

APPENDIX CII

Ecological Risk Assessment

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CII ECOLOGICAL RISK ASSESSMENT

This section presents the findings of the ecological risk assessment of the New Housing Area site, Adak Island, Alaska. The risk assessment described in this section is deliberately limited to the evaluation of risks associated with petroleum product releases. This limitation places bounds on the chemicals of potential ecological concern (COPECs) evaluated during the risk assessment, but has no effect on the risk assessment procedures or guidance followed during this risk assessment.

The risk assessment procedures follow current Alaska DEC (ADEC 2000) and U.S. Environmental Protection Agency (USEPA 1997a, 1997b, 1998, 1999) ecological risk assessment guidance. Very little ecological toxicity data (i.e., toxicity reference values) are available for petroleum mixtures such as total petroleum hydrocarbons (TPH), gasoline-range organics (GRO), diesel-range organics (DRO) or residual-range organics (RRO). To develop toxicity reference values (TRVs) for petroleum mixtures in soil, surface water and sediment for this risk assessment, procedures previously developed (URS 1996a, 1996b, 1996c) to derive soil TRVs for wildlife, and surface water and sediment TRVs for aquatic receptors, on Adak have been updated with more recent toxicological literature.

CII.1 INTRODUCTION

Under Alaska DEC (2000) risk assessment guidance (ADEC 2000), the first stage of an ecological risk assessment at a given site is to determine whether a detailed ecological risk assessment of that site is required. A detailed ecological risk assessment of a given site is required whenever the potential for an ecological threat from exposure to chemicals detected on site exists. In this risk assessment, the decision on whether to perform a detailed ecological risk assessment, or not, was made during the problem formulation stage of the risk assessment process. Before a decision can be made on the need for a detailed ecological risk assessment of a given site, a determination is made regarding the following:

1. The presence of sensitive environments, critical habitats, or sensitive species at a site; and
2. The presence of complete exposure pathways which result in the exposure of ecological receptors to site contaminants

If it is determined that no sensitive environments, critical habitats or sensitive species are present at a given site, and complete exposure pathways cannot be identified, Alaska DEC guidance permits the ecological risk assessment process for that site to be terminated. If sensitive environments are present, and/or if complete exposure pathways are identified, the detailed ecological risk assessment process must continue with an ecological effects evaluation of onsite chemicals. This initial decision as to whether or not a detailed ecological risk assessment is required is made at what Alaska DEC terms Ecological Scientific/Management Decision Point #1. Before this decision can be made, ADEC requires the development of an ecological conceptual site model (CSM) to define exposure pathways, if any, of ecological receptors to site contaminants. Alaska DEC also requires completion of a series of ecological checklists, found in Appendix B of the Alaska DEC Risk Assessment Procedures Manual (ADEC 2000). These ecological checklists are used to document the environmental setting of and potential ecological receptors at a site.

The CSM (Figure CII-1) and ecological checklists (Attachment CII-1), along with descriptions of the ecological setting, ecological receptors, and fate and transport of contaminants in soil, groundwater, surface water and sediment at New Housing Area site, are presented in the problem formulation section of the ecological risk assessment.

CII.2 PROBLEM FORMULATION

This section describes the ecological setting of the New Housing Area site, ecological receptors at the site, and the environmental fate and transport of site contaminants. These discussions culminate with the development of an ecological CSM (Figure CII-1), and completion of an Alaska DEC ecological checklist (Attachment CII-1) that document the environmental setting. The problem formulation stage of the risk assessment concludes with Ecological Scientific/Management Decision Point #1: the decision as to whether or not a significant ecological threat may be posed to receptors by site contaminants. The outcome of the problem formulation stage of the ecological risk assessment is to either 1) proceed with the ecological effects evaluation portion of the risk assessment, or 2) to terminate the ecological risk assessment, depending on whether or not a potential ecological threat is identified.

CII.2.1 Ecological Setting

The New Housing Area site is located in downtown Adak, east of runway 18-36, north of Public Works Road, west of Bayshore Highway, and south of Kagalaska Drive (Figure 2-1). The site consists primarily of personnel housing units, including Sandy Cove Housing (88 units), Eagle Bay Housing (33 units), and Turnkey Housing (15 units). Each unit consists of two to four individual townhouses. Turnkey and Eagle Bay Housing are no longer occupied. These housing

areas occupy an area of approximately 100 acres that includes open, grass-covered areas between the separate housing complexes.

The environmental setting of the New Housing Area site has been summarized using the Alaska DEC ecological checklists. The ecological checklists for the site are contained in Attachment CII-1 of this document, and their contents are described in more detail in the rest of this section. Adak Island is within the Aleutian Islands ecoregion as defined by Alaska DEC (ADEC 1999).

The general topography of the New Housing Area site is flat to slightly undulating, with surface drainage predominantly collected and discharged to surface water bodies by ditches and the storm sewer system. Ground surface elevations in this area are generally about 25 to 30 feet above mean lower low water (MLLW). The regional topography in the vicinity slopes gently toward the southwest. However, the topography in the northeast portion of the Sandy Cove Housing area slopes toward the northeast.

The native vegetation on Adak is classified as maritime tundra. The maritime tundra of Adak is treeless and typified by low-growing grasses, forbs and shrubs. Ferns are conspicuous, and mosses and lichens are common on the ground surface. Terrestrial vegetation on Adak is primarily composed of perennial species growing close to the ground, forming continuous monotonous stands (Amundsen 1985). Most plant species on Adak reproduce vegetatively, and die back to ground level following the brief growing season.

No undisturbed areas of native maritime tundra vegetation are found within the New Housing Area site. The ground surface at the site is covered with paved streets and sidewalks, parking areas, driveways, residential housing units, and non-native grass-covered residential lawns. Grasses and other soft-stemmed plants dominate the vegetation at the site. These grasses are typically cut short within the housing area.

Due to the scarcity of native vegetation and the high level of ground surface disturbance, the New Housing Area site provides no ecologically significant wildlife habitat. Terrestrial invertebrate abundance in the Aleutians is relatively low (URS 1996d) due to the foggy, cool and windy climate. Earthworms are present on Adak, but are unlikely to be present at sites where the ground surface is paved or capped with gravel (URS 1996d). Of the three introduced mammal species on Adak, the Norway rat is likely to forage on or around the site; however, Caribou are not found within the vicinity of the site and arctic foxes are no longer located on the island. Songbirds, such as the Lapland longspur and snow bunting, may be occasionally present in the area, but are much more abundant in the native tundra habitat throughout the island. Historically, birds have been abundant near feeders established by the residents (USFWS 1995). However, with the closure of the Turnkey and Eagle Bay housing units, and the low current

human population compared to the number of residents present during Navy use of former Naval Air Facility (NAF) Adak, present day bird use of the New Housing Area site is likely low, consisting largely of overflight of the site.

No sensitive environment or critical habitat as defined by Alaska DEC (ADEC 2000) is found within the site boundaries. The southern half of Adak is part of the Alaska Maritime National Wildlife Refuge and is the closest critical habitat to the New Housing Area. None of the listed threatened or endangered species on Adak (e.g., Aleutian shield fern, Aleutian Canada goose, Steller's sea lion) are found within or in close proximity to the site. The nearest Aleutian shield fern habitat is believed to be on the slopes of Mt. Reed, several miles southwest of the site.

CII.2.1.1 Soil Environment

As noted earlier, much of the New Housing Area is paved or contains buildings, precluding wildlife contact with soil in these portions of the site. Most of the remainder of the site is covered with mowed landscape grasses. In a few areas, particularly alongside some roads are narrow strips of ruderal, or severely disturbed vegetation. No native maritime tundra is present within the site boundaries. The site is not contiguous with areas of high-quality wildlife habitat on Adak, which further limits the use of the site by wildlife. At best, portions of the New Housing Area contain very poor wildlife habitat that is highly disturbed, and deliberately maintained as poor wildlife habitat. The built up and paved portions of the site provide no wildlife habitat.

There are no standard definitions of the depth of soil to which ecological receptors may be exposed. This absence of a standard definition of surface soil in ecological risk assessment requires a site specific definition of surface soil to be made prior to sorting available site data for use in exposure point calculation. Amundsen (1985) observed root and rhizome depths of tundra grasses on Amchitka Island to not exceed 5 feet below ground surface (bgs). It is conceivable that soil invertebrates and wildlife burrowing underneath the site from open areas could potentially come into contact with contaminants in the soil near the bottom of a 0 to 5 feet bgs biologically active zone. The burrowing depth of the only terrestrial mammal likely found at the site, the Norway rat, is 12 to 36 inches (Zeiner et al. 1990). Earthworms are rare to nonexistent at Adak sites covered with gravel (URS 1996d), and their burrowing depth in soil on Adak is unknown.

The Washington State Department of Ecology defines soil from 0 to 6 feet bgs as the biologically active zone (Ecology 2001). This definition is based on the assumption that 6 feet bgs is the soil depth below which soil invertebrates are unlikely to occur, the maximum burrowing depth of animals, and the maximum depth to which plant roots extend. For the

purposes of this risk assessment, we have selected Ecology's definition of the biologically active zone in soil as a conservative working definition of the soil environment within which we might reasonably consider ecological receptors to be present.

The areas of soil in the biologically active zone within the New Housing Area site that historically contained the highest known contaminant levels have been remediated. The non-native grasses and other plants within the site boundaries have little ecological value, either as plant habitat itself or as cover and food sources for wildlife species. No critical habitat is found within the site boundaries. In addition, none of the listed threatened or endangered species on Adak (i.e., Aleutian shield fern, Aleutian Canada goose, Steller's sea lion) is found within or near the site.

As there are no structural or other limitations that physically inhibit ecological receptors from coming in contact with soil or vegetation in the open areas of the New Housing Area site, wildlife species may come into contact with soil at the site. However, the absence of any ecologically significant wildlife habitat precludes the use of the site by wildlife, and thereby precludes contact with potential site contaminants. In the CSM (Figure CII-1), we have described the situation where wildlife receptors can potentially contact (but do not come into ecologically significant contact with) soil as a minor or insignificant exposure pathway to site chemicals. Minor or insignificant exposure pathways will not be quantitatively evaluated in the ecological risk assessment of the New Housing Area site.

CII.2.1.2 Groundwater

Groundwater flow from beneath the New Housing Area is complex, flowing in three different directions. Most groundwater flows either west toward the East Canal, or east toward Kuluk Bay. Groundwater from a small portion of the southern end of Sandy Cove Housing flows toward Sweeper Cove.

The groundwater closest to the ground surface at the site occurs as perched groundwater beneath the Sandy Cove and Turnkey Housing areas. This perched groundwater is found approximately 8 to 12 feet bgs. For the remainder of the site, the regional groundwater table ranges from 18 to 30 feet bgs. Groundwater occurrence beneath the site is typically deeper than the biologically active zone in soil (e.g., 0 to 6 feet bgs as defined by the Washington State Department of Ecology [Ecology 2001]). Plant roots are not likely to extend from the ground surface to even the shallowest groundwater at the site. Soil macroinvertebrates, birds, and mammals are also not likely to come into direct contact with the shallowest groundwater at the site. Based on these observations, terrestrial plants and wildlife at the site are not considered to be exposed to groundwater for this risk assessment. The direct exposure pathways for plants, soil invertebrates,

and wildlife to groundwater within the boundaries of the New Housing Area are, therefore, incomplete.

CII.2.1.3 Surface Water

No surface waters constituting high-quality habitat for ecological receptors exist within the boundaries of the New Housing Area site. The nearest surface waters that constitute high-quality habitat are South Sweeper Creek, Sweeper Cove, and Kuluk Bay. Kuluk Bay and Sweeper Cove are large marine water bodies located approximately 1,200 and 1,700 feet, respectively, from the nearest fuel release points within the Sandy Cove Housing portion of the site. The lower portion of South Sweeper Creek forms a sandy estuary where it empties into Sweeper Cove. As a result of the cycling tides, saltwater periodically moves beneath the freshwater flow as a wedge along the bottom of the creek. South Sweeper Creek is located approximately 3,800 feet from the nearest fuel release point in the Eagle Bay Housing portion of the site.

The nearest surface water body of any type is the East Canal of the airport ditch system. The East Canal is a fresh water body situated approximately 800 feet west of the closest known fuel release point within the Eagle Bay Housing portion of the site. It is considered the western boundary of the site in this area, and is the receiving water body for groundwater discharging from the site toward the west. Site data indicate that petroleum released at the Eagle Bay Housing portion of the New Housing Area has migrated to the East Canal of the airport ditch system.

The East Canal was constructed as part of the airport ditch system, and is an engineered diversionary structure designed to collect surface water runoff from the airfield to prevent flooding of the airport runways during periods of heavy rainfall and high water. Water in the East Canal collects from a combination of storm water discharges, surface water runoff, and groundwater influx. Water in the East Canal moves toward the south, then west through culverts situated south of Runway 18-36 into the West Canal, and is ultimately transferred from the West Canal through turbine pumps into South Sweeper Creek near the southwestern corner of the Runway 18-36. Although the canals of the airport ditch system are part of the potential migration pathway from the southwestern portion of the site to South Sweeper Creek, they are not considered to be high-quality habitat. South Sweeper Creek is considered the closest ecological exposure point for aquatic organisms potentially exposed to petroleum-related chemicals that were released at the site and transported to the East Canal

Because the only connection between surface water within the airport drainage system and the tidally influenced South Sweeper Creek is through turbine pumps, it is not possible for fish to migrate between South Sweeper Creek and the East Canal. Although not known with certainty,

it is likely that no fish exist in the East Canal. Therefore, fish are not considered to be ecological receptors within the East Canal.

Because adult breeding life stages of some benthic species fly, benthic invertebrates have likely colonized the East Canal to some extent. However, the East Canal is not considered to be high-quality habitat. Therefore, the exposure of benthic invertebrates to petroleum contaminants in the East Canal is considered to be a minor or insignificant pathway.

The distance that surface water within the East Canal must travel prior to being pumped into South Sweeper Creek (3,000 feet), make it exceedingly unlikely that fish and benthic invertebrates in South Sweeper Creek are exposed to contaminants from the New Housing Area site. A much more likely scenario is that aquatic biota in South Sweeper Creek are exposed to contaminants whose sources are adjacent to or near South Sweeper Creek.

Site data and contaminant fate and transport modeling discussed in Section 3.5.8 indicate that petroleum contaminants released at the Sandy Cove Housing portion of the New Housing Area have not migrated the 1,200 feet to Kuluk Bay or 1,700 feet to Sweeper Cove. The distance groundwater has to travel from New Housing Area site to either Kuluk Bay or Sweeper Cove makes it unlikely that marine biota are exposed to contaminants from the site.

In the ecological CSM (Figure CII-1), exposure of aquatic biota to surface water contaminants from the site is shown as a minor or insignificant pathway. As no surface water bodies constituting high quality habitat exists within the boundaries of the New Housing Area site, there is no aquatic ecological receptor exposure to surface water contaminants at the site itself. The potential for transport of site contaminants via groundwater to surface water bodies considered high quality habitat (South Sweeper Creek, Sweeper Cove, and Kuluk Bay) cannot be completely discounted. However, the mass loading of contaminants via groundwater and or surface water transport to these three downgradient surface water bodies is considered negligible, rendering the New Housing Area site an insignificant source of contaminant exposure to fresh surface water and marine receptors. Minor or insignificant exposure pathways are not quantitatively evaluated in the ecological risk assessment for the site.

CII.2.1.4 Sediment

As no surface water bodies constituting high-quality habitat for ecological receptors exist within the periphery of New Housing Area site, there are no sediments at the site considered to be ecologically sensitive environments. This includes sediments within the East Canal of the airport ditch system. Ecological receptor exposure to sediments within the site itself and the East Canal are, therefore, considered an incomplete exposure pathway (Figure CII-1).

As is the case for surface water, the transport of site contaminants via groundwater to off-site sediments of South Sweeper Creek, Sweeper Cove, and Kuluk Bay as a potentially complete exposure pathway cannot be discounted. However, site data and contaminant fate and transport modeling discussed in Section 3.5.8 indicate that transport of site contaminants to sediments of these water bodies (identified as high-quality habitat) is considered negligible.

The primary contaminant sources in sediments of these water bodies are those located within close proximity to the water, such as South of Runway 18-36 or NMCB Building Expanded Area. In the ecological CSM (Figure CII-1), the pathways for exposure of potential ecological receptors to site contaminants in off-site sediments are shown as potentially complete, but are considered minor or insignificant. Minor or insignificant exposure routes are not quantitatively evaluated in the risk assessment for the site.

CII.2.2 Conclusion of Preliminary (Screening Level) Problem Formulation

Once the CSM and Alaska DEC ecological checklists have been completed, Alaska DEC guidance (ADEC 2000) permits a determination of whether or not a significant ecological threat associated with exposure to onsite contaminants exists at a site. Termed Ecological Scientific/Management Decision Point (SMDP) #1 by Alaska DEC, the decision as to whether or not to proceed with the ecological effects evaluation portion of the risk assessment depends on the answers to the questions listed below:

<i>Ecological Scientific/Management Decision Point #1^a</i>	
-	Are sensitive environments identified? Yes? Proceed with ecological risk assessment Go to effects evaluation No? End ecological risk assessment unless the following question is answered yes <p style="text-align: center;">ANSWER FOR SWMU 62: NO</p>
-	Are completed exposure pathways identified? Yes? Proceed with ecological risk assessment Go to effects evaluation <p style="text-align: center;">ANSWER FOR SWMU 62: NO</p>

Note:

a) The numbers used to describe Ecological Scientific/Management Decision Points (SMDP) in this text are those given by Alaska DEC (ADEC 2000), which results in the appearance that some SMDPs were omitted in this text. All SMDPs appropriate to this site were evaluated, but not all SMDPs identified by Alaska DEC (ADEC 2000) were needed for the site.

No state or federal sensitive environments exist within or in the vicinity of the New Housing Area site. Therefore, the ecological risk assessment process can be discontinued unless one or more complete exposure pathways are identified. As shown in the CSM (Figure CII-1), no complete exposure pathways have been identified for any ecological receptors that warrant quantitative risk assessment. Several minor or insignificant exposure pathways are present, none of which result in any ecologically significant exposure to contaminants at the site, and none of which requires quantitative evaluation.

In conclusion, no ecological threat exists for any ecological receptor from petroleum release products at the New Housing Area site. Therefore, no further ecological risk assessment is warranted for this site.

CII.3 LITERATURE CITED

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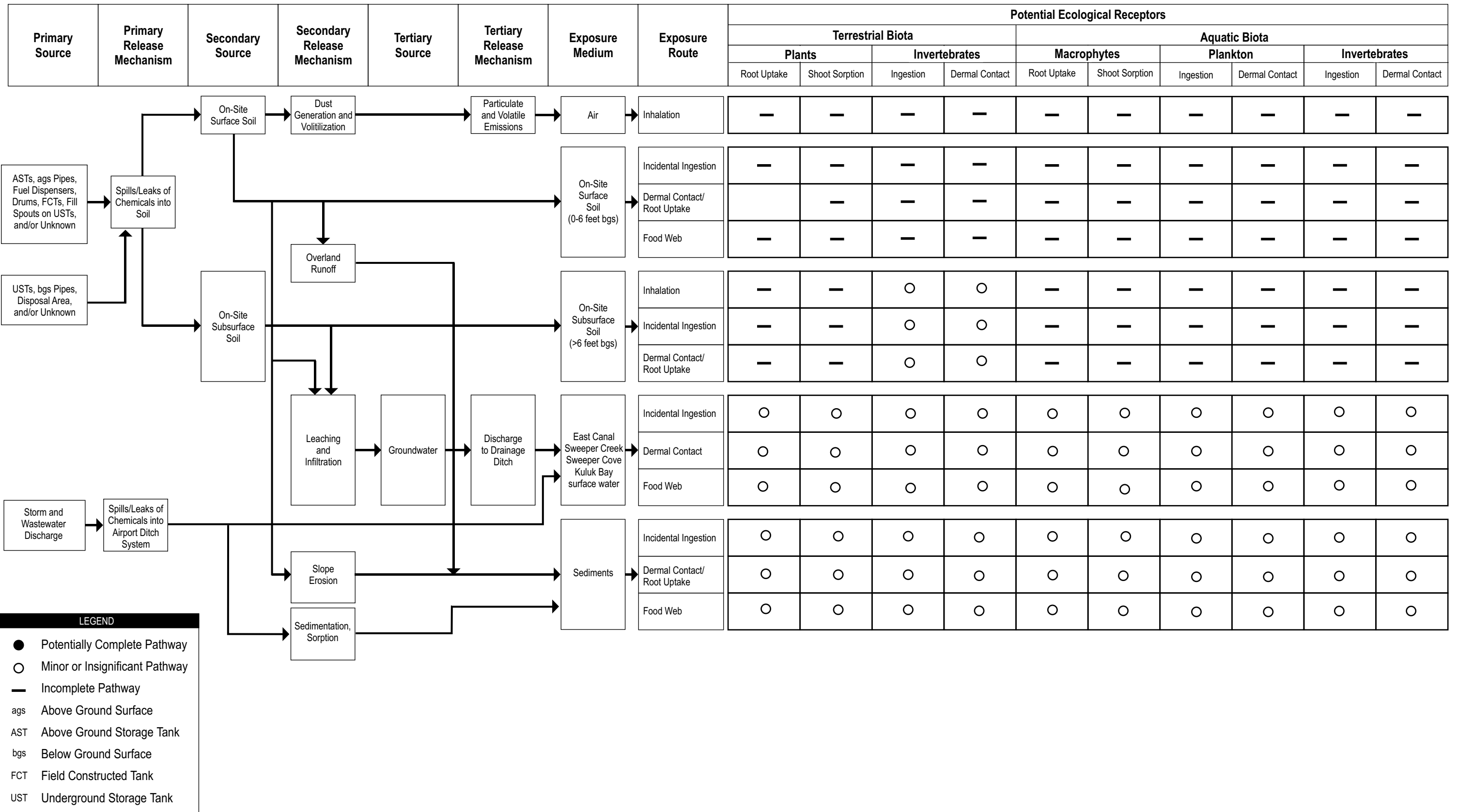
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ATTACHMENT CII-1

Ecological Checklist

ECOLOGICAL CHECKLIST

Source: Alaska Department of Environmental Conservation (ADEC). Risk Assessment Procedures Manual, Appendix B. June 8, 2000.

Figure B.1 ECOLOGICAL CHECKLIST #1: GENERAL

1. SITE NAME: SWMU 62

ADEC LC: _____

2. LOCATION: Adak Island, Alaska

3. LATITUDE: _____

4. LONGITUDE: _____

5. APPROXIMATE SITE AREA: 100 acres

6. DATES OF SITE VISITS: Ongoing since 1994

- ATTACH USGS TOPOGRAPHIC MAP
 ATTACH AVAILABLE PHOTOS

7. LAND USE ON THE SITE

90 _____ % RESIDENTIAL
_____ % RURAL
_____ % URBAN
10 _____ % INDUSTRIAL/COMMERCIAL
_____ % AGRICULTURAL
_____ % RECREATIONAL
_____ % FOREST/WOODED
_____ % WETLANDS
_____ % UNDISTURBED
_____ % OTHER

8. LAND USE SURROUNDING THE SITE

35 _____ % RESIDENTIAL
_____ % RURAL
_____ % URBAN
65 _____ % INDUSTRIAL/COMMERCIAL
_____ % AGRICULTURAL
_____ % RECREATIONAL
_____ % FOREST/WOODED
_____ % WETLANDS
_____ % UNDISTURBED
_____ % OTHER

9. DESCRIBE MOVEMENT OF SOIL ON THE SITE

- AGRICULTURAL USE
- NATURAL EVENTS
- EROSION
- HEAVY EQUIPMENT
- MINING
- OTHER

10. IDENTIFY SENSITIVE ENVIRONMENTS

(PLEASE SEE SECTION 4.2.4.2 State Sensitive Environments AND 4.2.4.3 Federal Sensitive Environments)

None

11. POTENTIAL ROUTES OF OFFSITE MIGRATION

- SWALES
- RUNOFF
- DEPRESSIONS
- WINDBLOWN PARTICULATES
- DRAINAGE DITCHES
- VEHICULAR TRAFFIC
- OTHER _____

12. DEPTH OF WATER TABLE _____ **8 feet**

13. IDENTIFY WATER BODIES IN THE VICINITY OF THE SITE

East Canal, 800 feet from site; Kuluk Bay, 1200 feet from site; Sweeper Cove, 1700 feet from site

14. EVIDENCE OF FLOODING

- YES
- NO

5. SHRUB/SCRUB DENSITY

- DENSE
- PATCHY
- SPARSE

C. OPEN AREAS

1. ARE THERE OPEN (BARE, BARREN) FIELD AREAS PRESENT AT THE SITE

- YES
- NO

2. PERCENTAGE OF SITE OPEN FIELD

 0 %

 ACRES

3. DOMINANT TYPE OF PLANT

-
-
-

4. DOMINANT HEIGHT OF DOMINANT PLANT

- 0-2 FEET
- 2-5 FEET
- > 5 FEET

5. DOMINANT PLANT DENSITY

- DENSE
- PATCHY
- SPARSE

Figure B.3 ECOLOGICAL CHECKLIST #3: AQUATIC-FLOWING SYSTEMS

1. TYPE OF FLOWING WATER SYSTEMS PRESENT AT THE SITE

- RIVER
 - PERENNIAL
 - INTERMITTENT
- STREAM
 - PERENNIAL
 - INTERMITTENT
- CREEK
- BROOK
- DRY-WASH
- MAN-MADE (DITCH, ETC.)
- ARROYO
- INTERMITTENT STREAM
- CHANNELING SPARSE
- LAKE OR POND
- TIDAL STREAM
 - BAY
 - ESTUARY
- OTHER
- NONE

2. GENERAL COMPOSITION OF SUBSTRATE

- BEDROCK
- SAND
- SILT
- BOULDER
- COBBLE
- GRAVEL
- MARL
- CLAY
- MUCK
- DEBRIS
- CONCRETE
- OTHER

3. CONDITION OF THE BANK – HEIGHT, SLOPE, ETC.

4. FLOW INTERMITTENT

- YES
- NO

5. DISCHARGE FROM SITE TO WATER BODY

- YES
- NO

6. DISCHARGE FROM WATER BODY

- YES
- NO

7. TYPE OF AQUATIC VEGETATION PRESENT

- EMERGENT
- SUBMERGENT
- FLOATING
- NONE

8. OTHER ORGANISMS PRESENT

- BENTHIC MACRO INVERTEBRATES
- FISH
- BIRDS
- MAMMALS
- OTHER
- NONE

Figure B.4 ECOLOGICAL CHECKLIST #4: AQUATIC NON-FLOWING SYSTEMS

1. TYPE OF OPEN WATER NON-FLOWING SYSTEMS PRESENT AT THE SITE

- NATURAL
- MAN-MADE
- NONE

2. KNOWN USES OF WATER BODY

- RECREATIONAL
- NAVIGATIONAL
- SUBSISTENCE
- OTHER

3. APPROXIMATE SIZE OF WATER BODY

_____ ACRES

4. TYPE OF AQUATIC VEGETATION PRESENT

- EMERGENT
- SUBMERGENT
- FLOATING

5. DEPTH OF WATER

_____ FEET

6. GENERAL COMPOSITION OF SUBSTRATE

- BEDROCK
- SAND
- SILT
- BOULDER
- COBBLE
- GRAVEL
- MARL
- CLAY
- MUCK
- DEBRIS
- CONCRETE
- OTHER

7. SOURCE OF WATER IN THE WATER BODY

- RIVER/STREAM/CREEK
- GROUNDWATER
- SURFACE RUNOFF
- INDUSTRIAL DISCHARGE
- OTHER

8. DISCHARGE FROM SITE TO WATER BODY

- YES
- NO

9. DISCHARGE FROM SITE TO WATER BODY

- | | | |
|---------------------------------------|---------------------------------|----------------------------------|
| <input type="checkbox"/> RIVER/STREAM | <input type="checkbox"/> ONSITE | <input type="checkbox"/> OFFSITE |
| <input type="checkbox"/> GROUNDWATER | <input type="checkbox"/> ONSITE | <input type="checkbox"/> OFFSITE |
| <input type="checkbox"/> WETLAND | <input type="checkbox"/> ONSITE | <input type="checkbox"/> OFFSITE |
| <input type="checkbox"/> IMPOUNDMENT | <input type="checkbox"/> ONSITE | <input type="checkbox"/> OFFSITE |

Figure B.5 ECOLOGICAL CHECKLIST #5: WETLANDS

1. ANY DESIGNATED OR KNOWN WETLANDS AT THE SITE

- YES
- NO

2. ARE WETLANDS HABITATS EXPECTED

- YES
- NO

3. TYPES OF VEGETATION PRESENT

- EMERGENT
- SUBMERGENT
- SCRUB/SHRUB
- WOODED
- OTHER

4. DISCHARGE FROM SITE TO WETLANDS

- YES
- NO

5. DISCHARGE FROM WETLAND

- | | | |
|---------------------------------------|---------------------------------|----------------------------------|
| <input type="checkbox"/> RIVER/STREAM | <input type="checkbox"/> ONSITE | <input type="checkbox"/> OFFSITE |
| <input type="checkbox"/> GROUNDWATER | <input type="checkbox"/> ONSITE | <input type="checkbox"/> OFFSITE |
| <input type="checkbox"/> LAKE/POND | <input type="checkbox"/> ONSITE | <input type="checkbox"/> OFFSITE |
| <input type="checkbox"/> MARINE | <input type="checkbox"/> ONSITE | <input type="checkbox"/> OFFSITE |