of								Z-sco	re Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPC		97. S										· · ·		
Ethylbenzene	4	2	1.0	0.025	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na "	na "	1.0
m,p-Xylene	2	2	1.8	0.043	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	1.8
o-Xylene	2	1	0.015	0.015	na "	na ª	na ª	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.015
Naphthalene	2	2	28	0.90	na <sup>a</sup>	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	28
DRO	4	4	16,000	2,190	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	16,00
GRO	4	2	110	60	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	110
Subsurface Water COPC														
Arsenic	1	1	0.11	0.11	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	0.11
Arsenic, Dissolved	1	1	0.006	0.006	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na	0.006
Lead	1	1	0.68	0.68	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na *	na <sup>a</sup>	0.68
Nickel	1	1	0.20	0.20	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	0.20
DRO	2	2	960	9.3	na ª	na ª	na ª	na ª	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	960
RRO	1	1	3.8	3.8	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	3.8

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

GRO - Gasoline range organics.

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal  $r^2$  - Correlation coefficient for the normal plot Stdev - standard deviation

<sup>a</sup> Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

#### Table 1-10 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 16

	Nun	nber of									ore Plots			
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
	oumpies	Detections	(	(8/8/										
il COPC														
Antimony	13	2	21	14	5.1	6.7	0.76	Inconclusive	na	0.82	0.99	Lognormal	9.6	9.6
Arsenic	13	13	12	3.3	2.2	5.3	0.42	Lognormal	na	0.70	0.87	Lognormal	6.4	6.4
Beryllium	13	2	1.2	1.1	0.060	1.0	0.1	Inconclusive	na	0.97	0.98	Lognormal	1.1	1.1
Cadmium	13	4	7.2	1.4	1.7	1.6	1.1	Inconclusive	na	0.56	0.89	Lognormal	2.4	2.4
Chromium	13	13	147	8.9	40	38	1.1	Lognormal	na	0.70	0.92	Lognormal	69	69
Lead	15	15	822	18	231	178	1.3	Lognormal	na	0.70	0.97	Lognormal	530	530
Thallium	13	2	0.26	0.19	3.7	8.5	0.43	Inconclusive	na	0.97	0.98	Lognormal	36	0.2
Zinc	13	13	12,100	41	3,315	1,081	3.1	Inconclusive	na	0.32	0.76	Lognormal	3,521	3,52
Methylene chloride	4	2	0.0072	0.0061	na *	na ª	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.00
PCB-1260 (Aroclor 1260)	15	6	1.4	0.019	0.41	0.22	1.9	Inconclusive	na	0.58	0.79	Lognormal	0.78	0.7
bsurface Water COPC														
Beryllium	3	2	0.04	0.02	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	0.04
Cadmium	3	1	0.06	0.06	na <sup>a</sup>	na <sup>a</sup>	na ª	na ª	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.0
	100	3	0.50	0.16	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.5
Copper	3	5	0.50	0.0029	0.28	0.26	1.1	Inconclusive	na	0.93	0.91	Normal	0.53	0.5
Lead	2	5					na <sup>a</sup>	na <sup>a</sup>	na ª	na "	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.00
Lead, Dissolved	3	1	0.004	0.004	na <sup>a</sup>	na *						na <sup>a</sup>	na <sup>a</sup>	0.4
Nickel	3	3	0.42	0.11	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>			
Zinc	3	3	1.5	0.54	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	1.5
4-Isopropyltoluene	5	1	0.0066	0.0066	0.0027	0.0017	1.6	Inconclusive	na	na	na	na	na	0.00
n-Propylbenzene	5	2	0.00490	0.00430	0.0023	0.0021	1.1	Inconclusive	na	0.95	0.92	Normal	0.0043	0.00
sec-Butylbenzene	5	1	0.0040	0.0040	0.00045	0.0048	0.093	Inconclusive	na	nc	nc	nc	nc	0.00
Trichloroethene	5	1	0.0033	0.0033	0.0013	0.0011	1.2	Inconclusive	na	0.53	0.53	Lognormal	0.0058	0.00
bis-(2-ethylhexyl)phthalate	5	3	0.025	0.0014	0.0098	0.0078	0.1	Inconclusive	na	0.40	0.15	Normal	0.017	0.0

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

nc - Not calculated due to low variance in values.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

Stdev - standard deviation

Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

#### Table I-11 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 19

	Nur	ber of								Z-sco	re Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPO
oil COPC														
Cadmium	8	2	3.2	2.9	1	2	0.63	Inconclusive	na	0.98	0.97	Normal	2.2	2.2
Chromium	16	16	59	4.4	14	18	0.80	Lognormal	na	0.77	0.97	Lognormal	27	27
Lead	16	16	329	14	77	54	1.4	Inconclusive	na	0.49	0.88	Lognormal	86	86
Benzene	15	1	0.74	0.74	0.36	0.14	2.6	Inconclusive	na	0.47	0.8	Lognormal	1.2	0.74
Ethylbenzene	15	2	3.0	0.22	0.81	0.31	2.6	Inconclusive	na	0.47	0.93	Lognormal	14	3.0
m,p-Xylene	8	ĩ	0.20	0.20	0.065	0.041	1.6	Inconclusive	na	0.45	0.64	Lognormal	0.11	0.1
Toluene	15	1	3.1	3.1	0.84	0.30	2.8	Inconclusive	na	0.44	0.89	Lognormal	7.4	3.1
	7	2	17	8.0	6.7	3.6	1.9	Inconclusive	na	0.97	0.96	Normal	8.6	8.6
Xylenes DRO	16	14	13,300	7.0	3,401	1,670	2.0	Lognormal	na	0.53	0.59	Lognormal	380,682	13,3
GRO	16	5	6,650	4.9	1,657	450	3.7	Inconclusive	na	0.28	0.80	Lognormal	14,173	6,65
Subsurface Water COPC														0.2
Copper	2	2	0.20	0.04	na a	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	
	2	2	0.42	0.14	na ª	na <sup>a</sup>	na a	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.4
Lead	2	4	0.42	0.006	0.0087	0.0036	2.4	Inconclusive	na	0.43	0.69	Lognormal	0.032	0.02
Benzene	ð	4			na ª			na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	0.00
Ethane	4	1	0.0017	0.0017		na "	na " 1.0	Inconclusive	na	0.91	0.94	Lognormal	697	34
DRO	8	8	34	0.71	14	13			na	0.51	0.79	Lognormal	9,534	6.1
GRO	6	4	6.1	0.024	2.4	1.1	2.2	Lognormal		0.90	0.95	Lognormal	5.2	1.:
RRO	6	3	1.3	0.22	0.51	0.65	0.79	Inconclusive	na	0.90	0.95	Logiomia		

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration
COPC - Chemical of Potential Concern.
CV - coefficient of variation
DRO - Diesel range organics.
EPC - Exposure point concentration
GRO - Gasoline range organics.
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot
mg/kg - milligrams per kilogram
na - Not applicable
Normal r<sup>2</sup> - Correlation coefficient for the normal plot
RRO - Residual range organics.
Stdev - standard deviation

Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

# Tal Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 21

	Num	nber of									ore Plots			
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
oil COPC														
Aluminum	10	10	33,100	3,975	7,678	17,258	0.44	Inconclusive	na	0.91	0.81	Normal	21,708	21,70
Antimony	19	1	38	38	7.9	7.6	1.0	Inconclusive	na	0.53	0.82	Lognormal	9.7	9.7
Arsenic	19	19	170	2.8	38	18	2.0	Lognormal	na	0.38	0.87	Lognormal	28	28
Barium	10	10	193	56.5	37	120	0.31	Normal	na	0.95	0.93	Normal	141	141
Cadmium	19	8	69	0.40	16	4.5	3.5	Lognormal	na	0.26	0.74	Lognormal	5.2	5.2
Chromium	19	19	93	4.0	21	27	0.76	Inconclusive	na	0.83	0.96	Lognormal	44	44
Cobalt	10	10	14	2.5	4.0	7.4	0.54	Inconclusive	na	0.93	0.97	Lognormal	12 561	12 561
Manganese	10	10	786	77	269	405	0.66	Inconclusive	na	0.92	0.92	Normal	0.76	0.76
Mercury	19	6	4.8	0.07	1.3	0.48	2.6	Lognormal	na	0.42	0.72 0.95	Lognormal	15	2.0
Selenium	19	3	2.0	1.0	4.1	3.7	1.1	Inconclusive	na	0.87	0.95	Lognormal Lognormal	2.1	2.0
Silver	19	3	6.7	0.90	1.7	1.2	1.4	Lognormal	na	0.58	0.94	Normal	9.1	0.53
Thallium	19	1	0.53	0.53	3.7	7.6	0.48	Inconclusive	na	0.97	0.85	Normal	56	56
Vanadium	10	10	81	8.5	19	45	0.43	Normal	na	0.93	0.97	Lognormal	480	480
Zinc	19	19	1,130	24	280	252	1.1	Lognormal	na		na <sup>a</sup>	na a	na ª	0.19
1,2,4-Trimethylbenzene	4	2	0.19	0.032	na *	na "	na ª	na *	na °	na ª			0.048	0.19
m,p-Xylene	14	7	0.096	0.007	0.024	0.017	1.4	Lognormal	na	0.64	0.97	Lognormal		a second
Methylene chloride	4	1	0.006	0.006	na *	na *	na <sup>a</sup>	na *	na <sup>a</sup>	na <sup>a</sup>	na *	na *	na <sup>a</sup>	0.00
n-Butylbenzene	4	1	0.062	0.062	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.063
n-Propylbenzene	4	1	0.04	0.04	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.04
o-Xylene	14	i	0.006	0.006	0.0042	0.0048	0.88	Inconclusive	na	0.23	0.19	Normal	0.007	0.00
	4	1	0.036	0.036	na "	na ª	na ª	na *	na "	na <sup>a</sup>	na "	na ª	na <sup>a</sup>	0.03
sec-Butylbenzene 4-Chloroaniline	9	1	5.5	5.5	1.7	1.2	1.4	Lognormal	na	0.66	0.98	Lognormal	5.6	5.5
PCB-1260 (Aroclor 1260)	19	4	3	0.15	2.9	0.91	3.2	Inconclusive	na	0.33	0.72	Lognormal	2.4	2.4
DRO	19	16	3,800	46	859	514	1.7	Inconclusive	na	0.52	0.82	Lognormal	13,909	3,80
RRO	10	10	3,700	25	1,121	1,735	0.65	Normal	na	0.93	0.72	Normal	2,384	2,38
ubsurface Water COPC														
Arsenic	2	2	0.072	0.041	na ª	na ª	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	0.07
	2	2	0.26	0.10	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.26
Copper							na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.26
Lead	2	2	0.26	0.10	na *	na ª				na <sup>a</sup>	na a	na <sup>a</sup>	na a	0.000
Mercury	2	1	0.0006	0.0006	na "	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>				na "	0.18
Nickel	2	2	0.18	0.10	na *	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	1	
Zinc	2	2	5.1	0.65	na ª	na "	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	5.1
	2	1	0.0011	0.0011	na ª	na <sup>a</sup>	na <sup>a</sup>	na *	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.001
n-Propylbenzene	2	2	1.0	0.59	na "	na ª	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	1.0
## Table I-12 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 21

	Nun	nber of									ore Plots	2¥		
			Max Detect	Min Result				Shapiro-	D'Agostino's	Normal	Lognormal	Assumed Distribution	95% UCL	EPC
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r	r	Distribution	75 % OCL	LIC
Notes:														
95% UCL - 95 percent upper confid	lence limit	(UCL) on the	mean concentra	ation										
COPC - Chemical of Potential Cond	cem.													
CV - coefficient of variation														
DRO - Diesel range organics.														
EPC - Exposure point concentration	1													
Lognormal r <sup>2</sup> - Correlation coefficie	ent for the l	ognormal plo	t											
mg/kg - milligrams per kilogram														
na - Not applicable.														
Normal r <sup>2</sup> - Correlation coefficient f	for the norr	nal plot												
RRO - Residual range organics.	tor the non	in prov												
Stdev - standard deviation														
<sup>a</sup> Consistent with methods describ		EC (ADEC 2	002) and LISED	A (LISEDA 200	2h) less th	an 5 sampl	les in a d	ata set are inade	equate to calculat	e a meanin	gful 95% UCL			
Consistent with methods describ	bed by ADI	EC (ADEC, 2	EDC walks	A (USEFA, 200	20), iC33 u	an 5 samp	05 11 4 0	atu set ale made						
In this case, the maximum conce	entration w	as used for th	e EPC value.											

#### Table 1-13 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 22

	Num	nber of								Z-sco	ore Plots			
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	cv	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EP
Soil COPC														
Lead	9	9	497	5.4	152	102	1.5	Lognormal	na	0.57	0.91	Lognormal	597	49
o-Xylene	8	3	0.37	0.15	0.13	0.11	1.2	Inconclusive	na	0.75	0.80	Lognormal	0.81	0.3
Benzo(a)pyrene	11	1	0.35	0.35	0.10	0.035	3.0	Inconclusive	na	0.33	0.40	Lognormal	0.079	0.0
DRO	10	5	4,070	284	1,619	1,232	1.3	Inconclusive	na	0.83	0.86	Lognormal	93,037,525	4,0
GRO	10	3	38	24	14	10	1.4	Lognormal	na	0.72	0.88	Lognormal	135	38
RRO	8	7	3,815	5.4	1,313	576	2.3	Lognormal	na	0.46	0.96	Lognormal	159,483	3,8
Subsurface Water COPC														
Manganese	3	3	0.20	0.12	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na "	na *	na ª	na <sup>a</sup>	0.2
Manganese, Dissolved	3	3	0.17	0.09	na <sup>a</sup>	na "	na <sup>a</sup>	na "	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na "	0.1
DRO	4	2	1.4	0.28	na *	na ª	na ª	na ª	na <sup>a</sup>	na "	na <sup>a</sup>	na °	na <sup>a</sup>	1.
RRO	3	1	2.8	2.8	na ª	na a	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	2.

## Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

GRO - Gasoline range organics.

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

#### Table I-14 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 27

	Nun	ber of									re Plots			
	-	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
oil COPC														
Benzene	30	11	0.80	< 0.0025	0.16	0.089	1.8	Lognormal	na	0.54	0.97	Lognormal	0.28	0.28
Ethylbenzene	30	19	8.09	< 0.0025	1.7	0.93	1.8	Lognormal	na	0.59	0.96	Lognormal	14	8.1
m,p-Xylene	25	21	25	0.068	5.8	3.7	1.6	Lognormal	na	0.67	0.96	Lognormal	48	25
o-Xylene	25	21	16	0.010	3.8	3.0	1.3	Inconclusive	na	0.76	0.91	Lognormal	83	16
Toluene	30	11	7.6	< 0.0025	1.7	0.80	2.1	Lognormal	na	0.54	0.95	Lognormal	10	7.6
Naphthalene	25	23	191	0.0011	43	25	1.7	Inconclusive	na	0.62	0.93	Lognormal	159,536	
DRO	35	35	51,000	11	14,364	10,125	1.4	Inconclusive	na	0.74	0.94	Lognormal	293,675	51,00 491
GRO	30	23	491	2.3	132	140	1.3	Inconclusive	na	0.79	0.94	Lognormal	1,235	3,459
RRO	25	23	9,100	16	2,453	2,620	0.94	Inconclusive	na	0.89	0.88	Normal	3,459	5,455
Subsurface Water COPC														
Lead	1	1	0.19	0.19	na *	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.19
Lead, Dissolved	1	. 1	0.0020	0.0020	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	0.002
· · · · · · · · · · · · · · · · · · ·	1		0.20	0.20	na "	na ª	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.20
Manganese	1	1			na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.03
Benzene	3	2	0.030	< 0.001									na ª	0.12
Ethylbenzene	3	2	0.12	< 0.001	na ª	na "	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na "		
DRO	3	3	64	1.4	na ª	na ª	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	64
GRO	3	2	1.7	<0.1	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na "	na ª	na <sup>a</sup>	na a	1.7
RRO			1.6	1.6	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na a	na <sup>a</sup>	na <sup>a</sup>	1.6

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPC - Chemical of Potential Concern.
CV - coefficient of variation DRO - Diesel range organics.
EPC - Exposure point concentration GRO - Gasoline range organics.
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - Not applicable.
Normal r<sup>2</sup> - Correlation coefficient for the normal plot RRO - Residual range organics.
Stdev - standard deviation

## Table I-15 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 28

	Num	nber of									ore Plots			
		-	Max Detect	Min Result	Culor	Marr	CV	Shapiro-	D'Agostino's Test	Normal	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	<u> </u>	Wilkes Test	Test	1	<b>i</b>	Distribution	75 % OCL	210
Soil COPC														
Beryllium	11	1	1.8	1.8	0.43	1.3	0.34	Inconclusive	na	0.95	0.98	Normal	1.5	1.5
Thallium	11	1	0.26	0.26	5.2	11	0.48	Inconclusive	na	0.82	0.56	Normal	14	0.26
Ethylbenzene	10	1	1.1	1.1	0.34	0.12	2.9	Inconclusive	na	0.43	0.86	Lognormal	9.0	1.1
Methylene chloride	5	4	0.16	0.0071	0.065	0.050	1.3	Inconclusive	na	0.79	1.0	Lognormal	21	0.16
PCB-1254 (Aroclor 1254)	19	4	1.5	0.20	0.39	0.21	1.9	Inconclusive	na	0.55	0.82	Lognormal	0.47	0.47
Benzo(a)anthracene	8	1	4.4	4.4	1.5	1.0	1.5	Lognormal	na	0.70	0.91	Lognormal	2,030	4.4
Benzo(a)pyrene	8	1	2.3	2.3	0.82	0.74	1.1	Inconclusive	na	0.87	0.87	Lognormal	850	2.3
Benzo(b)fluoranthene	8	1	2.6	2.6	0.91	0.78	1.2	Inconclusive	na	0.85	0.88	Lognormal	1,072	2.6
DRO	21	20	92,650	7.9	27,349	18,613	1.5	Lognormal	na	0.72	0.92	Lognormal	7,516,257	92,65
DRO_aromatic	2	1	59	59	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	59
GRO	10	4	120	3.7	49	28	1.7	Inconclusive	na	0.71	0.85	Lognormal	8,202	120
RRO	6	6	2,200	1,200	413	1,733	0.24	Inconclusive	na	0.94	0.92	Normal	2,073	2,07
	2	2	360	230	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	360				
RRO_aromatic	2	2	300	230	na	na	IIa	na	na	na				
ediment COPC														
Chromium	68	67	649	<4	77	29	2.6	na	Inconclusive	0.16	0.79	Lognormal	28	28
Lead	68	55	4,590	4.0	554	93	5.9	na	Inconclusive	0.76	0.81	Lognormal	7.4	7.4
Zinc	68	68	4,810	12	589	160	3.7	na	Inconclusive	0.87	0.93	Lognormal	26	26
Benzene	8	1	0.050	< 0.0025	0.042	0.031	1.4	Lognormal	na	0.83	1.0	Lognormal	3.5	0.05
Ethylbenzene	8	2	1.8	< 0.0025	0.62	0.25	2.5	Lognormal	na	0.46	1.0	Lognormal	318	1.8
PCB-1254 (Aroclor 1254)	79	14	2.8	0.038	1.4	0.29	5.0	na	Inconclusive	0.15	0.79	Lognormal	0.16	0.16
PCB-1260 (Aroclor 1260)	79	27	5.4	< 0.041	1.5	0.40	3.8	na	Inconclusive	0.21	0.90	Lognormal	0.52	0.52
beta-BHC	10	2	0.012	0.0036	0.0036	0.0046	0.79	Inconclusive	na	0.88	0.98	Lognormal	0.010	0.01
gamma-BHC (Lindane)	13	2	0.0065	0.0029	3.9	1.8	2.1	Inconclusive	na	0.55	0.72	Lognormal	32,009	0.006
Dibenzofuran	68	26	5.6	< 0.0077	1.2	0.77	1.6	na	Lognormal	0.66	0.94	Lognormal	4.5	4.5
2-Methylnaphthalene	71	58	500	< 0.0077	93	35	2.6	na	na	0.40	0.96	Lognormal	1,291	500
Benzo(a)anthracene	71	5	1.9	< 0.0062	0.57	0.38	1.5	na	Inconclusive	0.71	0.94	Lognormal	1.5	1.5
Benzo(a)pyrene	71	4	1.4	< 0.0062	0.52	0.35	1.5	na	Inconclusive	0.70	0.95	Lognormal	1.4	1.4
Benzo(b)fluoranthene	71	5	1.6	< 0.0062	0.54	0.37	1.5	na	Inconclusive	0.72	0.94	Lognormal	1.5	1.5
Ideno(1,2,3-cd)pyrene	71	3	1.2	<0.0062	0.51	0.34	1.5	na	Inconclusive	0.69	0.95	Lognormal	1.3	1.2
Naphthalene	71	55	220	<0.0077	36	13	2.8	na	Lognormal	0.37	0.97	Lognormal	175	175
DRO	83	83	150,000	22.00	26,815	17,557	1.5	na	Inconclusive	0.68	0.96	Lognormal	98,564	98,56
	3	1	60	<12	na	na	na	na	na	na	na	na	na	60
DRO_Aromatic	5	5	150,000	26	64.389	36,541	1.8	Lognormal	na	0.67	0.94	Lognormal	2.9E+20	150,0
DRO_ Aliphatic	5	2	220	<1	95	55	1.7	Lognormal	na	0.75	0.98	Lognormal	8.3E+09	220
GRO	-		14,000	69	3.012	2,615	1.2	na	Lognormal	0.69	0.97	Lognormal	3,634	3,63
RRO	69	66	11,000	58	4,715	2,613	1.8	Lognormal	na	0.63	0.93	Lognormal	5.3E+08	11,00
RRO_Aliphatic	5	4	500	58 64	4,713	2,022	0.6	Inconclusive	na	0.98	0.94	na	430	430

## Table I-15 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 28

	Nun	nber of								Z-sco	ore Plots			
			Max Detect	Min Result			CU	Shapiro-	D'Agostino's	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r	r	Distribution	95 % UCL	Erc
Ephemeral Surface Water CO	PC													
Chromium	3	1	0.015	0.015	na ª	na <sup>a</sup>	na "	na	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.01
Copper	3	1	0.040	< 0.02	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na a	na "	na "	na <sup>a</sup>	0.04
Lead	3	1	0.086	< 0.002	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.08
	3	1	0.011	<0.002	na a	na *	na ª	na <sup>a</sup>	na <sup>a</sup>	na "	na ª	na ª	na <sup>a</sup>	0.01
Lead, Dissolved	-				na ª	na *	na a	na ª	na "	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.6
Zinc	3	1	0.62	<0.05					na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	0.2
Zinc, Dissolved	3	1	0.23	<0.05	na *	na *	na ª	na *						0.000
PCB-1260 (Aroclor 1260)	15	2	0.0019	< 0.0005	0.00044	0.00061	0.72	Inconclusive	na	0.62	0.77	Lognormal	0.00081	
DRO	17	17	326	0.39	78	22	3.6	Inconclusive	na	0.27	0.83	Lognormal	46	46
GRO	5	1	0.57	<0.05	0.24	0.13	1.8	Inconclusive	na	1.0	1.0	Lognormal	13	0.5
ubsurface Water COPC														
Arsenic	1	1	0.039	0.039	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	па а	0.03
Copper	2	1	0.18	< 0.02	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	0.1
Lead	2	2	0.20	0.008	na ª	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.2
		1	0.16	<0.05	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na ª	na <sup>a</sup>	na <sup>a</sup>	0.10
Nickel	2	2	3.2	0.49	na ª	na ª	na ª	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	3.2
DRO	2	2	3.2	0.49	na	Ind	114						0	
lant Tissue COPC													na ª	0.00
Antimony	1	1	0.0030	0.003	na "	na ª	na ª	na "	na <sup>a</sup>	na ª	na a	na <sup>a</sup>	na 3.1	0.00
Arsenic	5	1	0.55	<0.06	0.20	0.19	1.1	Lognormal	na	0.75	0.94 0.70	Lognormal Normal	36	36
Barium	5	5	40	0.45	15	22	0.67	Normal	na na	0.90	0.98	Lognormal	919,651	1.1
Cadmium	5	5	1.1	0.0020	0.47	0.30	1.6 1.7	Lognormal Lognormal	na	0.65	0.98	Lognormal	188,442	9.6
Chromium	5	4	10	<0.06	4.1	2.4	0.52	Normal	na	0.95	0.86	Normal	3.2	3.2
Copper	5	5	3.4	0.58	1.1 2.1	1.4	1.5	Lognormal	na	0.73	0.99	Lognormal	2,102	5.0
Lead	5	5	5.0	0.065 <0.004	0.011	0.013	0.86	Inconclusive	na	0.92	0.97	Lognormal	0.22	0.02
Mercury	5	4	0.027		1.5	1.2	1.2	Lognormal	na	0.78	0.94	Lognormal	551	3.7
Nickel	5	5	3.7	0.060	0.019	0.044	0.45	Normal	na	0.93	0.80	Normal	0.062	0.05
Selenium	5	1	0.050	< 0.025	0.019	0.044	0.43	Inconclusive	na	0.91	0.97	Lognormal	0.37	0.02
Silver	5	2	0.023	<0.002			2.0	Lognormal	na	0.59	0.90	Lognormal	35,484	3.1
Vanadium	5	5	3.1	0.016	1.4	0.70	0.94	Normal	na	0.93	0.89	Normal	61	61
Zinc	5	5	76	1.3	30	32	0.94	Inconclusive	na	0.70	0.59	Normal	0.013	0.01
2-Methylnaphthalene	5	3	0.014	< 0.005	0.0052	0.0079		Inconclusive	na	0.73	0.77	Lognormal	1.1	0.05
Acenaphthene	5	4	0.052	0.0038	0.021	0.016	1.3 0.62	Normal	na	0.80	0.63	Normal	0.013	0.01
Anthracene	5	4	0.016	< 0.005	0.0052	0.0084		Inconclusive	na	0.80	0.76	Normal	0.088	0.08
Benzo(a)anthracene	5	4	0.11	0.0045	0.049	0.038	1.3		na	0.79	0.72	Normal	0.13	0.1
Benzo(a)pyrene	5	2	0.17	< 0.005	0.075	0.055	1.4	Inconclusive	na	0.70	0.7.8			

#### Table 1-15 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 28

	Num	nber of									re Plots			
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EP
Plant Tissue COPC (continued)													100	
Benzo(b)fluoranthene	5	4	0.15	0.0037	0.065	0.043	1.5	Inconclusive	na	0.73	0.80	Lognormal	153	0.1
Benzo(g,h,i)perylene	5	3	0.099	0.0031	0.044	0.034	1.3	Inconclusive	na	0.77	0.64	Normal	0.075	0.07
Benzo(k)fluoranthene	5	2	0.16	< 0.005	0.072	0.056	1.3	Inconclusive	na	0.78	0.70	Normal	0.12	0.1
Chrysene	5	4	0.21	0.005	0.094	0.068	1.4	Inconclusive	na	0.78	0.77	Normal	0.16	0.1
Dibenz(a,h,)anthracene	5	3	0.033	0.0035	0.014	0.0135	1.0	Normal	na	0.73	0.60	Normal	0.027	0.02
Fluoranthene	5	4	0.50	< 0.005	0.25	0.21	1.2	Normal	na	0.75	0.53	Normal	0.44	0.4
Fluorene	5	4	0.041	< 0.005	0.017	0.018	0.98	Normal	na	0.77	0.66	Normal	0.034	0.03
Ideno(1,2,3-cd)pyrene	5	4	0.19	0.0027	0.083	0.059	1.4	Inconclusive	na	0.79	0.82	Lognormal	3,555	0.1
Naphthalene	5	4	0.022	0.0043	0.0080	0.0093	0.86	Normal	na	0.73	0.64	Normal	0.017	0.01
Phenanthrene	5	5	0.56	0.0027	0.23	0.19	1.2	Normal	na	0.78	0.50	Normal	0.42	0.4
Pyrene	5	4	0.48	< 0.005	0.20	0.17	1.2	Normal	na	0.84	0.64	Normal	0.36	0.3
PCB-1254 (Aroclor 1254)	5	5	0.22	0.0049	0.094	0.090	1.0	Normal	na	0.92	0.88	Normal	0.18	0.1
PCB-1260 (Aroclor 1260)	5	5	0.099	0.0049	0.044	0.040	1.1	Inconclusive	na	0.83	0.88	Lognormal	7.6	0.09

## Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

GRO-Gasoline range organics.

Lognormal  $r^2$  - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

## Table I-16 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 29

	Nur	nber of									re Plots			
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Freshwater Sediment COPC														3
Aluminum	4	4	15,900	4,820	na ª	na ª	na ª	na ª	na "	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	15,90
Arsenic	4	4	5.7	2.8	na "	na "	na ª	na *	na "	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	5.7
Barium	4	4	115	40	na ª	na "	na ª	na *	na "	na ª	na "	na <sup>a</sup>	na ª	115
Cobalt	4	4	7.0	2.0	na <sup>a</sup>	na "	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	7.0
Manganese	4	4	114	80	na ª	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	114
Mercury	4	1	0.05	0.05	na <sup>a</sup>	na *	na <sup>a</sup>	na *	na <sup>a</sup>	na <sup>a</sup>	na "	na "	na <sup>a</sup>	0.050
Vanadium	4	4	35	17	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na "	na <sup>a</sup>	na "	na "	na <sup>a</sup>	35
	4	1	0.0032	0.0032	na <sup>a</sup>	na ª	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	0.003
m,p-Xylene	4	1	0.0086	0.0086	0.040	0.014	2.8	Inconclusive	na	0.29	0.73	Lognormal	0.020	0.008
Dibenzofuran DRO	26	24	25,000	9.3	4,883	1,096	4.5	Lognormal	na	0.20	0.92	Lognormal	1,859	1,859
Fresh Surface Water COPC														
	4	4	0.04	0.04	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	0.04
Aluminum	4	4	0.005	0.005	na *	na ª	na <sup>a</sup>	na "	na "	na "	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.005
Barium	•	4	0.005	0.005	na "	na ª	na <sup>a</sup>	na "	na "	na "	na *	na ª	na <sup>a</sup>	0.027
Manganese	4			0.017	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na *	na <sup>a</sup>	0.02
Silver, Dissolved	1	1	0.02	< 0.02	0.0095	0.0084	1.1	Lognormal	na	0.87	1.0	Lognormal	0.071	0.008
Zinc DRO	13	1	0.33	<0.1	0.077	0.73	0.73	Inconclusive	na	0.86	1.0	Lognormal	0.16	0.16
DRO_ Aliphatic	1	1	0.33	0.33	na <sup>a</sup>	na ª	na ª	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	0.33
GRO	11	2	0.41	<0.05	0.12	0.13	0.93	Lognormal	na	0.75	0.91	Lognormal	0.29	0.29
Fish Tissue COPC											3		0.71	0.71
Arsenic	8	8	0.78	0.50	0.10	0.64	0.16	Inconclusive	na	0.92	0.91	Normal	0.71	
Barium	8	8	0.049	0.015	0.012	0.030	0.39	Inconclusive	na	0.97	0.98	Lognormal	0.043	0.043
Cadmiun	8	4	0.0090	0.0060	0.00095	0.0069	0.14	Lognormal	na	0.85	0.90	Lognormal	0.0075	0.007
Copper	8	8	0.98	0.55	0.13	0.70	0.18	Lognormal	na	0.82	0.88	Lognormal	0.79	0.79
Lead	8	5	0.012	0.003	0.0032	0.0049	0.65	Lognormal	na	0.79	0.93	Lognormal	0.0080	0.008
Mercury	8	8	0.022	0.014	0.0026	0.018	0.15	Inconclusive	na	0.99	0.97	Normal	0.020	0.020
	8	3	0.1	0.03	0.026	0.036	0.71	Lognormal	na	0.60	0.70	Lognormal	0.054	0.054
Nickel	8	8	0.17	0.12	0.015	0.14	0.11	Inconclusive	na	0.95	0.97	Lognormal	0.15	0.15
Selenium	о 8	8	0.06	0.017	0.012	0.043	0.28	Normal	na	0.84	0.71	Normal	0.051	0.051
Vanadium	8	8	7.1	5.6	0.59	6.5	0.091	Inconclusive	na	0.93	0.92	Normal	6.9	6.9
Zinc	•			<0.005	0.0014	0.0030	0.47	nc	nc	nc	nc	nc	nc	0.006
2-Methylnaphthalene	8	1	0.0065	<0.005	0.0014	0.0030	0.56	Inconclusive	na	0.55	0.66	Lognormal	0.0042	0.004

Fish Tissue COPC (continued)

#### Table 1-16 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 29

	Num	nber of								Z-sco	re Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPO
													0.0010	0.00
Anthracene	8	2	0.0072	0.0017	0.0017	0.0030	0.58	Lognormal	na	0.73	0.86	Lognormal	0.0042	0.00
Benzo(a)anthracene	8	2	0.0082	0.0014	0.0021	0.0031	0.68	Lognormal	na	0.74	0.92	Lognormal	0.0047	0.00
Benzo(a)pyrene	8	2	0.0059	0.0021	0.0012	0.0029	0.43	Lognormal	na	0.68	0.75	Lognormal	0.0037	0.00
Benzo(b)fluoranthene	8	2	0.0040	0.0012	0.0007	0.0025	0.30	Inconclusive	na	1.00	0.97	Normal	0.0030	0.00
Benzo(g,h,i)perylene	8	3	0.0064	0.0034	0.0014	0.0033	0.42	Lognormal	na	0.89	0.96	Lognormal	0.0043	0.00
Benzo(k)fluoranthene	8	3	0.012	0.0024	0.0033	0.0038	0.87	Lognormal	na	0.56	0.64	Lognormal	0.0064	0.00
Chrysene	8	2	0.0084	0.0025	0.0021	0.0032	0.64	nc	nc	nc	nc	nc	nc	0.00
Dibenz(a,h,)anthracene	8	1	0.0041	0.0041	0.00057	0.0027	0.21	nc	nc	nc	nc	nc	nc	0.00
Fluoranthene	8	3	0.0093	0.0017	0.0025	0.0032	0.77	Lognormal	na	0.59	0.71	Lognormal	0.0050	0.00
Fluorene	8	3	0.0076	0.0012	0.0020	0.0029	0.69	Lognormal	na	0.73	0.94	Lognormal	0.0046	0.00
Ideno(1,2,3-cd)pyrene	8	3	0.0027	0.00074	0.00076	0.0021	0.36	Normal	na	0.80	0.77	Normal	0.0026	0.00
Naphthalene	8	3	0.0047	0.0018	0.00089	0.0026	0.34	Lognormal	na	0.79	0.90	Lognormal	0.0033	0.00
	8	4	0.0086	0.0015	0.0023	0.0031	0.74	Lognormal	na	0.59	0.75	Lognormal	0.0048	0.00
Phenanthrene		7	0.0030	0.0015	0.0025	0.0036	0.74	Inconclusive	na	0.62	0.69	Lognormal	0.0054	0.00
Pyrene	8	3			0.0020	0.0030	0.30	Normal	na	0.97	0.95	Normal	0.014	0.0
PCB-1254 (Aroclor 1254)	8	8	0.016	0.0061							nc	nc	nc	0.00
PCB-1260 (Aroclor 1260)	8	1	0.0045	< 0.002	0.0012	0.0014	0.86	nc	nc	nc	ne	ne	1	

## Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPC - Chemical of Potential Concern. CV - coefficient of variation DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - not applicable

nc - not calculated due to low variance in values.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

### Table I-17 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 30

	Num	nber of									ore Plots			
			Max Detect	Min Result	Chlory	Mean	cv	Shapiro- Wilkes Test	D'Agostino's Test	Normal	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV.	WIIKES TEST	Test					
Fish Tissue COPC														
Arsenic	5	5	0.94	0.33	0.23	0.66	0.34	Inconclusive	na	0.96	0.89	Normal	0.88	0.88
Barium	5	5	0.061	0.024	0.014	0.039	0.36	Inconclusive	na	0.92	0.97	Lognormal	0.059	0.059
Cadmium	5	3	0.008	0.0070	0.00071	0.0070	0.10	Inconclusive	na	nc	nc	nc	nc	0.0080
Copper	5	5	1.2	0.59	0.22	0.79	0.28	Inconclusive	na	0.88	0.93	Lognormal	1.1	1.1
Lead	5	5	0.004	0.0020	0.001	0.003	0.34	Inconclusive	na	nc	nc	nc	nc	0.004
Mercury	5	5	0.034	0.0090	0.011	0.022	0.50	Inconclusive	na	0.94	0.95	Lognormal	0.057	0.034
Nickel	5	4	0.05	0.030	0.011	0.039	0.29	Inconclusive	na	0.98	0.98	Lognormal	0.057	0.050
Selenium	5	5	0.19	0.13	0.022	0.16	0.14	Inconclusive	na	0.95	0.97	Lognormal	0.18	0.18
Vanadium	5	5	0.08	0.046	0.013	0.062	0.21	Inconclusive	na	0.99	0.99	Normal	0.075	0.075
Zinc	5	5	14	5.9	3.4	8.6	0.39	Inconclusive	na	0.85	0.88	Lognormal	14	14
Fluoranthene	5	1	0.0015	0.0015	0.00045	0.0023	0.19	Inconclusive	na	nc	nc	nc	nc	0.001
PCB-1254 (Aroclor 1254)	5	5	0.011	0.0062	0.0020	0.010	0.21	Inconclusive	na	0.84	0.79	Normal	0.011	0.011
Plant Tissue COPC													na "	0.56
Arsenic	2	1	0.56	<0.21	na *	na *	na *	na *	na *	na "	na "	na "		21
Barium	2	2	21	12	na "	na *	na ª	na ª	na *	na "	na "	na "	na "	
Cadmium	2	2	0.88	0.18	na *	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na *	na ª	na	0.88
Chromium	2	2	9.0	1.0	na "	na "	na ª	na *	na <sup>a</sup>	na "	na "	na "	na "	1.000
Copper	2	2	2.8	2.2	na *	na "	na "	na *	na "	na "	na "	na "	na "	2.8
Lead	2	2	3.5	0.68	na *	na "	na "	na *	na "	na "	na "	na "	na "	3.5
Mercury	2	2	0.021	0.008	na *	na *	na *	na *	na *	na "	na *	na "	na "	
Nickel	2	2	4.2	1.1	na *	na "	na "	na *	na *	na *	na	na "		4.2
Selenium	2	1	0.050	0.050	na *	na "	na "	na *	na <sup>a</sup>	na "	na	na "	na "	0.050
Silver	2	2	0.019	0.011	na *	na *	na "	na "	na "	na "	na "	na	na "	-
Vanadium	2	2	3.6	0.36	na *	na *	na *	na <sup>a</sup>	na "	na "	na "	na "	na *	3.6
Zinc	2	2	57	28	na *	na 📍	na ª	na ª	na "	na "	na "	na *	na "	57
2-Methylnaphthalene	2	1	0.0076	<0.005	na "	na "	na *	na *	na "	na "	na "	na "	naª	0.007
Acenaphthene	2	2	0.013	0.0037	na "	na *	na *	na "	na "	na "	na "	na "	na	0.01
Anthracene	2	1	0.049	<0.005	na "	na "	na *	na "	na "	na "	na "	na "	na "	0.04
Benzo(a)anthracene	2	2	0.075	0.0025	na *	na "	na "	na ª	na "	na "	na *	na "	na *	0.07
Benzo(a)pyrene	2	2	0.021	0.0027	na *	na *	na *	na *	na *	na ª	na *	na "	na "	0.02
Benzo(b)fluoranthene	2	2	0.053	0.0045	na *	na *	na ª	na *	na *	na <sup>a</sup>	na *	na "	na "	0.05
	2	2	0.013	0.0019	na *	na *	na ª	na *	na "	na ª	na *	na *	na "	0.013
Benzo(g,h,i)perylene Benzo(k)fluoranthene	2	2	0.046	0.0045	na *	na "	na "	na *	na "	na *	na *	na *	na *	0.040

#### 1 adde 1-17 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 30

	Num	ber of									ore Plots			
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPO
Plant Tissue COPC (continued)														
Chrysene	2	2	0.087	0.0037	na *	na *	na ª	na *	na *	na <sup>a</sup>	na "	na "	na <sup>a</sup>	0.08
Dibenz(a,h)anthracene	2	2	0.013	0.0019	na "	na "	na ª	na "	na *	na "	na °	na "	na "	0.01
Fluoranthene	2	2	0.38	0.0083	na *	na *	na "	na *	na "	na "	na "	na "	na "	0.38
Fluorene	2	2	0.022	0.0025	na *	na *	na ª	na "	na "	na "	na "	na "	na "	0.02
Indeno(1,2,3-cd)pyrene	2	2	0.024	0.0041	na *	na *	na ª	na "	na *	na <sup>a</sup>	na "	na "	na *	0.024
Naphthalene	2	2	0.0078	0.0019	na *	na *	na ª	na *	na *	na ª	na "	na <sup>a</sup>	na <sup>a</sup>	0.007
Phenanthrene	2	2	0.29	0.013	na "	na *	na ª	na ª	na "	na ª	na ª	na *	na <sup>a</sup>	0.29
Pyrene	2	2	0.28	0.0073	na ª	na ª	na ª	na "	na *	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	0.28
PCB-1254 (Aroclor 1254)	2	2	0.011	0.0097	na *	na *	na *	na *	na "	na *	na "	na *	na "	0.01
PCB-1260 (Aroclor 1260)	2	2	0.0095	0.0050	na *	na *	na *	na "	na "	na "	na "	na "	na "	0.009

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPC - Chemical of Potential Concern.
CV - coefficient of variation EPC - Exposure point concentration
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - not applicable nc - not calculated due to low variance in values.
Normal r<sup>2</sup> - Correlation coefficient for the normal plot Stdev - standard deviation

### Table I-18 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 31

	Nun	nber of	Max Detect	Min Result	х.			Shapiro-	D'Agostino's	Z-sco Normal	ore Plots Lognormal	Assumed		
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r <sup>2</sup>	r <sup>2</sup>	Distribution	95% UCL	EPC
Soil COPC														0.017
m,p-Xylene	4	2	0.017	0.0066	na "	na *	na <sup>a</sup>	na "	na "	na "	na "	na °	na "	0.017
o-Xylene	4	1	0.0053	0.0053	na <sup>a</sup>	na "	na ª	na "	0.0053					
PCB-1260 (Aroclor 1260)	8	6	22	0.36	7.2	5.3	1.4	Lognormal	na	0.70	0.90	Lognormal	6054	22
DRO	24	24	11,000	11	2,298	1,273	1.8	Lognormal	na	0.53	0.98	Lognormal	8,307	8,307
RRO	24	12	9,600	12	2,817	1,179	2.4	Inconclusive	na	0.45	0.85	Normal	2,165	2,165

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

## Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 32

	Nur	nber of	Max Detect	Min Result				Shapiro-	D'Agostino's		ore Plots Lognormal	Assumed		
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r <sup>2</sup>	r <sup>2</sup>	Distribution	95% UCL	EPC
Soil COPC DRO	5	5	13,000	230	5,647	4,486	1.26	Inconclusive	na	0.82	0.94	Lognormal	7,091,847	13,000
RRO	5	3	3,600	110	1,132	1,580	0.7	Inconclusive	na	0.65	0.71	Lognormal	3,898	3,600

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal  $r^2$  - Correlation coefficient for the lognormal plot

na - Not applicable.

mg/kg - milligrams per kilogram

## Table I-20 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 33

	Nun	nber of								Z-sco	ore Plots			-
		Detections		Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPC	 	10		1 80 -	1917 1917							3		
DRO	3	3	660	150	na ª	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na "	na *	na "	na "	660
RRO	3	3	2,100	270	na "	na ª	na ª	na °	na <sup>a</sup>	na ª	na <sup>a</sup>	na "	na "	2,100

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

## Taure 1-21 Human Health Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska

Site 34
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	Nun	nber of					2				ore Plots Lognormal			1.1
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	r <sup>2</sup>	r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPC Diesel Range Organics (DRO)	9	9	1,100	13	419	327	1.3	Lognormal	na	0.75	0.94	Lognormal	9,959	1,100
Residual Range Organics (RRO)	9	8	1,200	58	387	290	1.3	Lognormal	na	0.59	0.86	Lognormal	1,162	1,102

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration CV - coefficient of variation
EPC - Exposure point concentration
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot na - Not applicable.
mg/kg - milligrams per kilogram
Normal r<sup>2</sup> - Correlation coefficient for the normal plot
Stdev - standard deviation

### Table I-22 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 3

	Num	nber of								Z-sco	ore Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EP
Soil COPEC														
Lead	3	3	119	27	na *	na *	na ª	na ª	na ª	na *	na <sup>a</sup>	na <sup>a</sup>	na *	11
PCB-1260	2	2	0.75	0.29	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.7
Antrhacene	3	1	10.3	10	na <sup>a</sup>	na "	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	10
	3	1	50.8	51	na ª	na "	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	50
Naphthalene DRO	6	5	3,760	314	1,420	1,419	1.0	Normal	na	0.92	0.66	Normal	2,587	2,5
Subsurface Water Co	OPEC													
Xylenes	1	1	0.54	0.54	na <sup>a</sup>	na "	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	0.5
DRO	4	4	14	1.8	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	na "	1.
RRO	3	3	8.1	1.3	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	8.

## Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPEC - Chemical of Potential Ecological Concern.
CV - coefficient of variation DRO - Diesel range organics.
EPC - Exposure point concentration
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

### Table I-23 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 4

	Nun	nber of									re Plots			
			Max Detect	Min Result				Shapiro-	D'Agostino's	Normal	Lognormal	Assumed		
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r <sup>2</sup>	r <sup>2</sup>	Distribution	95% UCL	EPC
Soil COPC														
Anthracene	1	1	14	14	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	14
Chrysene	1	1	11	11	na <sup>a</sup>	11								
Fluorene	1	1	13	13	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	13				
DRO	4	4	5,300	150	na ª	na ª	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	5,300
RRO	1	1	3,420	3,420	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	3,420
Subsurface Water COPC													1	
Xylenes	1	1	0.0069	0.0069	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na ª	na ª	na "	na "	na ª	0.0069
DRO	4	4	3.7	0.96	na ª	na *	na ª	na <sup>a</sup>	na ª	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	3.7
RRO	3	3	6.5	2.6	na <sup>a</sup>	na *	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na °	na <sup>a</sup>	na <sup>a</sup>	6.5

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPC - Chemical of Potential Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - Not applicable. Normal r<sup>2</sup> - Correlation coefficient for the normal plot RRO - Residual range organics.

Stdev - standard deviation

#### Table I-24 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 6

	Nun	nber of								Z-sco	re Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	cv	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPEC												• = 3		
Aluminum	2	2	9,850	7,790	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	9,850
Manganese	2	2	164	73	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	164
Zinc	13	13	172	20	48	72	0.66	Inconclusive	na	0.91	0.98	Lognormal	106	106
DRO	17	17	102,000	12	27,008	16,359	1.7	Lognormal	na	0.66	0.94	Lognormal	14,716,131	102,00
RRO	6	6	8,500	220	3,127	3,200	0.98	Inconclusive	na	0.90	0.96	Lognormal	122,317	8,500
Ephemeral Surface Water COF	EC													
DRO	3	1 .	1.8	0.050	na ª	na <sup>a</sup>	na <sup>a</sup>	na a	na <sup>a</sup>	na <sup>a</sup>	na ª	na ª	na "	1.8

## Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPEC - Chemical of Potential Ecological Concern.
CV - coefficient of variation DRO - Diesel range organics.
EPC - Exposure point concentration
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - Not applicable.
Normal r<sup>2</sup> - Correlation coefficient for the normal plot RRO - Residual range organics.

Stdev - standard deviation

# Ta Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 7

	Num	ber of								Z-sco	ore Plots			1
	Num	ber or	Max Detect	Min Result				Shapiro-	D'Agostino's		Lognormal	Assumed		
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r <sup>2</sup>	r <sup>2</sup>	Distribution	95% UCL	EPC
oil Tundra COPEC														
Arsenic	18	18	50	2.0	12.32	9.3	1.3	Lognormal	na	0.58	0.84	Lognormal	15	15
Chromium	19	18	100	5.0	27	27	1.0	Lognormal	na	0.70	0.91	Lognormal	43	43
Cadmium	19	9	4.1	1.0	2.5	2.5	1.0	Inconclusive	na	0.61	0.78	Lognormal	3.4	3.4
Copper	19	19	320	6.6	75	44	1.7	Inconclusive	na	0.52	0.84	Lognormal	8.3	8.3
Lead	20	20	460	10	143	96	1.5	Inconclusive	na	0.62	0.86	Lognormal	196	196
Mercury	18	4	0.56	0.10	0.18	0.17	1.1	Inconclusive	na	0.80	0.82	Lognormal	0.31	0.31
Nickel	19	16	280	5.0	62	30.0	2.1	Lognormal	na	0.39	0.90	Lognormal	50	50
Silver	19	2	2.0	2.0	2.6	2.1	1.3	Inconclusive	na	0.60	0.86	Lognormal	3.0	2.0
Bromomethane	10	5	0.40	< 0.0053	0.13	0.11	1.3	Inconclusive	na	0.82	0.81	Normal	0.18	0.18
4-Methylphenol (p-Cresol)	14	3	3.9	< 0.33	6.4	2.7	2.4	Inconclusive	na	0.41	0.86	Lognormal	13	3.9
PCB-1260 (Aroclor 1260)	22	4	13	< 0.05	2.8	0.8	3.5	Inconclusive	na	0.30	0.81	Lognormal	1.6 0.031	0.0005
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	13	4	0.00052	0.0000011	0.00019	0.000084	2.3	Inconclusive	na	0.46	0.88	Lognormal	1.54	0.0003
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	13	12	0.02	0.0000091	0.0055	0.0016	3.4	Lognormal	na	0.30	0.96	Lognormal	0.00094	0.0001
1,2,3,4,6,7,8-Heptachlorodibenzofuran	12	4	0.00016	0.0000043	0.000046	0.000016	2.9	Inconclusive	na	0.37	0.80	Lognormal	0.00094	0.0001
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	13	8	0.0011	0.0000047	0.00030	0.00010	3.2	Lognormal	na	0.33	0.88	Lognormal	0.000020	0.0000
1,2,3,4,7,8-Hexachlorodibenzofuran	13	4	0.000027	< 0.0000015	0.0000074	0.000028	2.6	Inconclusive	na	0.40	0.85	Lognormal	0.000020	0.0000
1,2,3,6,7,8-Hexachlorodibenzofuran	13	1	0.000011	<0.00000075		0.0000016	2.0	Inconclusive	na	0.54	0.88	Lognormal	0.000013	0.0000
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	13	4	0.000046	< 0.00000145		0.0000043	2.9	Inconclusive	na	0.35	0.84	Lognormal	0.000003	0.0000
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	13	2	0.000031	0.0000051		0.0000043		Lognormal	na	0.68	0.95	Lognormal	0.0000012	0.00000
2,3,4,6,7,8-Hexachlorodibenzofuran	13	8	0.000019	0.00000041	0.0000052		2.0	Inconclusive	na	0.50	0.83	Lognormal	0.000016	0.0000
2.3.4.7.8-Pentachlorodibenzofuran	13	1	0.000012	<0.0000008	0.0000035	0.0000018	2.0	Inconclusive	na	0.58	0.87	Lognormal	0.000018	0.0000
2.3.7.8-Tetrachlorodibenzofuran	13	6	0.000029	< 0.000002	0.000086	0.0000037	2.3	Inconclusive	na	0.49	0.88	Lognormal		
Total Heptachlorodibenzofurans (HpCDF)	3	1	0.00053	< 0.00001	na *	na *	na *	na *	na "	na "	na "	na *	na *	0.0005
Total Heptachlorodibenzo-p-dioxins (HpCDD)	3	2	0.0022	< 0.0000185	па	na *	na *	na "	na *	na "	na "	na *	na *	0.002
Total Hexachlorodibenzofurans (HxCDF)	3	1	0.00019	< 0.000004	na *	na *	na "	na *	na *	na "	na "	na "	na "	0.0001
Total Hexachlorodibenzo-p-dioxins (HxCDD)	3	1	0.00034	< 0.0000061	na *	na *	na *	na *	na "	na *	na "	na *	na *	0.0003
Total Pentachlorodibenzofurans (PeCDF)	3	1	0.00011	< 0.000088	na *	na *	na *	na *	na "	na "	na *	na *	na *	0.0001
			0.00015	0.00015	na *	na *	na *	na "	na "	na "	na "	na "	na "	0.0001
Total Tetrachlorodibenzofurans (TCDF)	3	1						na "	na "	na "	na "	na *	na*	0.0000
Total Tetrachlorodibenzo-p-dioxins (TCDD)	3	1	0.000039	<0.000069	na *	na	na		na	0.25	0.92	Lognormal	32,222	32,00
DRO	24	21	32,000	11	6,454	1,826	3.5	Lognormal	na	0.19	0.18	Normal	3,448	3,448
RRO	7	7 7	3,900	620	1,396	2,423	0.58	Inconclusive	lla	0.19	0.10			
phemeral Surface Water COPEC						0.00000				0.75	0.99	Lognormal	0.81	0.017
Arsenic	5	1	0.017	0.017	0.0068	0.0045	1.5	Lognormal	na	0.75				
Barium	2	2	0.012	0.008	na *	na *	na *	na "	na	na *	na *	na *	na*	0.012
Chromium	5	1	0.02	0.02	0.0072	0.009	0.80	Inconclusive	na	0.98	0.97	Normal	0.016	0.010
Lead	5	5	0.065	0.002	0.027	0.016	1.7	Lognormal	na	0.60	0.80	Lognormal	1.2	0.065
	3	1	0.00038	0.00038	na *	na *	na "	na *	na *	na *	na "	na *	na *	0.0003
Mercury, Dissolved	3	1	0.0038	0.0038	0.020	0.023	0.87	Inconclusive	na	0.98	0.96	Normal	0.041	0.041
Nickel	5	1	0.0033	0.0024	0.054	0.041	1.3	Inconclusive	na	na	na	na	na	0.002
Thallium				0.0024	na *	na *	na "	na *	na *	na *	na "	na *	na ª	0.001
Thallium, Dissolved	3	1	0.0012			na *	na *	na *	na *	na *	na *	na *	na *	0.00000
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3	1	0.0000052	<0.0000027	na *	na	na	na	ца	Inte				

#### Table I-25 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 7

	Num	ber of								Z-sco	re Plots			
	Samples		Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Cphemeral Surface Water COPEC (continued) 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	3	1	0.00000071	<0.000000051 <0.000000051	na " na "	na " na "	na * na *	na * na *	па * па *	na " na "	na " na "	na * na *	na " na "	0.00000
Total Heptachlorodibenzo-p-dioxins (HpCDD) DRO	3	2	12	0.2	5.1	2.4	2.1	na	na	na	na	na	na	1

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPEC - Chemical of Potential Ecological Concern. CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal  $r^2$  - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

### Table 1-20 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 9

Samples Detections         Output         Output         Finance				ore Plots	Z-sco								nber of	Nun	
Animony         15         1         14         14         8.7         13         0.68         Inconcluity         na         0.93         0.93         Lognormal         72           Cadmiun         15         7         20         3.6         5.2         4.0         1.3         Legnormal         na         0.94         Legnormal         1.4           Chornium         15         14         6.0         7.5         2.1         2.2         Legnormal         na         0.77         0.93         Legnormal         9.8           Copper         15         14         6.03         -10         1.05         1.1         Inconclusive         na         0.73         0.92         Legnormal         7.0           Sclenium         15         1         1.0         -0.5         0.33         0.44         0.73         Inconclusive         na         0.43         0.21         0.21         1.1         Inconclusive         na         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44         0.44	UCL EPC	95% UCL		Lognormal r <sup>2</sup>	Normal r <sup>2</sup>			cv	Mean	Stdev				Samples	
Arcenic         15         7         20         3.6         5.2         4.0         1.3         Legnormal         na         0.69         0.91         Legnormal         1.7           Cadmium         15         14         60         5.0         14         19         0.70         Legnormal         na         0.77         0.93         Legnormal         9.8         Legnormal         na         0.40         0.89         Legnormal         9.8         Legnormal         na         0.40         0.93         Legnormal         na         0.40         0.89         Legnormal         9.8           Lead         15         1         6.00         -0.1         0.15         Legnormal         na         0.47         0.98         Legnormal         2.75           Sclenium         15         1         1.0         -55         0.3         0.44         0.73         Lognormal         na         0.46         0.84         Legnormal         1.4         1.50         1.5         1.700         1.5         4.63         2.1         Inconcluive         na         0.46         0.97         Legnormal         0.44         0.94         Legnormal         0.41         1.20         Distroprose         0.000000000		1.1													Soil COPEC
Arsenic       15       7       20       3.6       5.2       4.0       1.3       Lognormal       na       0.69       0.91       Lognormal       1.7         Cadmium       15       14       60       5.0       14       19       0.70       Lognormal       na       0.77       0.93       Lognormal       9.3         Copper       15       15       46       0.0       106       155       Lognormal       na       0.40       0.93       Lognormal       9.3         Mercury       15       1       6.00       -0.1       0.15       0.13       1.1       Inconclusive       na       0.57       0.92       Lognormal       9.3         Sclenium       15       1       1.0       -0.5       0.33       0.44       0.73       Inconclusive       na       0.40       0.82       Lognormal       1.4         2.0       15       1.5       1.70       1.5       4.63       2.18       Inconclusive       na       0.46       0.92       Lognormal       0.44       0.97       Lognormal       0.44       0.97       Lognormal       0.14       1.3       Lognormal       0.14       1.30       Lognormal       0.14       1.		20	Lognormal	0.96	0.93	na	Inconclusive	0.68	13	8.7	14	14	1	15	
Chronium         15         14         60         50         14         19         0.70         Lognormal         ns         0.77         0.93         Lognormal         29           Copper         15         14         639         c.01         160         105         15         Lognormal         ns         0.40         0.89         Lognormal         78           Mercury         15         1         0.60         0.51         Lognormal         ns         0.40         0.82         Lognormal         0.21           Sclenium         15         1         1.0         0.5         0.53         1.04         0.63         0.71         Lognormal         ns         0.40         0.82         Lognormal         1.11           Sclenium         15         1         0.10         0.00         0.07         Lognormal         ns         0.44         0.93         Lognormal         1.01         0.13         1.11         Lognormal         ns         0.46         0.94         Lognormal         1.01         1.01         0.02         1.01         Lognormal         ns         0.46         0.95         Lognormal         ns         0.46         0.95         Lognormal         ns         0		17	Lognormal	0.91	0.69	na	Lognormal	1.3	4.0	5.2	3.6	20	7		
Chronium         15         14         60         5.0         14         19         0.70         Legnormal         na         0.77         0.93         Legnormal         98           Lad         15         15         429         6.0         106         15         Legnormal         na         0.40         0.89         Legnormal         0.21         0.21         Legnormal         na         0.40         0.82         Legnormal         0.21           Nickel         15         11         0.60         1.0         1.5         Lognormal         na         0.40         0.82         Legnormal         0.21           Sclenium         15         1.1         0.60         1.0         1.5         Lognormal         na         0.44         0.93         Legnormal         0.11           Zhech         15         1.0         0.13         0.61         0.079         0.071         Lognormal         na         0.44         0.93         Legnormal         0.14         Lognormal         na         0.46         0.95         Legnormal         0.14         Lognormal         na         0.46         0.95         Legnormal         0.14         Lognormal         na         0.46         0.95		4.1	Lognormal	0.94	0.78	na	Lognormal	0.98	2.2	2.1	0.75	7.0	4	15	Cadmium
Cupyers         15         14         630         col         160         160         160         160         15         5         Legemernal         a         0.57         0.92         Legemernal         0.21           Mercary         15         1         0.60         -0.1         0.15         0.13         1.1         Inconclusive         na         0.40         0.83         Legemernal         0.21           Selenium         15         1         1.0         -0.5         0.33         0.44         0.71         inconclusive         na         0.44         0.84         Legemernal         1.1           Zale         1.0         0.13         1.3         0.010         0.000007         0.078         0.042         1.7         Legemernal         na         0.44         0.44         0.94         Normal         0.14         2.06E/dorporporporporporporporporporporporporpo			Lognormal	0.93	0.77	na	Lognormal	0.70	19	14	5.0	60	14	15	Chromium
Laid         14         630         <10         160         105         1.5         Lognormal         na         0.57         0.92         Lognormal         0.21           Nickel         15         11         100         <5		98	Lognormal	0.89	0.40	na	Lognormal	2.0	53	106	6.0	429	15	15	Copper
Instituty         15         11         1000         2.5         2.6         17         1.6         Inconclusive         m         0.40         0.82         Lognormal         17           Selenium         15         1         1.0         <0.5			Lognormal	0.92	0.57	na	Lognormal	1.5	105	160	<10	630	14	15	
Nicka <sup>1</sup> 15         11         110         25         26         17         1.6         Inconclusive         na         0.40         0.82         Legnormal         17           Zinc         15         1.5         1.790         1.5         463         0.173         Inconclusive         na         0.45         0.99         Legnormal         4.59           PCB-1260 (Araclor 1260)         15         1.5         0.13         0.061         0.077         7.7         Inconclusive         na         0.46         0.97         Legnormal         2.046-60           1.2-Dichorobenzene         15         7         0.025         0.0000070         0.031         0.012         2.6         Legnormal         na         0.46         0.97         Legnormal         8.7           1.2-Dichoropropane         8         1         0.00000025         0.078         0.051         1.3         Localusive         na         0.43         0.97         Legnormal         8.7851           2.2-Dichoropropane         8         2         0.0000074         0.000070         0.33         0.42         1.1         Normal         0.85         0.83         Legnormal         1.8751         2.2-Dichoroproproproproproproprop	21 0.2	0.21	Lognormal	0.98	0.73	na	Inconclusive	1.1	0.13	0.15	<0.1	0.60	1	15	
Scheimin         15         1         1.0         -0.5         0.33         0.44         0.73         Inconclusive         na         0.95         0.99         Lognormal         1.4           Zinc         15         1.5         1.70         1.5         463         21.8         1.0         0.04         0.079         0.77         Inconclusive         na         0.44         0.84         0.99         Lognormal         459           PCB-1260 (Aroclor 1260)         15         7         0.025         0.0000016         0.27         0.12         2.3         Lognormal         na         0.46         0.95         Lognormal         6.974.52           1.3-Dichtorophenzene         15         7         0.025         0.0000002         0.078         0.055         1.3         Inconclusive         na         0.43         0.97         Lognormal         6.974.52           2.Dichtorophenzene         8         5         0.0000025         0.0700013         0.045         0.059         1.3         Inconclusive         na         0.82         0.83         Lognormal         8.7851           2.Dichtorophenyl phenyl ether         10         2         0.0000024         0.000012         0.33         0.11         Inconclu		27	Lognormal	0.82	0.40	na	Inconclusive	1.6	17	26	<5	110	11		,
Zinc         15         1,790         15         463         218         2.1         Inconclusive         na         0.44         0.84         Lognormal         0.14           12-Dibromechane         8         2         0.000010         0.000007         0.77         Inconclusive         na         0.96         0.97         Lognormal         0.14           1.2-Dichtorbenzene         15         7         0.025         0.000010         0.000070         0.014         0.055         1.3         Inconclusive         na         0.46         0.97         Lognormal         0.14           1.3-Dichtorbenzene         8         1         0.0000070         0.031         0.012         2.6         Lognormal         na         0.45         0.97         Lognormal         0.87         0.97         Lognormal         0.87         0.97         Lognormal         0.87         0.97         Lognormal         na         0.45         0.53         1.5         Lognormal         na         0.57         Lognormal         0.87         0.67         0.000025         0.0000078         0.23         1.0         Normal         na         0.75         Normal         0.86         0.32         0.64         Normal         0.86         0.32<		1.1	Lognormal	0.99	0.95	na	Inconclusive	0.73	0.44	0.33	<0.5	1.0	1		
PCD: 1260 (Arecler 1260)         15         0.13         0.13         0.07         0.77         Inconcluive         na         0.96         0.97         Lognormal         0.14           1.2-Dibromethane         8         2         0.000016         0.027         0.12         2.3         Lognormal         na         0.46         0.97         Lognormal         6.974.20           1.2-Dichlorobenzene         15         7         0.025         0.000002         0.000000         0.31         0.012         2.6         Lognormal         na         0.46         0.95         Lognormal         6.974.20           1.3-Dichloropropane         8         5         0.0000002         0.000002         0.000012         0.31         0.112         2.6         Lognormal         na         0.43         0.97         Lognormal         8.7851-00           2Dihorotohyne         5         2         0.0000026         0.0000018         0.45         0.31         1.5         Lognormal         na         n.6         n.6 <td></td> <td></td> <td>Lognormal</td> <td>0.84</td> <td>0.44</td> <td>na</td> <td>Inconclusive</td> <td></td> <td>218</td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td>			Lognormal	0.84	0.44	na	Inconclusive		218				-		
12-Dibromethane       8       2       0.000010       0.000097       0.078       0.045       1.7       Legnormal       na       0.68       0.92       Legnormal       2.061-000         1.2-Dichlorobenzene       15       7       0.068       0.0000025       0.074       0.12       2.3       Legnormal       na       0.46       0.99       Legnormal       6.974.52         1.3-Dichlorobenzene       8       5       0.0000070       0.031       0.012       2.6       Legnormal       na       0.43       0.97       Legnormal       8.761-00         2-Dichloropropane       8       1       0.0000026       0.0000070       0.031       1.5       Legnormal       na       0.43       0.97       Legnormal       8.761-00         2-Dichloropropane       8       2       0.0000076       0.023       0.031       1.5       Legnormal       na       0.87       0.78       Normal       0.87       0.75       Normal       0.87       0.75       Normal       0.64       0.42       1.1       Inconclusive       na       0.75       Normal       0.64       4.50       0.55       4.50       0.55       4.50       0.55       4.50       0.55       4.50       0.55 <td< td=""><td></td><td></td><td></td><td>0.97</td><td>0.96</td><td>na</td><td>Inconclusive</td><td>0.77</td><td>0.079</td><td>0.061</td><td>0.13</td><td></td><td></td><td></td><td></td></td<>				0.97	0.96	na	Inconclusive	0.77	0.079	0.061	0.13				
1.2 Dichlorobenzene       15       7       0.025       0.0000016       0.27       0.12       2.3       Lognormal       na       0.46       0.95       Lognormal       6,74,52         1.3-Dichloroprepane       15       7       0.068       0.0000070       0.031       0.055       1.3       Inconclusive       na       0.43       0.97       Lognormal       8,7851         2.2-Dichloropropane       8       1       0.0000026       0.0000070       0.031       0.059       1.3       Inconclusive       na       0.82       0.83       Lognormal       8,76540         2.Chlorotylivinj ether       5       2       0.0000078       0.23       1.0       Normal       na       nc       nc <td></td> <td>2.06E+08</td> <td>Lognormal</td> <td>0.92</td> <td>0.68</td> <td>na</td> <td>Lognormal</td> <td>1.7</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td>		2.06E+08	Lognormal	0.92	0.68	na	Lognormal	1.7					-		
1.3-Dickloroberazene         15         7         0.068         0.0000025         0.014         0.055         1.3         Inconclusive         na         0.74         0.94         Normal         0.12           1.3-Dickloroprepane         8         5         0.000007         0.000070         0.012         2.6         Lognormal         na         0.43         0.97         Lognormal         8.76E+00           2.2-Dickloroprepane         8         2         0.0000025         0.0000054         0.46         0.42         1.1         Normal         na         0.90         0.78         Normal         0.86           2-Chloropropane         8         2         0.0000024         0.0000013         0.45         0.031         1.5         Lognormal         na         nc		6,974,525	Lognormal	0.95	0.46	na	Lognormal	2.3	0.12	0.27			-	-	
1.3-Dichloropropane         8         5         0.000097         0.0000072         0.031         0.012         2.6         Lognormal         na         0.43         0.97         Lognormal         8.765-00           2.2-Dichloropropane         8         1         0.0000026         0.0000054         0.045         0.031         1.5         Lognormal         na         0.82         0.83         Lognormal         8.765-00           2.Chloroctyl ivnje ther         5         2         0.0000078         0.045         0.031         1.5         Lognormal         na         nc         nc <td></td> <td>0.12</td> <td>Normal</td> <td>0.94</td> <td>0.74</td> <td>na</td> <td>•</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		0.12	Normal	0.94	0.74	na	•								
12-Dichlorophane         8         1         0.0000092         0.078         0.059         1.3         Inconclusive         na         0.82         0.83         Lognormal         8.76E-M2           2-Dichlorophane         \$         2         0.0000045         0.0000013         0.46         0.42         1.1         Normal         na         0.90         0.78         Normal         0.86           2-Chlorotoluce         \$         2         0.0000045         0.0000013         0.45         0.031         1.1         Inconclusive         na         0.87         0.75         Normal         0.45           2-Hexanone         5         2         0.0000024         0.0000016         0.38         0.33         1.1         Inconclusive         na         0.75         Normal         0.45           4-Horophenyl phenyl ether         10         2         0.0000017         0.0000079         0.0000074         0.44         0.39         1.1         Inconclusive         na         0.61         0.92         Lognormal         5.64           4-Lohorophenol         10         1         0.0000014         0.0000014         0.4000014         0.39         1.31         Inconclusive         na         0.32         0.41         <	851 0.000	87,851	Lognormal	0.97	0.43	na									
2.2-Dimetrylopinal         5         2         0.0000026         0.0000054         0.46         0.42         1.1         Normal         na         0.90         0.78         Normal         0.86           2-Chiorochiyi vinjt ether         5         2         0.0000045         0.0000078         0.23         0.23         0.23         0.23         0.23         0.03         1.1         Inconclusive         na         nc         nc <td< td=""><td>E+09 0.0000</td><td>8.76E+09</td><td>Lognormal</td><td>0.83</td><td>0.82</td><td>na</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>· · ·</td></td<>	E+09 0.0000	8.76E+09	Lognormal	0.83	0.82	na									· · ·
2-Linorobenyl funyl ener         3         2         0.0000045         0.0045         0.03         1.5         Lognormal         na         nc	86 0.0000	0.86	Normal	0.78	0.90								-		
2-Linorodouble         6         2         0.000003         0.000007         0.023         1.0         Normal         na         0.87         0.75         Normal         0.45           4-Bromophenyl phenyl ether         10         2         0.0000024         0.0000012         0.38         0.33         1.1         Inconclusive         na         0.75         0.64         Normal         0.64           4-Chorophenyl phenyl ether         10         2         0.0000047         0.0000017         0.046         0.39         1.1         Inconclusive         na         0.75         0.64         Normal         0.64           4-Liportopylholouene         8         1         0.36         <0.000017	ic 0.0000	nc	nc	nc										-	
2-retrighting         3         2         0.0000021         0.000012         0.038         0.033         1.1         Inconclusive         na         0.75         0.64         Normal         0.55           4-Bromophenyl phenyl ether         10         2         0.0000024         0.0000007         0.046         0.026         1.8         Lognormal         na         0.75         0.64         Normal         0.64           4-Isorophenyl phenyl ether         10         2         0.000007         0.046         0.026         1.8         Lognormal         na         0.75         0.64         Normal         0.64           7-retransport         8         1         0.66         -0.005         0.13         0.10         1.2         Inconclusive         na         0.91         0.92         Lognormal         56           2.4-Dirictoluene         10         1         0.0000016         0.42         0.44         0.95         Inconclusive         na         0.32         0.41         Lognormal         2.427E+1           2.4-Dirictoluene         10         1         0.0000016         0.36         0.39         0.94         Inconclusive         na         0.60         2.427E+1           2.4-Ehythythenol (c-Cresol)<	45 0.0000	0.45	Normal											0	
4-Bromophenyl phenyl	55 0.0000	0.55												-	
4-Chiorophenyl phenyl ether         10         2         0.0000029         0.0000024         0.044         0.99         11         Inconclusive         na         0.064         0.92         Lognormal         1.19E412           4-Isopropyltoluene         8         3         0.00000047         0.0000017         0.044         0.39         1.13         Inconclusive         na         0.64         0.92         Lognormal         56           2.4-Dictolorophenol         10         2         0.0000015         0.0000014         0.44         0.39         1.13         Inconclusive         na         0.79         0.71         Normal         0.64           2.4-Dinicrotoluene         10         1         0.0000016         0.36         0.39         0.94         Inconclusive         na         0.32         0.41         Lognormal         2.427E+1           2.4-Dinicrotoluene         10         1         0.0000016         0.36         0.39         0.94         Inconclusive         na         0.76         0.80         Lognormal         4.9E+26           2-Methyl-4.6-dinitrophenol         10         1         0.00000035         0.420         0.44         0.95         Inconclusive         na         0.76         Normal         0	64 0.0000	0.64													
4-Isopropylioluene       8       3       0.0000047       0.000007       0.000007       0.000007       0.000007       0.000007       0.000007       0.000007       0.00000007       0.0000007       0.0													-		
Bromomethane         8         1         0.36         0.00034         0.13         0.10         1.2         Inconclusive         na         0.72         0.71         Normal         0.64           2,4-Dichlorophenol         10         1         0.0000015         0.0000034         0.44         0.95         Inconclusive         na         0.79         0.71         Normal         0.69           2,4-Dinethylphenol         10         1         0.0000016         0.000016         0.36         0.39         0.94         Inconclusive         na         0.79         0.71         Normal         0.69           2,4-Dinitrotoluene         10         1         0.0000016         0.36         0.39         0.94         Inconclusive         na         0.70         0.70         Normal         0.69           2-Methylphenol (o-Cresol)         10         1         0.0000035         0.42         0.44         0.95         Inconclusive         na         0.87         0.57         Normal         0.69           3.3-Dichlorobenzidine         10         1         0.0000030         1.5         1.5         1.0         Inconclusive         na         0.87         0.57         Normal         2.3           3Dichlorob			U				U								
2.4-Dichlorophenol       10       2       0.0000014       0.0000014       0.044       0.39       1.13       Inconclusive       na       0.37       0.59       Normal       0.69         2.4-Dimethylphenol       10       1       0.0000014       0.0000014       0.42       0.44       0.95       Inconclusive       na       0.32       0.41       Lognormal       2.427E+1         2.4-Dinitrotoluene       10       1       0.0000016       0.0000016       0.36       0.39       0.94       Inconclusive       na       0.90       0.59       Normal       0.60         2.4-Ehritrotoluene       10       1       0.0000037       0.0000035       0.42       0.44       0.95       Inconclusive       na       0.76       0.80       Lognormal       4.9E+26         2Methyl-4.6-dinitrophenol       10       1       0.00000035       0.42       0.44       0.95       Inconclusive       na       0.87       0.57       Normal       0.69         2Methyl-4.6-dinitrophenol       10       1       0.00000088       0.71       0.78       0.90       Inconclusive       na       0.87       0.56       Normal       1.2         3.3-Dichlorobenzidine       10       2       0.00			0										-	-	
2.4-Dimethylphenol       10       1       0.0000014       0.0000014       0.42       0.44       0.93       Inconclusive       na       0.32       0.41       Lognormal       2.427E+1         2.4-Dinitrotoluene       10       1       0.0000016       0.36       0.39       0.94       Inconclusive       na       0.90       0.59       Normal       0.60         2.6-Dinitrotoluene       10       1       0.0000016       0.36       0.39       0.94       Inconclusive       na       0.76       0.80       Lognormal       4.9E+26         2.Methyl-4.6-dinitrophenol       10       1       0.00000035       0.00000035       0.42       0.44       0.95       Inconclusive       na       0.76       0.80       Lognormal       4.9E+26         2.Methylphenol (o-Cresol)       10       1       0.00000068       0.71       0.78       0.90       Inconclusive       na       0.93       0.56       Normal       1.2         3.3-Dichlorobenzidine       10       2       0.000030       1.800       2.0       0.92       Lognormal       na       0.91       0.60       Lognormal       3.0         4-Chloroalline       10       1       0.00013       0.000038       0.0077 <td></td> <td>2,4-Dichlorophenol</td>															2,4-Dichlorophenol
2.4-Dinitrotoluene       10       1       0.000016       0.000016       1.3       1.7       0.53       Inconclusive       na       0.92       Normal       0.60         2.6-Dinitrotoluene       10       1       0.000016       0.36       0.39       0.94       Inconclusive       na       0.90       0.59       Normal       4.9E+26         2-Methyl+4.6-dinitrophenol       10       3       0.0000035       0.42       0.44       0.95       Inconclusive       na       0.87       0.57       Normal       4.9E+26         2-Methylphenol (o-Cresol)       10       1       0.0000035       0.42       0.44       0.95       Inconclusive       na       0.87       0.57       Normal       1.2         3Dichlorobenzidine       10       2       0.0000016       1.50       1.5       1.5       1.0       Inconclusive       na       0.93       0.56       Normal       1.2         3Dichlorobenzidine       10       2       0.0000016       0.00003       1.800       2.0       0.92       Lognormal       na       0.91       0.000       3.0         4-Chlorotoluene       8       1       0.025       0.0000043       0.00003       1.4       Lognormal		and the second se							-				-		2,4-Dimethylphenol
2,6-Dinitrotoluene       10       1       0.0000016       0.0000016       0.0000012       0.50       0.59			0										1		2,4-Dinitrotoluene
2-Methyl-4,6-dinitrophenol       10       3       0.00000037       0.00000022       1.3       1.2       1.3       1.12       1.3       1.12       1.3       1.12       1.3       1.12       1.3       1.12       1.3       1.12       1.13       1.13       1.12       1.13       1.13       1.12       1.13       1.13       1.12       1.13       1.13       1.12       1.13       1.13       1.12       1.13       1.13       1.12       1.13       1.13       1.12													-	10	2,6-Dinitrotoluene
2-Methylphenol (o-Cresol)       10       1       0.00000035       0.00000035       0.44       0.59       inconclusive       na       0.01       0.01       1.2         3,3-Dichlorobenzidine       10       1       0.00000068       0.0000008       0.71       0.78       0.90       Inconclusive       na       0.93       0.56       Normal       1.2         3-Nitroaniline       10       2       0.0000019       0.0000008       1.5       1.5       1.0       Inconclusive       na       0.93       0.56       Normal       2.3         4-Chloroaniline       10       2       0.00000043       0.077       0.032       2.4       Inconclusive       na       0.47       0.94       Normal       5.76E+13         4-Chloroaniline       10       1       0.00013       0.000038       1.5       1.2       1.3       Inconclusive       na       0.47       0.94       Normal       1.18E+14         4-Nitroaniline       10       1       0.00012       0.000038       0.000038       0.000038       1.4       Lognormal       na       0.76       0.80       Lognormal       0.0015       0.0015       0.00028       1.4       Lognormal       na       0.73       0.96			0							1.5	0.0000022	0.0000037	3	10	2-Methyl-4,6-dinitrophenol
3,3-Dichlorobenzidine       10       1       0.0000068       0.71       0.78       0.90       Inconclusive       na       0.93       0.56       Normal       1.2         3-Nitroaniline       10       2       0.0000019       0.000008       1.5       1.5       1.0       Inconclusive       na       0.85       0.70       Normal       2.3         4-Chloroaniline       10       2       0.000030       1.800       2.0       0.92       Lognormal       na       0.91       0.60       Lognormal       3.0         4-Chloroaniline       10       1       0.025       0.0000043       0.077       0.032       2.4       Inconclusive       na       0.47       0.94       Normal       5.76E+13         4-Nitroaniline       10       1       0.00013       0.000038       1.5       1.2       1.3       Inconclusive       na       0.76       0.80       Lognormal       0.00099         1,2,3,4,6,7,8,9-Octachlorodibenzofuran       10       6       0.00012       0.000036       0.00028       1.3       Lognormal       na       0.71       0.96       Lognormal       0.00021       0.00021       0.00036       0.00036       1.4       Lognormal       na       0.73						na			0.44	0.42	0.0000035	0.0000035	1	10	2-Methylphenol (o-Cresol)
3-Nitroaniline       10       2       0.0000019       0.0000008       1.3       1.3       1.3       1.3       1.3       1.3       1.3       1.3       1.3       1.3       1.4       10       10       2       0.000030       0.000030       1.800       2.0       0.92       Lognormal       na       0.91       0.60       Lognormal       3.0         4-Chloroaniline       10       2       0.000030       0.00033       0.077       0.032       2.4       Inconclusive       na       0.47       0.94       Normal       5.76E+13         4-Chloroaniline       10       1       0.00013       0.000038       1.5       1.2       1.3       Inconclusive       na       0.47       0.94       Normal       1.18E+14         4-Nitroaniline       10       1       0.00013       0.000038       0.00033       0.000030       1.4       Lognormal       na       0.76       0.80       Lognormal       0.00099       0.00099       0.00028       1.3       Lognormal       na       0.79       0.96       Lognormal       0.00021       0.00099       0.00025       0.000035       1.4       Lognormal       na       0.73       0.96       Lognormal       0.00021       0.00021						na		0.90	0.78	0.71	0.0000068	0.0000068	1	10	
4-Chloroaniline       10       2       0.000030       1.800       2.0       0.92       Lognormal       na       0.91       0.60       Lognormal       3.0         4-Chloroaniline       8       1       0.025       0.0000043       0.077       0.032       2.4       Inconclusive       na       0.47       0.94       Normal       5.76E+12         4-Nitroaniline       10       1       0.00013       0.0000088       1.5       1.2       1.3       Inconclusive       na       0.76       0.80       Lognormal       0.00099         1,2,3,4,6,7,8,9-Octachlorodibenzofuran       10       6       0.0011       0.0000070       0.00036       0.00028       1.3       Lognormal       na       0.71       0.96       Lognormal       0.00021       0.000099         1,2,3,4,6,7,8,9-Octachlorodibenzofuran       10       9       0.0011       0.000070       0.00028       1.3       Lognormal       na       0.77       0.96       Lognormal       0.00021         1,2,3,4,6,7,8-Heptachlorodibenzofuran       10       7       0.000030       0.000025       0.000012       0.000035       1.3       Lognormal       na       0.76       0.95       Lognormal       0.00012       0.000021						na	Inconclusive	1.0	1.5	1.5	0.0000008	0.0000019	2	10	
4-Chlorotoluene       8       1       0.025       0.0000043       0.077       0.032       2.4       Inconclusive       na       0.47       0.94       Normal       5.76E+12         4-Nitroaniline       10       1       0.00013       0.000088       1.5       1.2       1.3       Inconclusive       na       0.76       0.80       Lognormal       1.18E+14         1.2.3.4,6.7,8.9-Octachlorodibenzofuran       10       6       0.00012       0.000038       0.00033       0.00038       1.4       Lognormal       na       0.76       0.80       Lognormal       0.00099         1.2.3.4,6.7,8.9-Octachlorodibenzo-p-dioxin       10       9       0.0011       0.000070       0.00028       1.3       Lognormal       na       0.71       0.96       Lognormal       0.00021       0.00012       0.00012       0.000080       1.4       Lognormal       na       0.73       0.96       Lognormal       0.00021       0.00021       0.000012       0.000012       0.000035       1.3       Lognormal       na       0.73       0.96       Lognormal       0.00021       0.00021       0.000035       1.3       Lognormal       na       0.76       0.95       Lognormal       0.00016       0.000066       1.23,4,6,7,8-Heptchl			0			na	Lognormal	0.92	2.0	1.800	0.000030	0.000030	2	10	
4-Nitroaniline         10         1         0.00013         0.000088         1.5         1.2         1.3         Inconclusive         na         0.76         0.80         Lognormal         1.18E+14           4-Nitroaniline         10         6         0.00012         0.000038         0.00043         0.00030         1.4         Lognormal         na         0.71         0.96         Lognormal         0.00099           1.2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin         10         9         0.0011         0.000070         0.00036         0.00028         1.3         Lognormal         na         0.79         0.96         Lognormal         0.00021         0.00011         0.000080         1.4         Lognormal         na         0.73         0.96         Lognormal         0.00021         0.00012         0.000012         0.000011         0.000080         1.4         Lognormal         na         0.73         0.96         Lognormal         0.00021         0.00012         0.000012         0.000035         1.3         Lognormal         na         0.76         0.95         Lognormal         0.00016         0.00016         0.000035         1.3         Lognormal         na         0.76         0.95         Lognormal         0.00016         0.000066						na	Inconclusive	2.4	0.032	0.077	0.00000043	0.025			
10       6       0.00012       0.000038       0.00043       0.00030       1.4       Lognormal       na       0.71       0.96       Lognormal       0.00099         1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin       10       9       0.0011       0.0000070       0.00036       0.00028       1.3       Lognormal       na       0.79       0.96       Lognormal       0.015         1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin       10       7       0.0000002       0.000011       0.0000080       1.4       Lognormal       na       0.73       0.96       Lognormal       0.00021         1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin       10       8       0.00012       0.0000059       0.000045       0.000035       1.3       Lognormal       na       0.76       0.95       Lognormal       0.0016         1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin       10       8       0.00012       0.0000020       0.0000015       1.4       Lognormal       na       0.76       0.95       Lognormal       0.0016         1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin       10       4       0.0000066       0.0000025       0.0000020       1.2       Lognormal       na       0.70       0.97       Lognormal       0.0000067         1,			0		0.76	na	Inconclusive	1.3	1.2	1.5			1	-	
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin       10       9       0.0011       0.000070       0.00036       0.00028       1.3       Lognormal       na       0.79       0.96       Lognormal       0.00021         1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin       10       9       0.0011       0.0000070       0.00036       0.00028       1.3       Lognormal       na       0.73       0.96       Lognormal       0.00021         1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin       10       7       0.0000059       0.000045       0.000035       1.3       Lognormal       na       0.76       0.95       Lognormal       0.0016         1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin       10       8       0.000022       0.0000020       0.0000015       1.4       Lognormal       na       0.76       0.95       Lognormal       0.0016         1,2,3,4,7,8-Heptachlorodibenzo-p-dioxin       10       4       0.0000066       0.0000025       0.0000020       1.2       Lognormal       na       0.70       0.97       Lognormal       0.000007         1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin       10       4       0.0000024       0.0000025       0.0000020       1.2       Lognormal       na       0.70       0.97       Lognormal       0.000007			Lognormal	0.96	0.71	na	Lognormal	1.4	0.000030				-		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin       10       7       0.000030       0.0000025       0.00011       0.0000080       1.4       Lognormal       na       0.73       0.96       Lognormal       0.00021         1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin       10       7       0.0000005       0.0000025       0.000015       1.3       Lognormal       na       0.76       0.95       Lognormal       0.0016         1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin       10       8       0.000006       0.0000023       0.0000020       0.000015       1.4       Lognormal       na       0.76       0.97       Lognormal       0.000006         1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin       10       4       0.0000066       0.0000025       0.0000025       0.0000020       1.2       Lognormal       na       0.70       0.97       Lognormal       0.000007         1,2,3,7,8-Hexachlorodibenzo-p-dioxin       10       4       0.0000066       0.0000025       0.0000020       1.2       Lognormal       na       0.70       0.97       Lognormal       0.0000015         2,3,7,8-Tetrachlorodibenzofuran       10       7       0.0000066       0.0000026       0.0000024       0.0000019       1.3       Lognormal       na       0.77       0.93 <td></td> <td></td> <td>Lognormal</td> <td>0.96</td> <td>0.79</td> <td>na</td> <td>•</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			Lognormal	0.96	0.79	na	•								
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin         10         8         0.00012         0.0000059         0.000045         0.000035         1.3         Lognormal         na         0.76         0.95         Lognormal         0.0016           1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin         10         4         0.0000066         0.0000020         0.0000015         1.4         Lognormal         na         0.70         0.97         Lognormal         0.0000067           1,2,3,4,7,8-Heptachlorodibenzo-p-dioxin         10         4         0.0000083         <0.0000025			Lognormal	0.96	0.73	na	0								
1/2.3/4,0,7,8-Hexachlorodibenzofuran         10         4         0.0000066         0.0000020         0.0000015         1.4         Lognormal         na         0.70         0.97         Lognormal         0.000006           1,2,3,4,7,8-Hexachlorodibenzofuran         10         4         0.0000066         0.0000020         0.0000020         1.2         Lognormal         na         0.70         0.97         Lognormal         0.000006           1,2,3,4,7,8-Hexachlorodibenzofuran         10         4         0.0000026         0.0000020         1.2         Lognormal         na         0.70         0.97         Lognormal         0.000006           2,3,7,8-Tetrachlorodibenzofuran         10         7         0.0000026         0.0000024         0.0000019         1.3         Lognormal         na         0.77         0.93         Lognormal         0.000001         0.0000015         1.3         Lognormal         na         0.77         0.93         Lognormal         0.0000015         1.3         Lognormal         na         0.76         0.90         Lognormal         0.0000015         1.3         Lognormal         0.0000015         0.0000015         1.3         Lognormal         0.0000015         0.0000015         1.3         Lognormal         0.0000015         0.000001	Contraction of the second second		Lognormal	0.95	0.76	na	-								
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		0.0000067	Lognormal	0.97	0.70								-		
1,2,3,7,8-Tetrachlorodibenzofuran         10         7         0.0000006         0.0000026         0.0000019         1.3         Lognormal         na         0.77         0.93         Lognormal         0.000015           2,3,7,8-Tetrachlorodibenzofuran         10         7         0.00000026         0.0000024         0.0000015         1.3         Lognormal         na         0.77         0.93         Lognormal         0.000015           2,3,7,8-Tetrachlorodibenzofuran         10         7         0.00000026         0.0000027         0.0000015         1.3         Lognormal         na         0.66         0.90         Lognormal         0.0000016		0.0000079											-		
$2,3,7,8$ -letrachlorodibenzoruran 10 7 0.000000 0.0000020 0.00000015 1.2 Lerrormal $n_3$ 0.66 0.90 Lognormal 0.000001	0015 0.000	0.000015		0.93											
	00014 0.0000	0.0000014					•								
Z <sub>2</sub> , z <sub>1</sub> , z <sub>2</sub> -1 etractiorodibenzofurans (HpCDF) 3 1 0.000095 na	a 0.000	na •	-				U					second and a second second second		10	2,3,7,8-Tetrachlorodibenzo-p-dioxin

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#### Table I-26 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 9

	Nun	nber of								Z-sc	ore Plots			
	Samples	Detections	Max Detect (mg/L)	Min Result (mg/L)	Stdev	Mean	cv	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPEC (continued)														
Total Heptachlorodibenzo-p-dioxins (HpCDD)	3	2	0.00018	na *	na *	na *	na 🏾	ла *	na *	na "	na *	na "	na	0.00018
Total Tetrachlorodibenzofurans (TCDF)	3	2	0.000010	na *	na *	na *	na ª	na *	na "	na *	na *	na *	na	0.000010
DRO	16	16	510	8.9	150	170	0.88	Inconclusive	na	0.89	0.95	Lognormal	462	462
RRO	6	6	2,100	53	705	959	0.74	Inconclusive	na	0.97	0.82	Normal	1,539	1,539
Ephemeral Surface Water COPEC													0.015	0.015
Barium	6	6	0.020	0.005	0.006	0.0078333	0.76	Inconclusive	na	0.66	0.74	Lognormal		100410000000
Zinc, Dissolved	3	1	0.060	0.060	na *	na "	na *	na "	na	na "	na *	na "	na	0.060
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3	1	0.0000037	< 0.0000024	na *	na *	na *	na "	na *	na *	na *	na *	na "	0.000003

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPEC - Chemical of Potential Ecological Concern. CV - coefficient of variation DRO - Diesel range organics. EPC - Exposure point concentration Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - Not applicable. nc- Not calculated. Normal r<sup>2</sup> - Correlation coefficient for the normal plot RRO - Residual range organics.

Stdev - standard deviation

#### Table 1-27 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 21

	Nun	nber of							-		ore Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	cv	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
	Bampica	Detections	(	(B/B/										
Soil COPEC														
Aluminum	10	10	33,100	3,975	7,678	17,258	0.44	Inconclusive	na	0.91	0.81	Normal	21,708	21,70
Antimony	19	1	38	<6	7.9	7.6	1.0	Inconclusive	na	0.53	0.82	Lognormal	9.7	9.7
Arsenic	19	19	170	2.8	38	18	2.0	Lognormal	na	0.38	0.87	Lognormal	28	28
Barium	10	10	193	57	37	120	0.31	Inconclusive	na	0.95	0.93	Normal	141	141
Cadmium	19	8	69	<0.3	16	4.5	3.5	Lognormal	na	0.26	0.74	Lognormal	5	5
Chromium	19	19	93	4.0	21	27	0.76	Inconclusive	na	0.83	0.96	Lognormal	44	44
Copper	19	19	130	4.0	32	37	0.87	Lognormal	na	0.82	0.98	Lognormal	63	63
Mercury	19	6	4.8	< 0.06	1.3	0.48	2.6	Lognormal	na	0.42	0.72	Lognormal	0.76	0.76
Selenium	19	3	2.0	1.0	4.1	3.7	1.1	Inconclusive	na	0.87	0.95	Lognormal	15	2.0
Silver	19	3	6.7	<0.4	1.7	1.2	1.4	Lognormal	na	0.58	0.94	Lognormal	2.1	2.1
Vanadium	10	10	81	8.5	19	45	0.43	Normal	na	0.93	0.76	Normal	56	56
Zinc	19	19	1,130	24	280	252	1.1	Lognormal	na	0.69	0.97	Lognormal	480	480
4-Chloroaniline	9	1	5.5	< 0.33	1.7	1.2	1.4	Lognormal	na	0.66	0.98	Lognormal	5.6	5.5
PCB-1254 (Aroclor 1254)	19	2	0.14	<0.39	2.9	0.72	3.6	Inconclusive	na	0.24	0.64	Lognormal	0.67	0.14
PCB-1260 (Aroclor 1260)	19	4	3.1	< 0.39	2.9	0.91	3.2	Lognormal	na	0.33	0.72	Lognormal	2.4	2.4
DRO	19	16	3,800	46	859	514	1.7	Inconclusive	na	0.52	0.82	Lognormal	13,909	3,800
RRO	10	10	3,700	25	1,121	1,735	0.65	Normal	na	0.93	0.72	Normal	2,384	2,384
Ephemeral Surface Water COPE	с													
Arsenic	4	2	0.002	0.002	na "	na *	na "	na *	na *	na "	na *	na *	na ª	0.002
Barium	2	2	0.010	0.050	na "	na *	na "	na "	na "	na "	na "	na "	na "	0.010
Manganese	2	2	0.69	0.49	na <sup>a</sup>	na *	na "	na *	na "	na "	na "	na *	na *	0.69
Diesel Range Organics (DRO)	4	3	0.47	0.20	na ª	na *	na *	na "	na *	na ª	na *	na <sup>a</sup>	na "	0.47

## Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration
COPEC - Chemical of Potential Ecological Concern.
CV - coefficient of variation
DRO - Diesel range organics.
EPC - Exposure point concentration
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot
mg/kg - milligrams per kilogram
na - Not applicable.
Normal r<sup>2</sup> - Correlation coefficient for the normal plot
RRO - Residual range organics.
Stdev - standard deviation
Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL.

In this case, the maximum concentration was used for the EPC value.

#### Table I-28 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 22

	Num	ber of								Z-sco	ore Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EP
oil COPEC													na "	34
Antimony	1	1	34	34	na <sup>a</sup>	na ª	na "	na <sup>a</sup>	na "	na "	na "	na "		49
Lead	9	9	497	5.4	152	102	1.5	Lognormal	na	0.57	0.91	Lognormal	597	
Zinc	5	5	169	60	44	93	0.47	Inconclusive	na	0.76	0.86	Lognormal	160	16
Di-n-butyl phthalate	1	1	3.5	3.5	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	naª	3.
Benzo(a)pyrene	11	1	0.35	< 0.0053	0.10	0.035	3.0	Inconclusive	na	0.33	0.40	Lognormal	0.079	0.0
Benzo(b)fluoranthene	11	4	0.42	0.00035	0.13	0.041	3.1	Inconclusive	na	0.32	0.66	Lognormal	0.20	0.2
Chrysene	11	7	0.77	0.00020	0.23	0.079	2.9	Lognormal	na	0.36	0.93	Lognormal	6.3	0.7
Naphthalene	11	8	1.2	0.00031	0.42	0.25	1.7	Lognormal	na	0.68	0.93	Lognormal	2,875	1.
Phenanthrene	11	8	0.21	0.00022	0.12	0.071	1.7	Lognormal	na	0.68	0.94	Lognormal	53	0.2
DRO	10	5	4,070	<4	1.619	1,232	1.3	Inconclusive	na	0.83	0.86	Lognormal	93,037,525	4,0
GRO	10	3	38	<1	14	10	1.4	Lognormal	na	0.72	0.88	Lognormal	135	38
RRO	8	7	3,815	5.4	1,313	576	2.3	Lognormal	na	0.46	0.96	Lognormal	159,483	3,8

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPEC - Chemical of Potential Ecological Concern.

CV - coefficient of variation DRO - Diesel range organics.

EPC - Exposure point concentration

GRO - Gasoline range organics.

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

## Taure 1-27 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 28

	Nur	nber of							to:		ore Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPEC														
Beryllium	11	1	1.8	1.8	0.43	1.3	0.34	Inconclusive	na	0.95	0.98	Normal	1.5	1.5
PCB-1254 (Aroclor 1254)	19	4	1.5	< 0.043	0.39	0.21	1.9	Inconclusive	na	0.55	0.82	Lognormal	0.47	0.47
Anthracene	8	2	1.9	0.016	0.72	0.69	1.0	Inconclusive	na	0.89	0.86	Normal	1.1	1.1
Benzo(a)anthracene	8	1	4.4	< 0.018	1.5	1.0	1.5	Lognormal	na	0.70	0.91	Lognormal	2,030	4.4
Benzo(a)pyrene	8	1	2.3	< 0.018	0.82	0.74	1.1	Inconclusive	na	0.87	0.87	Lognormal	850	2.3
Benzo(b)fluoranthene	8	1	2.6	< 0.018	0.91	0.78	1.2	Inconclusive	na	0.85	0.88	Lognormal	1,072	2.6
Benzo(k)fluoranthene	8	1	2.7	< 0.018	0.93	0.79	1.2	Inconclusive	na	0.84	0.88	Lognormal	1,110	2.7
Chrysene	8	1	5.5	< 0.018	1.8	1.1	1.6	Lognormal	na	0.64	0.91	Lognormal	3,354	5.5
Fluoranthene	8	2	9.3	< 0.025	0.52	0.54	1.0	Inconclusive	na	0.89	0.87	Normal	0.89	0.89
Phenanthrene	8	2	4.1	0.016	1.4	0.96	1.4	Lognormal	na	0.72	0.90	Lognormal	393	4.1
Pyrene	8	2	7.5	0.025	2.5	1.4	1.8	Lognormal	na	0.57	0.93	Lognormal	1,692	7.5
DRO	21	20	92,650	7.9	27,349	18,613	1.5	Lognormal	na	0.72	0.92	Lognormal	7,516,257	92,650
	21	1	59	59	na "	na "	na ª	na "	na "	na "	na *	na "	na *	59
DRO_ Aromatic	-									na *	na "	na "	na *	490
DRO_Aliphatic	2	2	490	50	na "	na "	na *	na *	na "				8,202	120
GRO	10	4	120	3.7	49	28	1.7	Inconclusive	na	0.71	0.85	Lognormal	2,073	2,073
RRO	6	6	2,200	1,200	413	1,733	0.24	Inconclusive	na	0.94	0.92	Normal		
RRO_Aromatic	2	2	360	230	na "	na <sup>a</sup>	na "	na "	na "	na *	na "	na "	na *	360
ediment COPEC														
Chromium	68	67	649	<4	77	29	2.6	na	Inconclusive	0.16	0.79	Lognormal	28	28
Lead	68	55	4,590	4.0	554	93	5.9	na	Inconclusive	0.76	0.81	Lognormal	7.4	7.4
Zinc	68	68	4,810	12	589	160	3.7	na	Inconclusive	0.87	0.93	Lognormal	26	26
Ethylbenzene	8	2	1.8	< 0.0025	0.62	0.25	2.5	Lognormal	na	0.46	0.96	Lognormal	318	1.8
Toluene	8	3	0.37	< 0.0025	0.13	0.074	1.7	Lognormal	па	0.62	0.98	Lognormal	18	0.37
Xylenes	8	3	0.78	< 0.0025	0.26	0.16	1.6	Lognormal	na	0.67	0.89	Lognormal	442	0.78
PCB-1242	79	1	0.12	< 0.04	2.8	0.37	7.5	na	Inconclusive	0.09	0.67	Lognormal	0.10	0.10
PCB-1254 (Aroclor 1254)	79	14	2.8	0.038	1.4	0.29	5.0	na	Inconclusive	0.15	0.79	Lognormal	0.16	0.16
PCB-1260 (Aroclor 1260)	79	27	5.4	0.063	1.5	0.40	3.8	na	Inconclusive	0.21	0.90	Lognormal	0.52	0.52
4.4'-DDD	13	6	1.2	<0.00715	3.8	2.0	1.9	Lognormal	na	0.60	0.91	Lognormal	2,635	1.2
beta-BHC	10	2	0.012	0.0036	0.0036	0.0046	0.79	Inconclusive	na	0.88	0.98	Lognormal	0.010	0.010
Endosulfan sulfate	10	1	0.0086	< 0.0053	0.0085	0.0093	0.92	Lognormal	na	0.79	0.93	Lognormal	0.020	0.008
	13	2	0.0065	< 0.00215	3.9	1.8	2.1	Inconclusive	na	0.55	0.72	Lognormal	32,009	0.006
gamma-BHC (Lindane)	13	2	0.0046	< 0.00215	3.9	1.8	2.0	Inconclusive	na	0.56	0.72	Lognormal	34,339	0.004
Heptaclor	68	26	5.6	<0.0077	1.2	0.77	1.6	na	Lognormal	0.66	0.94	Lognormal	4.5	4.5
Dibenzofuran		20 58	500	<0.0077	93	35	2.6	na	na	0.40	0.96	Lognormal	1,291	500
2-Methylnaphthalene	71		14	<0.0077	3.0	1.8	1.7	na	Lognormal	0.61	0.94	Lognormal	15	14
Acenaphthene	70	40	0.047	<0.0077	0.49	0.32	1.5	na	Inconclusive	0.67	0.95	Lognormal	1.2	0.047
Acenaphthylene	71	1		<0.0062	0.49	0.32	1.5	na	Inconclusive	0.71	0.94	Lognormal	1.8	1.8
Anthracene	71	7	1.8	<0.0062	0.58	0.38	1.5	па	Inconclusive	0.71	0.94	Lognormal	1.5	1.5
Benzo(a)anthracene	71	5	1.9		0.57	0.38	1.5	na	Inconclusive	0.70	0.95	Lognormal	1.4	1.4
Benzo(a)pyrene	71	4	1.4	0.13 0.10	0.52	0.33	1.5	na	Inconclusive	0.72	0.94	Lognormal	1.5	1.5
Benzo(b)fluoranthene	71	5	1.6		0.54	0.37	1.5	Lognormal	na	0.68	0.95	Lognormal	1.2	0.91
Benzo(g,h,I)perylene	71	2	0.91	< 0.0062	0.50	0.33	1.5	na	Inconclusive	0.72	0.94	Lognormal	1.5	1.5
Benzo(k)fluoranthene	71	4	1.9	0.19		0.30	1.5	na	Inconclusive	0.67	0.96	Lognormal	1.8	1.8
Chrysene	71	7	2.6	< 0.0062	0.67 0.49	0.43	1.5	na	Inconclusive	0.67	0.95	Lognormal	1.1	0.015
Dibenzo(a,h)anthracene	71	1	0.015	0.0062	0.49	0.54	1.5	IIa	inconcrust to	0.01				

## Table I-29 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 28

	No	nber of									ore Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
diment COPEC (continued)											0.07		2.0	2.8
Fluoranthene	71	12	14	< 0.0062	2.1	0.79	2.7	na	Lognormal	0.37	0.97	Lognormal	2.8	2.8
Fluorene	71	47	20	<0.0077	4.8	2.7	1.8	na	Lognormal	0.60	0.95	Lognormal	33 1.3	1.2
Ideno(1,2,3-cd)pyrene	71	3	1.2	0.05	0.51	0.34	1.5	na	Inconclusive	0.69	0.95	Lognormal	1.5	175
Naphthalene	71	55	220	0.024	36	13	2.8	na	Lognormal	0.37	0.97	Lognormal Lognormal	26	21
Phenanthrene	71	42	21	<0.0077	3.9	1.9	2.1	na	Lognormal	0.52	0.95 0.97	Lognormal	24	9.4
Pyrene	71	11	9.5	< 0.0062	1.5	0.64	2.3	na	Lognormal Inconclusive	0.44	0.97	Lognormal	98,564	98,5
DRO	83	83	150,000	22	26,815	17,557	1.5	na			na ª	na "	naª	60
DRO_Aromatic	3	1	60	<12	na "	na "	na *	na "	na *	na ª	na 0.94	na Lognormal	2.87E+20	150,0
DRO_ Aliphatic	5	5	150,000	26	64,389	36,541	1.8	Lognormal	na	0.67 0.75	0.94	Lognormal	8.25E+09	220
GRO	5	2	220	<1	95	55	1.7	Lognormal	na Lognormal	0.75	0.98	Lognormal	3,634	3,63
RRO	69	66	14,000	69	3,012	2,615	1.2	na Lognormal	na	0.63	0.93	Lognormal	530,973,047	11,00
RRO_Aliphatic	5	4	11,000	58	4,715 170	2,622 269	0.6	Normal	na	0.98	0.94	Normal	430	430
RRO_Aromatic	5	5	500	64	170	209	0.0	Normai	IId	0.70	0.7.1			
hemeral Surface Water COPEC													na "	0.01
Chromium	3	1	0.015	0.015	na 🗖	na "	na "	na	na *	na "	na "	na "		0.04
Copper	3	1	0.040	0.040	na "	na *	na ª	na "	na "	na "	na *	na "	na "	
Lead	3	1	0.086	0.086	na "	na ª	na <sup>a</sup>	na "	na "	na <sup>a</sup>	na "	na <sup>a</sup>	na "	0.08
	3	1	0.011	0.011	na *	na ª	na ª	na <sup>a</sup>	na ª	na ª	na "	na *	na *	0.01
Lead, dissolved	-	-			na *	na ª	na *	na <sup>a</sup>	na "	na *	na "	na <sup>a</sup>	naª	0.6
Zinc	3	1	0.62	0.62				na "	na "	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.2
Zinc, dissolved	3	1	0.23	0.23	na ª	na * 0.00061	na * 0.72	Lognormal	na	0.62	0.77	Lognormal	0.00081	0.000
PCB-1260 (Aroclor 1260)	15	2	0.0019	0.0015	0.00044 78	22	3.6	Inconclusive	na	0.27	0.83	Lognormal	46	46
DRO	17	17	326 0.57	0.39	0.24	0.13	1.8	Inconclusive	na	1.0	1.0	na	na	0.5
GRO	5	1	0.57	0.025	0.24	0.15	1.0	meenenusive						
sh Tissue COPC				-					na <sup>a</sup>	na <sup>a</sup>	na ª	na "	naª	0.00
Antimony	3	3	0.007	0.005	na "	na "	na ª	na "				na <sup>a</sup>	na ª	0.0
Arsenic	3	3	0.08	0.06	na *	na "	na ª	na <sup>a</sup>	na	na "	na *			1.1
Barium	3	3	1.1	1.0	na "	na "	na "	na "	na "	na "	na "	na	na "	
	3	3	0.008	0.008	na ª	na <sup>a</sup>	na ª	na "	na *	na <sup>a</sup>	na "	na *	na <sup>a</sup>	0.00
Cadmium	-	3	1.2	0.64	na *	na "	na "	na <sup>a</sup>	na ª	na "	na ª	na "	na <sup>a</sup>	1.3
Copper	3	-			na ª	na ª	na *	na ª	na "	na "	na "	na "	na "	0.02
Lead	3	3	0.028	0.011				na ª	na "	na *	na ª	na "	na ª	0.09
Mercury	3	3	0.098	0.076	na "	na "	na ª					na "	na ª	1.1
Nickel	3	3	1.1	0.63	na *	na *	na *	na <sup>a</sup>	na "	na "	na *		naª	0.1
Selenium	3	3	0.16	0.13	na ª	na *	na *	na *	na	na "	na *	na "	1 1 1 1 1 1 1	0.1
Vanadium	3	3	0.11	0.099	na "	na ª	na	na "	na *	naª	na *	na	naª	
	3	3	51	43	na *	na ª	na ª	na "	na "	na <sup>a</sup>	na *	na "	na "	51
Zinc	5	4	0.19	0.0053	na *	na ª	na ª	na "	na "	na <sup>a</sup>	na "	na "	na "	0.1
2-Methylnaphthalene	4						na "	na ª	na ª	na ª	na "	na "	na <sup>a</sup>	0.02
Acenaphthene	4	4	0.026	0.0063	na "	na "		na "	na "	na ª	na *	na "	na "	0.00
Benzo(g,h,i)perlyene	4	1	0.0043	0.0043	na ª	naª	na	na	lia	IId	IIu			

## Тε Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 28

	Nur	nber of								Z-sco	ore Plots			
		Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPO
Fish Tissue COPC (continued)														
Fluoranthene	4	2	0.0037	0.0015	na ª	na ª	na ª	na "	na "	na *	na *	na <sup>a</sup>	na "	0.00
Fluorene	4	4	0.067	0.011	na *	na ª	na ª	na *	na "	na *	na *	na *	na ª	0.00
Naphthalene	4	3	0.068	0.016	na ª	na <sup>a</sup>	na ª	na ª	na ª	na "	na "	na "	na ª	0.0
Phenanthrene	4	4	0.018	0.0062	na *	na ª	na ª	na ª	na ª	na "	na *	na "	na <sup>a</sup>	0.0
Pyrene	4	2	0.0023	0.0018	na *	na <sup>a</sup>	na ª	na ª	na "	na "	na *	na ª	na <sup>a</sup>	0.00
PCB-1260 (Aroclor 1260)	4	4	0.14	0.06	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na *	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	0.1
lant Tissue COPC														
Antimony	1	1	0.003	0.003	na	na	na	na	na	na	na	na	na	0.00
Arsenic	17	10	2.4	0.06	0.74	0.54	1.4	Lognormal	na	0.68	0.97	Lognormal	1.6	1.0
Barium	17	17	40	0.45	12	15	0.78	Inconclusive	na	0.94	0.90	Normal	45	4
Cadmium	17	17	1.1	0.002	0.26	0.13	2.0	Lognormal	na	0.41	0.90	Lognormal	0.47	0.4
Chromium	17	16	78	0.12	19	6.1	3.0	Lognormal	na	0.31	0.91	Lognormal	24	2
Copper	17	17	6.9	0.54	1.9	2.3	0.80	Lognormal	na	0.79	0.97	Lognormal	3.6	3.
Lead	17	17	11	0.065	3.6	2.6	1.4	Lognormal	na	0.70	0.98	Lognormal	13	1
Mercury	17	16	0.16	0.003	0.046	0.037	1.2	Lognormal	na	0.74	0.98	Lognormal	0.11	0.1
Nickel	17	17	8.6	0.060	2.1	1.3	1.6	Lognormal	na	0.56	0.97	Lognormal	3.4	3.
Selenium	17	11	0.99	0.020	0.23	0.12	2.0	Lognormal	na	0.44	0.93	Lognormal	0.23	0.
Silver	17	8	0.058	0.007	0.014	0.012	1.2	Lognormal	na	0.73	0.98	Lognormal	0.033	0.0
	17	17	7.3	0.016	1.9	1.1	1.7	Lognormal	na	0.60	0.98	Lognormal	6.8	6.
Vanadium	17	17	76	1.3	21	25	0.84	Lognormal	na	0.86	0.93	Lognormal	58	5
Zinc	17	12	0.026	0.0028	0.0058	0.0085	0.69	Lognormal	na	0.80	0.97	Lognormal	0.012	0.0
2-Methylnaphthalene	17	13	0.075	0.0017	0.020	0.015	1.2	Lognormal	na	0.63	0.96	Lognormal	0.029	0.0
Acenaphthene	17	13	0.075	0.0019	0.011	0.0086	1.3	Lognormal	na	0.53	0.91	Lognormal	0.013	0.0
Anthracene		11	0.05	0.0028	0.061	0.03	2.1	Inconclusive	na	0.50	0.85	Lognormal	0.088	0.0
Benzo(a)anthracene	17	9	0.24	0.0028	0.080	0.038	2.1	Inconclusive	na	0.50	0.83	Lognormal	0.11	0.
Benzo(a)pyrene	17		0.30	0.0022	0.064	0.034	1.9	Lognormal	na	0.51	0.93	Lognormal	0.089	0.0
Benzo(b)fluoranthene	17	14	0.24	0.0018	0.042	0.022	1.9	Inconclusive	na	0.54	0.84	Lognormal	0.055	0.0
Benzo(g,h,i)perylene	17	10	0.15	0.0018	0.042	0.022	1.7	Lognormal	na	0.60	0.94	Lognormal	0.20	0.3
Benzo(k)fluoranthene	17	11		0.0031	0.000	0.056	1.9	Lognormal	na	0.52	0.95	Lognormal	0.18	0.1
Chrysene	17	15	0.42	0.002	0.012	0.0094	1.3	Inconclusive	na	0.67	0.88	Lognormal	0.014	0.0
Dibenz(a,h,)anthracene	17	7		0.0017	0.012	0.0094	1.6	Lognormal	na	0.60	0.98	Lognormal	0.73	0.
Fluoranthene	17	16	1.0		0.28	0.016	1.0	Lognormal	na	0.63	0.95	Lognormal	0.027	0.0
Fluorene	17	16	0.077	0.002		0.016	1.2	Inconclusive	na	0.53	0.85	Lognormal	0.11	0.1
Ideno(1,2,3-cd)pyrene	17	13	0.21	0.0013	0.066	0.034	0.97	Lognormal	na	0.67	0.95	Lognormal	0.015	0.0
Naphthalene	17	13	0.042	0.0027	0.010			Lognormal	na	0.59	0.92	Lognormal	0.59	0.
Phenanthrene	17	17	1.0	0.0027	0.25	0.17	1.5			0.54	0.96	Lognormal	0.53	0.
Pyrene	17	16	0.93	0.0048	0.24	0.13	1.8	Lognormal	na	0.34	0.90	Lognormal	3.0	3.
PCB-1254 (Aroclor 1254)	16	16	9.3	0.0049	2.3	0.68	3.4	Lognormal	na	0.28	0.92	Lognormal	0.61	0.0
PCB-1260 (Aroclor 1260)	16	15	0.92	0.0049	0.26	0.15	1.7	Lognormal	na	0.58	0.97	Logiornia	0.01	

#### Table I-29 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 28

Number of		-, *i i		*. 					re Plots Lognormal	Assumed		×.,
Samples Detect	Max Detect ons (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	r <sup>2</sup>	r <sup>2</sup>	Distribution	95% UCL	EPC
												·

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration
COPEC - Chemical of Potential Ecological Concern.
CV - coefficient of variation
DRO - Diesel range organics.
EPC - Exposure point concentration
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot
na - Not applicable.
mg/kg - milligrams per kilogram
Normal r<sup>2</sup> - Correlation coefficient for the normal plot
RRO - Residual range organics.
Stdev - standard deviation
Consistent with methods described by ADEC (ADEC, 2003) and USEPA (USEPA, 2002b), less than 5 samples in a data set are inadequate to calculate a meaningful 95% UCL. In this case, the maximum concentration was used for the EPC value.

## Table 1-30 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 29

	Nun	ber of									ore Plots			
			Max Detect	Min Result				Shapiro-	D'Agostino's		Lognormal r <sup>2</sup>	Assumed	95% UCL	EPC
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	Wilkes Test	Test	r <sup>2</sup>	r	Distribution	95% UCL	EFC
Freshwater Sediment COPEC														15.00
Aluminum	4	4	15,900	4,820	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na *	na "	na <sup>a</sup>	na <sup>a</sup>	15,90
Arsenic	4	4	5.7	2.8	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na "	5.7
Barium	4	4	115	40	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na *	na <sup>a</sup>	na <sup>a</sup>	115
Beryllium	5	4	1.3	0.20	0.46	0.70	0.66	Inconclusive	na	0.96	0.94	Normal	1.1	1.1
Cobalt	4	4	7.0	2.0	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	7.0
	4	4	114	80	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	114
Manganese				0.05	na ª	па а	na ª	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.05
Mercury	4	1	0.05			na ª	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	35
Vanadium	4	4	35	17	na <sup>a</sup>		na na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na ª	na <sup>a</sup>	na ª	0.003
m,p-Xylene	4	1	0.0032	0.0032	na "	na ª	na 2.1	Inconclusive	na	0.50	0.82	Lognormal	0.072	0.07
2-Methylnaphthalene	21	4	0.23	< 0.0022	0.060	0.031	2.1	Inconclusive	na	0.26	0.75	Lognormal	0.014	0.01
Acenaphthylene	21	1	0.010	< 0.0022	0.035	0.012	2.9	Inconclusive	na	0.29	0.78	Lognormal	0.016	0.01
Anthracene	21	1	0.023	< 0.0022	0.035	0.013	2.7	Inconclusive	na	0.31	0.86	Lognormal	0.020	0.02
Fluorene	21	3	0.022	< 0.0022	0.035	0.014		Inconclusive	na	0.42	0.82	Lognormal	0.031	0.03
Naphthalene	21	3	0.11	< 0.0022	0.040	0.018	2.2	Inconclusive	na	0.37	0.89	Lognormal	0.025	0.02
Phenanthrene	21	4	0.037	< 0.0022	0.035	0.016	2.3		na	0.29	0.79	Lognormal	0.016	0.01
Pyrene	21	2	0.020	< 0.0022	0.035	0.013	2.7	Inconclusive		0.20	0.92	Lognormal	1,859	1,85
DRO	26	24	25,000	9.3	4,883	1,096	4.5	Lognormal	na	0.80	0.96	Lognormal	1,757	1,00
RRO	18	17	1,000	10	354	308	1.1	Lognormal	na	0.80	0.93	Lognormal	133	133
RRO, Aromatic	6	6	137	53	33	87	0.38	Inconclusive	na	0.92	0.95	Logitormai	100	
									na					
Fresh Surface Water COPEC									na		a	na <sup>a</sup>	na <sup>a</sup>	0.04
Aluminum	4	4	0.04	0.04	na ª	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na "	na ª			0.00
Barium	4	4	0.005	0.005	na *	na ª	na ª	na <sup>a</sup>	na ª	na *	na ª	na *	na ª	0.000.000
	1	1	0.02	0.02	na "	na <sup>a</sup>	na <sup>a</sup>	na "	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.02
Silver, Dissolved	13	1	0.33	0.33	0.077	0.73	0.73	Inconclusive	na	0.86	1.0	Lognormal	0.16	0.16
DRO		-			na "	na *	na ª	na ª	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.33
DRO_ Aliphatic	1	1	0.33	0.33	0.12	0.13	0.93	Lognormal	na	0.75	0.91	Lognormal	0.29	0.29
GRO	11	2	0.41	0.33	0.12	0.15	0.95	Logiormai	na	0.75		5		
Tet Time COPEC														
Fish Tissue COPEC	15	1	0.010	0.010	0.001	0.0076	0.2	Inconclusive	na	0.89	0.91	Lognormal	0.0083	0.008
Antimony	15	15	0.780	0.210	0.187	0.5600	0.3	Normal	na	0.91	0.83	Normal	0.65	0.65
Arsenic	15	15	0.466	0.015	0.141	0.1040	1.4	Lognormal	na	0.63	0.90	Lognormal	0.22	0.22
Barium	15	11	0.044	0.0060	0.013	0.0149	0.9	Inconclusive	na	0.89	0.68	Normal	0.021	0.02
Cadmiun	15	15	3.01	0.550	0.910	1.2333	0.7	Inconclusive	na	0.70	0.82	Lognormal	1.7	1.7
Copper	15	10	0.012	0.0030	0.003	0.0052	0.6	Lognormal	na	0.85	0.95	Lognormal	0.0069	0.00
Lead	15	15	0.012	0.0040	0.006	0.0141	0.4	Normal	na	0.93	0.80	Normal	0.017	0.01
Mercury Nickel	15	7	1.12	0.030	0.363	0.1940	1.9	Inconclusive	na	0.56	0.78	Lognormal	0.49	0.49

### Table I-30 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 29

	Nun	ber of							· · · ·		re Plots	2 1		
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPO
Selenium	15	15	0.52	0.120	0.137	0.2133	0.6	Inconclusive	na	0.68	0.77	Lognormal	0.28	0.28
Silver	15	5	0.036	0.011	0.011	0.0098	1.2	Inconclusive	na	0.80	0.85	Lognormal	0.021	0.02
Vanadium	15	15	0.142	0.017	0.031	0.0615	0.5	Lognormal	na	0.84	0.91	Lognormal	0.082	0.08
Zinc	15	15	36.9	5.56	10.631	15.1807	0.7	Inconclusive	na	0.84	0.84	Lognormal	24	24
2-Methylnaphthalene	16	4	0.009	0.0026	0.002	0.0032	0.6	Inconclusive	na	0.33	0.35	Lognormal	0.0038	0.00
Acenaphthene	16	5	0.0092	0.0013	0.002	0.0031	0.6	Inconclusive	na	0.70	0.84	Lognormal	0.0038	0.00
Anthracene	16	5	0.011	0.0017	0.002	0.0033	0.7	Inconclusive	na	0.73	0.84	Lognormal	0.0041	0.00
Benzo(a)anthracene	16	6	0.012	0.0014	0.003	0.0034	0.8	Inconclusive	na	0.61	0.77	Lognormal	0.0043	0.00
Benzo(a)pyrene	16	4	0.009	0.0021	0.002	0.0031	0.6	Inconclusive	na	0.64	0.73	Lognormal	0.0037	0.00
Benzo(b)fluoranthene	16	6	0.0073	0.0012	0.001	0.0027	0.5	Inconclusive	na	0.71	0.93	Lognormal	0.0032	0.00
Benzo(g,h,i)perylene	16	6	0.0089	0.0025	0.002	0.0033	0.5	Inconclusive	na	0.78	0.87	Lognormal	0.0040	0.00
Benzo(k)fluoranthene	16	6	0.018	0.0024	0.004	0.0043	1.0	Inconclusive	na	0.59	0.71	Lognormal	0.0057	0.00
Chrysene	16	6	0.012	0.0019	0.003	0.0035	0.8	Inconclusive	na	0.63	0.76	Lognormal	0.0044	0.00
Dibenz(a,h,)anthracene	16	3	0.0068	0.0016	0.001	0.0028	0.4	Inconclusive	na	0.79	0.93	Lognormal	0.0032	0.00
Fluoranthene	16	6	0.013	0.0017	0.003	0.0037	0.8	Inconclusive	na	0.61	0.76	Lognormal	0.0047	0.00
Fluorene	15	6	0.011	0.0012	0.003	0.0033	0.8	Inconclusive	na	0.63	0.83	Lognormal	0.0043	0.00
Ideno(1,2,3-cd)pyrene	16	7	0.0043	0.0007	0.001	0.0022	0.4	Inconclusive	na	0.91	0.90	Normal	0.0026	0.00
Naphthalene	16	7	0.0066	0.002	0.001	0.0027	1.8	Inconclusive	na	0.66	0.80	Lognormal	0.0032	0.00
Phenanthrene	15	9	0.012	0.0014	0.003	0.0035	0.8	Inconclusive	na	0.63	0.83	Lognormal	0.0048	0.00
Pyrene	16	7	0.014	0.0026	0.003	0.0040	0.8	Inconclusive	na	0.65	0.78	Lognormal	0.0050	0.00
PCB-1254 (Aroclor 1254)	16	15	0.030	0.0061	0.007	0.0146	0.5	Inconclusive	na	0.92	0.94	Lognormal	0.019	0.0
PCB-1260 (Aroclor 1260)	16	3	0.160	0.16	0.040	0.0114	3.5	Inconclusive	na	0.51	0.84	Lognormal	0.012	0.0

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPEC - Chemical of Potential Ecological Concern.
CV - coefficient of variation DRO - Diesel range organics.
EPC - Exposure point concentration
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - Not applicable.
Normal r<sup>2</sup> - Correlation coefficient for the normal plot RRO - Residual range organics.
Stdev - standard deviation

### T..... 1 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 31

	Num	ber of									ore Plots			
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	cv	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>	Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPEC													(054	22
PCB-1260 (Aroclor 1260)	8	6	22	0.36	7.2	5.3	1.4	Lognormal	na	0.70	0.90	Lognormal	6054	
DRO	24	24	11,000	11	2,298	1,273	1.8	Lognormal	na	0.53	0.98	Lognormal	8,307	8,307
RRO	24	12	9,600	12	2,817	1,179	2.4	Inconclusive	na	0.45	0.85	Normal	2,165	2,165
Ephemeral Surface Water COPE	С													
Barium	2	1	0.003	0.003	na <sup>a</sup>	na ª	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na"	0.003
Manganese	2	2	0.005	0.001	na <sup>a</sup>	na ª	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	na a	0.005

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPEC - Chemical of Potential Ecological Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal  $r^2$  - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal  $r^2$  - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

### Table I-32 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 32

	Num	nber of							8	Z-sco	ore Plots	2 2		
	×		Max Detect	Min Result			CU	Shapiro- Wilkes Test	D'Agostino's Test	Normal		Assumed Distribution	95% UCL	EPC
	Samples	Detections	(mg/kg)	(mg/kg)	Stdev	Mean	CV	WIRCS TEST	Test	· ·				
Soil COPEC										a	<sup>a</sup>	na <sup>a</sup>	na <sup>a</sup>	0.89
PCB-1260 (Aroclor 1260)	3	2	0.89	< 0.0043	na "	na "	na "	na "	na "	na "	na "		7,091,847	13,00
DRO	5	5	13,000	230	5,647	4,486	1.26	Inconclusive	na	0.82	0.94	Lognormal		
RRO	5	3	3,600	1,100	1,132	1,580	0.7	Inconclusive	na	0.65	0.71	Lognormal	3,898	3,60

#### Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration COPEC - Chemical of Potential Ecological Concern. CV - coefficient of variation DRO - Diesel range organics. EPC - Exposure point concentration Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot mg/kg - milligrams per kilogram na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

## Time - .3 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska

Site 33

		nber of Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test		ore Plots Lognormal r <sup>2</sup>	Assumed Distribution	95% UCL	EPC
Soil COPEC DRO RRO	3 3	3 3	660 2,100	150 270	na <sup>a</sup> na <sup>a</sup>	na <sup>a</sup> na <sup>a</sup>	na ª na ª	na <sup>a</sup> na <sup>a</sup>	na <sup>a</sup> na <sup>a</sup>	na <sup>a</sup> na <sup>a</sup>	na <sup>a</sup> na <sup>a</sup>	na <sup>a</sup> na <sup>a</sup>	na <sup>a</sup> na <sup>a</sup>	660 2,100

### Notes:

1

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration

COPEC - Chemical of Potential Ecological Concern.

CV - coefficient of variation

DRO - Diesel range organics.

EPC - Exposure point concentration

Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot

mg/kg - milligrams per kilogram

na - Not applicable.

Normal r<sup>2</sup> - Correlation coefficient for the normal plot

RRO - Residual range organics.

Stdev - standard deviation

## Table I-34 Ecological Summary Statistics and Derived 95% UCLs Northeast Cape, St. Lawrence Island, Alaska Site 34

5	Nun	nber of									ore Plots			5
	Samples	Detections	Max Detect (mg/kg)	Min Result (mg/kg)	Stdev	Mean	CV	Shapiro- Wilkes Test	D'Agostino's Test	Normal r <sup>2</sup>		Assumed Distribution	95% UCL	EPC
Soil COPEC		·												0.50
PCB-1254 (Aroclor 1254) PCB-1260 (Aroclor 1260)	8	5	0.59 0.47	0.020 0.019	0.19	0.16 0.099	1.2 1.6	Lognormal Lognormal	na	0.76 0.56	0.91	Lognormal Lognormal	1.6 0.47	0.59 0.47
DRO	9	9	1,100	13	419	327	1.3	Lognormal	na	0.75	0.94	Lognormal	9,959	1,100
RRO	9	8	1,200	58	387	290	1.3	Lognormal	na	0.59	0.86	Lognormal	1,162	1,162

Notes:

95% UCL - 95 percent upper confidence limit (UCL) on the mean concentration
COPEC - Chemical of Potential Ecological Concern.
CV - coefficient of variation
DRO - Diesel range organics.
EPC - Exposure point concentration
Lognormal r<sup>2</sup> - Correlation coefficient for the lognormal plot
mg/kg - milligrams per kilogram
na - Not applicable.
Normal r<sup>2</sup> - Correlation coefficient for the normal plot
RRO - Residual range organics.
Stdev - standard deviation
a - Content and deviation
b - Content and deviation