THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Environmental Conservation

Division of Spill Prevention and Response
Contaminated Sites Program

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File: 1544.38.001

March 4, 2015

Brad Platt
Federal Aviation Administration
Environmental Section
222 W. 7th Ave, #14
Anchorage, AK 99513-7587

Re: Coghlan Island Groundwater Use Determination in accordance with 18 AAC 75.350

Dear Mr. Platt:

Thank you for submitting the May 2013 Final *FAA Station Coghlan Island Groundwater Determination In Accordance With 18 AAC 75.350*. The Alaska Department of Environmental Conservation, Contaminated Sites Program (DEC) received this report on June 3, 2013. This report describes characterization of groundwater and groundwater contamination at the Federal Aviation Administration (FAA) Coghlan Island station, wherein the FAA contends that groundwater at Coghlan Island does not satisfy the criteria to be considered a current or reasonably expected potential future source of drinking water. The report reviews documented and modeled hydrogeology at Coghlan Island and includes findings to support the contention that groundwater at the station is not a drinking water source in accordance with 18 AAC 75.350.

DEC has conducted a review of the environmental records associated with the FAA Coghlan Island Station. Based on the information provided to date, DEC has determined that the groundwater at Coghlan Island does not meet the criteria to be considered a current or future drinking water source. DEC has further determined that groundwater affected at this site will not be transported to a current or reasonably expected future source of drinking water, and will not impact surface water quality. This letter summarizes the environmental records associated with this site and documents the supporting evidence for this Groundwater Use Determination.

Introduction

This Groundwater Use Determination is based on the administrative record for the FAA Coghlan Island site. This letter summarizes the decision process used to conclude that groundwater at Coghlan Island meets the conditions of 18 AAC 75.350, and the regulatory issues considered in the determination.

Background

Coghlan Island is located in Stephens Passage at the entrance to Auke Bay, near Juneau in southeast Alaska. Coghlan Island is approximately 1.5 miles long and 0.5 miles wide. The Coghlan Island FAA Station is located on the northern end of the island on property leased from the State of Alaska Department of Natural Resources. The FAA operates an unmanned Non-Directional Beacon (NDB), used for aircraft navigation, at the site. Coghlan Island is uninhabited and covered by thick coastal rainforest of Sitka Spruce and associated undergrowth.

Sites associated with FAA Coghlan Island Station are listed in the DEC Contaminated Sites Database as file number 1544.38.001, Hazard ID 4176 and include the former Fuel Pump House (Building 621), the Transmitter Building (Building 417), and the former fuel pipeline. The contaminant of concern at this site is diesel range organics (DRO).

Site History

There have been several investigations and remedial actions conducted at the FAA Coghlan Island Station, including:

- Environmental Compliance Investigation (1992)
- Above Ground Storage Tank Decommissioning Assessment (1997)
- Release Investigation (1998)
- Remedial Investigation (2012)

Basis for Groundwater Use Determination

18 AAC 75.350 indicates that groundwater is considered to be a drinking water source unless the following conditions are met:

- 75.350(1) Groundwater is not currently used as a drinking water source and does not contribute to a currently used drinking water source
- 75.350(2) Groundwater is not a reasonably expected future source of drinking water
- 75.350(3) Groundwater affected by hazardous substances will not be transported to groundwater that is a current or reasonably expected future source of drinking water

18 AAC 75.350(1) requires that groundwater is not currently being used as a drinking water source and does not contribute to a currently used drinking water source. No drinking water wells have been installed in the FAA Coghlan Island area. There are no permanent or long-term residents on the island. FAA personnel are on-site for short periods of time only, and there are no public service facilities, bathroom facilities or septic systems at the FAA station or on the island. There are no private or public drinking water systems or other groundwater wells hydrologically connected to the island. Fairview, the closest community to the island, is located one mile north, on the mainland.

18 AAC 75.350(2) requires that groundwater is not a reasonably expected future source of drinking water. An evaluation of the availability of groundwater indicates that the availability of groundwater as a drinking water source is prohibitively limited due to the shallow thickness of the aquifer. During monitoring well construction, bedrock was encountered at depths ranging between 4 to 7.5 feet, and dense gray till, found between 2 to 4 feet below ground surface, creates an aquitard. Due to this dense till layer, the unconfined aquifer thickness is limited in extent from the ground surface to a depth of 3 to 4 feet. This shallow unconfined aquifer relies directly upon precipitation infiltration for recharge. During winter months, infiltration and groundwater recharge may be limited or the storativity of the aquifer may be depleted.

The State of Alaska Department of Natural Resources confirmed that groundwater use is not expected or planned for this site. Alaska State Park Superintendent Michel Eberhardt said "*The land surrounding the site is within the Channel Island State Marine Park and is not planned for any other development other than dispersed public recreation which would never require any ground water usage. The most intensive use that may occur in the vicinity (within ½ mile) would be a Public use Cabin (PUC) and even that would only be a surface water gathering situation. We do not provide water at our remote locations (PUC or otherwise) and I cannot ever see us doing so.*" If the FAA lease is terminated some day in the future the land where the FAA station was located would become part of the Marine Park.

18 AAC 75.350(3) requires evidence that groundwater affected by hazardous substances will not be transported to a current or reasonably expected future drinking water source. No existing groundwater wells or community wells on the mainland are hydrologically connected to the aquifers on Coghlan Island. No know attempts to install a drinking water source well in the confined bedrock aquifer on Coghlan Island have been reported. However, groundwater from the bedrock or confined aquifers in the surrounding areas have produced brackish water or inadequate quantities for consumption.

DEC Decision

Groundwater at Coghlan Island has been adequately characterized and meets the conditions of 18 AAC 75.350. Based on the information available, DEC has determined that the groundwater at Coghlan Island does not meet the criteria to be considered a current or future drinking water source. DEC has further determined that contamination in the groundwater at this site will not be transported to either surface water or to a current or reasonably expected future source of drinking water. Following this determination, further groundwater monitoring at the Coghlan Island sites will not be required and the Migration to Groundwater soil cleanup levels are no longer requirements for the cleanup. As a result of this determination, the FAA Coghlan Station site in the DEC Contaminated Sites database will be evaluated for closure in a separate cleanup complete determination.

This determination is in accordance with 18 AAC 75.380(d) (1) and does not preclude DEC from requiring additional assessment and/or cleanup action if future information indicates that this site may pose an unacceptable risk to human health or the environment.

Appeal

Any person who disagrees with this decision may request an adjudicatory hearing in accordance with 18 AAC 15.195 - 18 AAC 15.340 or an informal review by the Division Director in accordance with 18 AAC 15.185. Informal review requests must be delivered to the Division Director, 410 Willoughby Avenue, Suite 303, Juneau, Alaska 99801, within 15 days after receiving the department's decision reviewable under this section. Adjudicatory hearing requests must be delivered to the Commissioner of the Department of Environmental Conservation, 410 Willoughby Avenue, Suite 303, Juneau, Alaska 99801, within 30 days after the date of issuance of this letter, or within 30 days after the department issues a final decision under 18 AAC 15.185. If a hearing is not requested within 30 days, the right to appeal is waived.

If you have questions about this closure decision, please contact the DEC project manager, Melody Debenham, at melody.debenham@alaska.gov or (907) 451-5175.

Sincerely,

Fred Vreeman
Environmental Program Manager

Enclosure: Final FAA Station Coghlan Island Groundwater Use Determination in Accordance with 18 AAC 75.350 (May 2013)
Communication from Michael Eberhardt, Alaska State Parks

cc: Mike Eberhardt, DNR

Mike Eberhardt
Department of Natural Resources
P.O. Box 111071
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FINAL
FAA STATION COGHLAN ISLAND
GROUNDWATER USE DETERMINATION
IN ACCORDANCE WITH 18 AAC 75.350

May 17, 2013

Contract Number DTFAAL-10-D-00002
Task Order Number 0030

Prepared for:
Federal Aviation Administration
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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AES	Ahtna Engineering Services, LLC
AOC	areas of concern
AST	above ground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
DRO	diesel range organics
EPA	United State Environmental Protection Agency
E&E	Ecology and Environment, Incorporated
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
GRO	gasoline range organics
HRC	Hydrocarbon Risk Calculator
ID	Identification
LNAPL	light non-aqueous phase liquid
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MW	monitoring well
NAPL	non-aqueous phase liquid
ND	non-detect or not detected above method detection limit
NDB	non-directional beacon
PAH	polynuclear aromatic hydrocarbon
RI	remedial investigation
RRO	residual range organics
TAH	total aromatic hydrocarbons
TAqH	total aqueous hydrocarbons
UVOST	Ultraviolet Optical Screening Tool
WRCC	Western Regional Climate Center
yds^3	cubic yards

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1.0 Introduction

The Federal Aviation Administration (FAA) operates air navigation aids on Coghlan Island near Juneau, in southeast Alaska, as shown on Figure 1. The FAA conducted site investigation activities in July 2012 and is now preparing reports documenting the site conditions, extent of fuel hydrocarbon contamination, the human health and environmental risks associated with the fugitive hydrocarbons, and compliance with Alaska Department of Environmental Conservation (ADEC) environmental closure criteria. For the Coghlan Island FAA Station, the Contaminated Sites Program File Identification (ID) is: 1544.38.001 and Hazard ID is: 4176.

The human health risk calculations and compliance with ADEC environmental closure criteria are affected by whether the groundwater at the site meets the following use criteria:

1. is considered a drinking water source,
2. is considered a reasonably expected potential future source of drinking water, and
3. if affected groundwater will be transported to a current drinking water source or reasonably expected potential future source of drinking water.

The FAA contends that the shallow groundwater identified at the FAA Station on Coghlan Island does not satisfy the criteria to be considered a current or reasonably expected potential future source of drinking water and groundwater will not transport contaminants to a current or potential source of drinking water. Therefore, groundwater at Coghlan Island is not subject to 18 Alaska Administrative Code (AAC) 75 Table C criteria. This document presents information to support that conclusion.

1.1 Contaminants of Concern/Media Impacted

Groundwater: Diesel range organics (DRO) have been detected in the shallow, unconfined groundwater at concentrations greater than the ADEC Groundwater Cleanup Levels (18 AAC 75.345 Table C). Figure 2, Site Plan, includes the locations of all monitoring wells including those installed during the 2012 Remedial Investigation (RI) conducted by Ahtna Engineering Service, LLC (AES).

1.2 Regulatory Authorities

The Coghlan Island FAA Station is regulated by ADEC 18 AAC 75.325 -18 AAC 75.390, Site Cleanup Rules (2012) Groundwater and Surface Water Cleanup Levels (2012), and 18 AAC 70, Water Quality Standards (ADEC, 2011). Table 1 provides a summary of ADEC Groundwater Cleanup Levels for petroleum hydrocarbons and the Water Quality Standards for Total Aromatic Hydrocarbons (TAH) and Total Aqueous Hydrocarbons (TAqH).

Table 1 – ADEC Groundwater Cleanup Levels & Water Quality Standards*	
Petroleum Hydrocarbons	Cleanup Level (mg/L)
Gasoline Range Organics	2.2
Diesel Range Organics	1.5
Residual Range Organics	1.1
Compound	Water Quality Standard (mg/L)
Total Aromatic Hydrocarbons (TAH)	0.01
Total Aqueous Hydrocarbons (TAqH)	0.015

Notes: mg/L = milligrams per liter
*Groundwater Cleanup Levels as stated in ADEC 18 AAC 75.345 Table C, Water Quality Standards as stated in ADEC 18 AAC 70.020 Water Quality Standards Table for Fresh and Marine Water Uses

In 18 AAC 70 (2011), Water Quality Standards, ADEC defines TAH as the sum of Benzene, Toluene, Ethylbenzene, and Total Xylenes (collectively, BTEX) concentrations, i.e.

Benzene + Toluene + Ethylbenzene + Total Xylenes = TAH

and TAqH as "*those collective dissolved and water-accommodated monoaromatic and polynuclear aromatic petroleum hydrocarbons that are persistent in the water column*" i.e.,

Total polynuclear aromatic hydrocarbon (PAH) concentrations + TAH = TAqH

and "*does not include floating surface oil or grease*".

Although no concentration standards are provided for other petroleum hydrocarbons, 18 AAC 70 does require "*there may be no concentrations of petroleum hydrocarbons, animal fats, or vegetable oils in shoreline or bottom sediments that cause deleterious effects to aquatic life*" and that "*surface waters and adjoining shorelines must be virtually free from floating oil, film, sheen, or discoloration*".

1.3 Other Relevant Guidance/Policy

The ADEC Technical Memorandum, Site Closure Memorandum, dated July 24, 2009, also provides regulatory guidance or policy for the Coghlan Island FAA Station.

1.4 Site Location and Information

Coghlan Island is located in Stephens Passage at the entrance to Auke Bay. State and Site Vicinity Maps are shown on Figure 1. Coghlan Island is approximately 1.5 miles long and 0.5 miles wide at the widest point. The Coghlan Island FAA Station is located on the northern end of the island on property leased from the State of Alaska Department of Natural Resources. The FAA operates an unmanned Non-Directional Beacon (NDB) at the site which is used for aircraft navigation. Coghlan Island is uninhabited and covered by thick coastal rainforest of Sitka Spruce, Hemlock and associated undergrowth.

2.0 Site History

There have been several investigations and remedial actions conducted at the Coghlan Island FAA Station: an Environmental Compliance Investigation in 1992, an above ground storage tank (AST) Decommissioning Assessment in 1997, a Release Investigation in 1998, and an RI in 2012. The Transmitter Building (Building 417), former Fuel Pump House (Building 621), a hazardous material storage shed, a double-wall AST, and the NDB transmitter array are the only structures currently at the site. The double-wall AST has replaced former ASTs 40-A-1 and 40-A-2 and the fuel pipelines associated with those ASTs.

2.1 Building 621, Former AST 40-A-1

Former AST 40-A-1 was located southeast of Pump House Building 621. This 10,000-gallon AST was originally installed in 1967 and was upgraded in 1982 to include a concrete secondary containment dike and rubberized fabric containment liner. The Environmental Compliance Investigation performed in 1992 identified fuel leaking from a float gauge on the east side of the AST and soil sampling indicated the presence of petroleum hydrocarbons above the evaluation criteria. Additional investigation was recommended.

The AST was decommissioned in 1997. During removal the containment dike was destroyed and the liner and fill overlying the liner were removed. Petroleum staining was noted beneath the tank and liner and an estimated area of approximately 400 square feet was observed to be impacted. Two confirmation samples were collected from the area south and east of the former tank, within the former dike. Analytical results did not report petroleum hydrocarbon constituents above the ADEC cleanup criteria, but some soil matrix affects are suspected. Approximately 55 cubic yards (yds^3) of impacted soil was removed during the AST decommissioning and transported off site for treatment and disposal. Approximately 50 yds^3 of contaminated soil was estimated to remain.

A release investigation was performed in 1998 by Montgomery Watson and resulted in the advancement of a number of borings and the installation of monitoring wells MW01, MW02, and MW04. DRO was the only contaminant reported to exceed the ADEC cleanup level of 200 milligrams per kilogram (mg/kg). Approximately 39 to 83 yds^3 of impacted soil was estimated to remain beneath the former tank location. No contaminants exceeding the ADEC cleanup levels were reported in the water from the monitoring wells. Based on soil boring observations, the bedrock is located at approximately 5 to 6 feet below ground surface (bgs) in this area.

2.1.1 2012 Remedial Investigation – Building 621

During the 2012 RI, AES field screened subsurface petroleum contamination using an UltraViolet Optical Screening Tool (UVOST) operated by Hammer Environmental. AES advanced a total of 29 UVOST probes, 17 soil borings, and 4 monitoring wells to further characterize the extent of contamination in this area. A total of 21 soil samples were collected. Eleven soil samples reported DRO concentrations greater than the ADEC Method Two, Over 40 Inch Zone, Migration to Groundwater cleanup level of 230 mg/kg ranging from 410 mg/kg to 3,700 mg/kg.

Four monitoring wells, MW110, MW117, and MW118, and MW122, were installed in the Former Pump House/Building 621 area during the 2012 RI. The borings identified a subsurface stratigraphy of 2.5 to 4 feet of sandy gravel (imported fill) over native silts and organics/peat overlying a clayey, gravelly sand (till). Bedrock or refusal was encountered at approximately 6 feet bgs in all wells. The depth to water ranged between approximately 0.5 feet bgs and 4 feet bgs. MW118 was installed upgradient of the source zone, MW110 was installed in the source zone, and MW122 was installed downgradient of the source zone. MW117 was screened at 5-6 feet bgs, in dense till, and completed with a bentonite seal that isolated the screened interval from the saturated fill overlying the till. Monitoring Well MW117 had insufficient water to collect groundwater quality parameters and analytical samples. MW117 was purged dry after approximately 0.5 gallons with negligible recharge. Analytical samples were collected from the remaining three wells.

MW110, located in the source area, had a groundwater DRO analytical result of 1.9 milligrams per liter (mg/L). Residual range organics (RRO), gasoline range organics (GRO), and individual BTEX concentrations were all less than the ADEC 18 AAC 75 Table C Groundwater cleanup levels; however the summed BTEX and PAH results exceeded Water Quality Standards with a TAH concentration of 0.0168 mg/L and a TAqH concentration of 0.09 mg/L. MW01, installed during the 1998 Release Investigation, did not have petroleum hydrocarbon concentrations exceeding ADEC's Groundwater cleanup levels. However, the sum of PAH concentrations resulted in a Water Quality Standard exceedance of 0.035 mg/L. Table 2 provides a summary of groundwater analytical sample results and TAH/TAqH calculation results from groundwater samples collected during the 2012 RI. Monitoring well locations are shown on Figures 2 and 3.

Table 2 - Groundwater Analytical Summary and Water Quality Standards Concentrations*

FAA Coghlan Island - Former Pump House/Building 621 Area

Monitoring Well	Sample Date	GRO	DRO	RRO	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	*TAH (mg/L)*	PAH (mg/L)	*TAqH (mg/L)*
Cleanup Level (mg/L)		***2.2***	***1.5***	***1.1***	***Water Quality Standards (mg/L)***				***0.01***	---	***0.015***
MW01	07/11/12	ND	0.24	ND	ND	ND	ND	ND	*ND*	0.035	***0.035***
MW02	07/11/12	ND	0.18	ND	ND	ND	ND	ND	*ND*	ND	*ND*
MW04	07/11/12	ND	0.20	ND	ND	ND	ND	ND	*ND*	ND	*ND*
MW110	07/19/12	0.16	**1.9**	0.30	0.00021	0.00018	0.0024	0.014	***0.01679***	0.0735	***0.09029***
MW118	07/20/12	ND	0.38	0.31	ND	ND	ND	ND	*ND*	ND	*ND*
MW122	07/20/12	ND	0.36	0.23	ND	ND	ND	0.00094	*0.00094*	ND	*0.00094*

Notes: BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
GRO = Gasoline Range Organics
ND = not detected above method detection limit
RRO = Residual Range Organics
DRO = Diesel Range Organics
mg/L = milligrams per liter
PAH = Polynuclear Aromatic Hydrocarbons, sum of detected PAH
TAH = Total Aromatic Hydrocarbons, sum of detected BTEX
TAqH = Total Aqueous Hydrocarbons, sum of TAH and PAH concentrations
Bolded results indicate Groundwater Cleanup Level or Water Quality Standards exceedances
*Quality Standards as stated in ADEC 18 AAC 70.020 Water Quality Standards Table

2.2 Building 417 – Former AST 40-A-2

A 500-gallon AST was located adjacent to the north side of the Transmitter Building (Building 417). The tank was installed in 1982 and replaced another tank of the same size. During the Environmental Compliance Investigation in 1992, soil contaminated with petroleum hydrocarbons was reported above evaluation criteria and additional investigation was recommended.

The AST was removed in 1997 and decommissioned. Heavy staining was observed in a 10 square foot area around the tank and on the north and west sides of the building. The total aerial extent of contamination was estimated at approximately 300 square feet, resulting from overfills. During the tank removal soil was excavated to approximately 0.5 feet bgs and surface water was encountered at about 0.75 feet bgs. Native soils were not saturated beneath the contaminated gravel, suggesting that the water encountered was not connected to groundwater beneath the site. Approximately 10 cubic yards of petroleum contaminated soil was removed during the tank decommissioning and transported off site for treatment and disposal (Montgomery & Watson, 1997). Observations at the time of the tank removal indicated approximately 40 yds^3 of impacted soil remained, extending laterally from the west side of the former tank to approximately 16 feet east of the former tank. Field observations indicated that the contamination was limited to the coarse-grained layers of soil and the underlying native soil appeared to be clean.

A release investigation performed in 1997 resulted in the advancement of a number of soil borings and the installation of one well in the former tank location. Boring depths in the impacted area indicated bedrock at approximately 2.5 to 4 feet bgs. An estimated 49 to 104 yds^3 of impacted soil were estimated to remain. Contamination was present in the smear zone near the former AST and overlying the bedrock downgradient of the former AST. Additionally, potential soil contamination was observed in a shallow ditch that runs adjacent and to the north of the former tank. During the release investigation, water in the ditch displayed a discontinuous sheen when the soil was disturbed, however, no samples were collected and contamination was not confirmed. No impacted groundwater was identified in the monitoring well installed at the former tank location.

2.2.1 2012 Remedial Investigation – Building 417

During the 2012 RI, AES advanced a total of 25 UVOST probes, 9 soil borings, and 3 monitoring wells to further characterize the extent of contamination in this area. A total of 14 soil samples were collected. Six soil samples reported DRO concentrations greater than the ADEC Method Two, Over 40 Inch Zone, Migration to Groundwater cleanup level of 230 mg/kg ranging from 3,300 mg/kg to 11,000 mg/kg.

Three monitoring wells, MW107B, MW108, and MW109, were installed in the Building 417 area during the 2012 RI. The borings identified a subsurface stratigraphy of 2 to 2.5 feet of sandy gravel (imported fill) overlying a clayey, gravelly sand (till). Bedrock or refusal was encountered at approximately 6 feet bgs in all wells. The depth to water ranged between 0.2 feet bgs and 1.5 feet bgs. MW107B was installed upgradient of the source zone, MW109 was installed in the source zone, and MW108 was installed downgradient of the source zone. Analytical samples were collected from all wells.

MW109, in the source area, had DRO analytical result of 5.6 mg/L. RRO, GRO, and individual BTEX concentrations were all less than the ADEC 18 AAC 75 Table C Groundwater cleanup levels and the summed BTEX and PAH results did not exceed Water Quality Standards with a TAH concentration of 0.0.00945 mg/L and a TAqH concentration of 0.01335 mg/L.

MW108, down-gradient of the source area, had a DRO analytical result of 2.7 mg/L. RRO, GRO, individual BTEX, and summed TAH concentrations were all less than groundwater cleanup levels and water quality standards, respectively. However, the groundwater sample collected during the 2012 RI had a summed PAH concentration of 0.0503 mg/L and this drove the TAqH concentration above the Water Quality Standard of 0.015 mg/L for a total TAqH concentration of 0.05624 mg/L. Table 3 provides a summary of groundwater analytical sample results and TAH/TAqH calculation results from groundwater samples collected during the 2012 RI.

Table 3 - Groundwater Analytical Results Summary and Water Quality Standard Concentrations*
FAA Coghlan Island - Transmitter Building/Building 417 Area

Monitoring Well	Sample Date	GRO	DRO	RRO	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	*TAH (mg/L)*	PAH (mg/L)	*TAqH (mg/L)*
Cleanup Level (mg/L)		***2.2***	***1.5***	***1.1***	***Water Quality Standards (mg/L)***				***0.01***	---	***0.015***
MW107B	07/11/12	ND	0.29	ND	ND	ND	ND	ND	*ND*	ND	*ND*
MW108	07/11/12	0.04	**2.7**	0.66	0.00019	0.00018	0.00027	0.0053	*0.00594*	0.0503	***0.05624***
MW109	07/11/12	0.25	**5.6**	0.63	0.00045	0.00016	0.00064	0.0082	*0.00945*	0.0039	*0.01335*

Notes: BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
GRO = Gasoline Range Organics
ND = not detected above method detection limit
RRO = Residual Range Organics
DRO = Diesel Range Organics
mg/L = milligrams per liter
PAH = Polynuclear Aromatic Hydrocarbons, sum of detected PAH
TAH = Total Aromatic Hydrocarbons, sum of detected BTEX
TAqH = Total Aqueous Hydrocarbons, sum of TAH and PAH concentrations
Bolded results indicate Groundwater Cleanup Levels and Water Quality Standards exceedances
*Quality Standards as stated in ADEC 18 AAC 70.020 Water Quality Standards Table

2.3 Former Fuel Pipeline

A former 2-inch diameter, 95-foot long fuel pipeline ran between AST 40-A-1 and AST 40-A-2. The pipeline was originally installed in 1982. During the Environmental Compliance Investigation in 1992, soil contaminated with petroleum hydrocarbons was reported above evaluation criteria in soil within the vicinity of the two ASTs and associated piping.

During the AST and pipeline decommissioning project in 1997 approximately 10 yds^3 of petroleum contaminated soil were transported off site for treatment and disposal. An excavation was dug (2 to 3 feet in depth) along the length of the pipeline. Water was encountered at a depth of approximately 1 to 2 feet bgs along the pipeline and at the northeast corner of the contaminated area northeast of the pump house. After the soil removal, soil samples were collected at four of the nine joints and in an area of visible contamination northeast of the pump house. DRO exceeded ADEC cleanup levels at three joints and staining was observed laterally approximately 5 feet on each side of the joints. The remaining soil contamination was estimated at 3 yds^3.

The 1998 release investigation included the advancement of several borings near the former pipeline. The results of soil sampling indicated that impacted soil was limited to the areas beneath

the eastern elbow and beneath the former pipeline approximately 14 feet east of the western elbow. Approximately 13 to 28 yds^3 of impacted soil were estimated to remain in these areas.

2.3.1 2012 Remedial Investigation – Former Fuel Pipeline

Between the UVOST probes advanced for Building 417 and Building 621, 14 of those UVOST probes were advanced to also investigate residual DRO contamination along the former fuel pipeline. UVOST field screening indicated no evidence of petroleum contamination. Two borings, B119 and B103, were advanced at the two elbows of the former pipeline. Analytical results from these borings indicated petroleum concentrations are significantly less than the ADEC soil cleanup levels.

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3.0 Basis for Groundwater Use Determination

In 18 AAC 75.990(46), ADEC defines groundwater as:

- Water in the saturated zone, for purposes of evaluating whether the groundwater is a drinking water source, or

- Water beneath the surface of the soil, for purposes of evaluating whether the water will act as a transport medium for hazardous substance migration.

3.1 Groundwater as a Current or Potential Future Drinking Water Source

Based on site characteristics that meet the criteria as detailed in 18 AAC 75.350, the Coghlan Island FAA Station meets the conditions to determine that groundwater is not a current or potential drinking water source.

Groundwater has historically been found in a shallow unconfined aquifer limited between the ground surface and 2 to 4 feet bgs. A deeper aquifer is suspected to exist in the fractures of the bedrock (USGS, 1995).

In accordance with 18 AAC 75.350, the shallow groundwater at the Coghlan Island FAA Station is not considered to be a current or a reasonably expected potential future drinking water source because the following conditions are met:

1. Shallow, unconfined groundwater is not:
    a. used for a private or public drinking water system,
        i. No drinking water wells have been installed in the FAA Coghlan Island area because:
            1. There are no permanent or long-term residents on the island;
            2. There are no public service facilities provided for visitors; and
            3. Visiting FAA personnel are on-site for short periods of time only. No bathroom facility or septic system is at the FAA facility or on the island.
    b. within the zone of contribution of an active private or public drinking water system,
        i. Fairview, the closest community to the island, is located one mile north of Coghlan Island on the mainland. They are not hydrologically connected; or
    c. within a recharge area for a private or public drinking water well, a wellhead protection area, or a sole source aquifer,
        i. No other groundwater wells are hydrologically connected to the island;

2. Groundwater is not a reasonably expected potential future source of drinking water based on an evaluation of:

    a. Limited availability of the groundwater due to:

        i. The shallow thickness of the aquifer,

            1. During monitoring well installation during the 2012 RI, bedrock was encountered at depths ranging between approximately 4 feet and 7.5 feet with an average monitoring well depth of 5.9 feet. Dense gray till, consistently found at depths beginning at approximately 2 to 4 feet bgs, creates an aquitard beginning at a depth of 3.5 feet bgs. Due to this dense till layer the unconfined aquifer thickness is limited in extent from the ground surface to a depth of 3 to 4 feet. A monitoring well (MW117) whose well screen was completed entirely within the till and sealed from influence from the above saturated soil soils was observed to purge dry during a sampling attempt with no recharge, indicating the till is not transmissive.

            2. This shallow unconfined aquifer relies directly upon precipitation infiltration. During the winter months of December and January when the average temperature is 29° Fahrenheit (Western Regional Climate Center [WRCC], 2012) infiltration and groundwater recharge may be limited or the storativity of the aquifer may be depleted.

    b. Insufficient quality of groundwater sources,

        i. Due to the direct influence of infiltrating precipitation and site surface water, the shallow unconfined aquifer is vulnerable to contaminant migration through the permeable strata and groundwater quality may be insufficient as a drinking water source.

    c. A preferred alternative source of drinking water,

        i. The need for a drinking water source is non-existent as Coghlan Island FAA personnel visits are infrequent and for short durations (day trips). In addition, the close proximity to the Fairview and Juneau communities provides a preferred alternative drinking water source; and

3. The groundwater affected by the hazardous substances identified will not be transported to groundwater that is a source of drinking water or that is a reasonably expected potential future source of drinking water, in concentrations in the receiving groundwater that exceed the groundwater cleanup levels due to the remote location of Coghlan Island,

    a. No existing groundwater wells or community wells on the mainland are hydrologically connected to the aquifers on Coghlan Island.

b. No known attempts to install a drinking water source well in the confined, bedrock aquifer on Coghlan Island have been reported. However, groundwater from the bedrock or confined aquifers in the surrounding areas, have produced brackish water or inadequate quantities for consumption:

   i. Brackish water was encountered in the confined aquifer of the Mendenhall Valley at a depth of approximately 350 feet bgs. Groundwater from the confined bedrock aquifer is not used for drinking water.

   ii. Groundwater from the bedrock aquifers in Mendenhall Peninsula and Point Lena were encountered at depths of approximately 200 feet bgs or greater. Water yields ranged from 0.2 liters per second (L/s) to 1.3 L/s. Saltwater intrusion and total dissolved solids concentrations and high mineral contents may prevent the groundwater from meeting drinking water regulations.

3.2 Groundwater as a Potential Transport Media for Contaminants

Based on model calculations and visual inspections, shallow groundwater at the Coghlan Island FAA Station does not act as a transport mechanism for hazardous substances to surface waters at concentrations exceeding ADEC 18 AAC 70 Water Quality Standards.
In accordance with 18 AAC 75.345 and 18 AAC 70, groundwater at Coghlan Island that is closely connected hydrologically to nearby surface water will not cause a violation of the Water Quality Standards in 18 AAC 70 for surface water or sediment because:

- In four down-gradient wells; MW01, MW02, MW122, and MW04, calculated TAH concentrations have been either non-detect or less than ADEC Water Quality Standards.

- In three of the four down-gradient wells; MW02, MW122, and MW04, calculated TAqH concentrations have been either non-detect or less than ADEC Water Quality Standards. One down-gradient well, MW01, reported TAqH results exceeding the ADEC Water Quality Standards.

    - To evaluate potential contaminant migration, BIOSCREEN was used to analyze site transport distances and contaminant degradation and attenuation rates.

    - Natural attenuation and degradation rates of compounds present in all source areas exceed areal distances from contaminant source locations to surface water boundaries.

        - BIOSCREEN simulations are further discussed below.

- Surface waters are and will continue to be free from floating oils, film, sheen, or discoloration.

    - No sheen was noted in purged water from monitoring wells sampled during the 2012 RI. However, strong hydrocarbon odor was observed in purge water from MW108, MW109, and MW110. If light non-aqueous phase liquid (LNAPL) is

present at the Coghlan Island FAA Station it is considered immobile and will not migrate to surface waters creating floating oil, film, sheen, or discoloration.

- Visible oils, films, sheen, or discoloration indicate the presence of LNAPL in water. LNAPL migrates through saturated subsurface zones by displacing existing water. The thickness of continuous LNAPL detected in groundwater at the Coghlan Island FAA Station does not meet the pressure threshold needed to displace water. Therefore, LNAPL is considered immobile and will not migrate to surface waters.

- ADEC's Technical Background Document *Maximum Allowable Concentration, Residual Saturation, and Free-Product Mobility* (Geosphere Inc. and CH2MHill, 2006) provides a thorough discussion of LNAPL characteristics.

    - ❖ A discussion of LNAPL characteristics and the Coghlan Island FAA Station is further discussed in this decision document in Section 3.2.2, "Free-Product Mobility".

3.2.1 BIOSCREEN

BIOSCREEN is a model distributed by the United States Environment al Protection Agency (EPA) that may be used to assess dissolved phase transport and plume areal extent through time and to estimate natural attenuation rates.

BIOSCREEN modeling parameters include hydrogeology, dispersion, adsorption, biodegradation, simulation area and time, and source data. Tables 4 and 5 provide a list of model input parameters, the value used in each simulation, and the source of the value used.

The estimated shortest distances from a source area, approximately 500 feet from the Building 621 source area, to surface water were input into BIOSCREEN. Distances from source areas to surface water were measured using visual high-tide indicators, such as vegetation lines.

3.2.1.1 Total Aromatic Hydrocarbons

TAH, the sum of individual BTEX concentrations, was calculated from analytical samples collected at each monitoring well from the 2012 RI sampling event as shown in Tables 2 and 3. TAH concentrations ranged from non-detect in four of the six wells to a maximum TAH concentration of 0.01679 mg/L at MW-110. MW-110 is located in the source zone of the Building 621/Former Pump House area. Figure 3 provides well locations, the estimated source zone area, groundwater contour and associated flow direction, TAH calculation results, and distance to downgradient high-tide marks.

A snapshot of the BIOSCREEN TAH input screen is shown as Model 1. Model 2 provides the output screen and modeled biodegradation concentrations downgradient of the source along with observed field concentrations from the 2012 RI groundwater sampling.

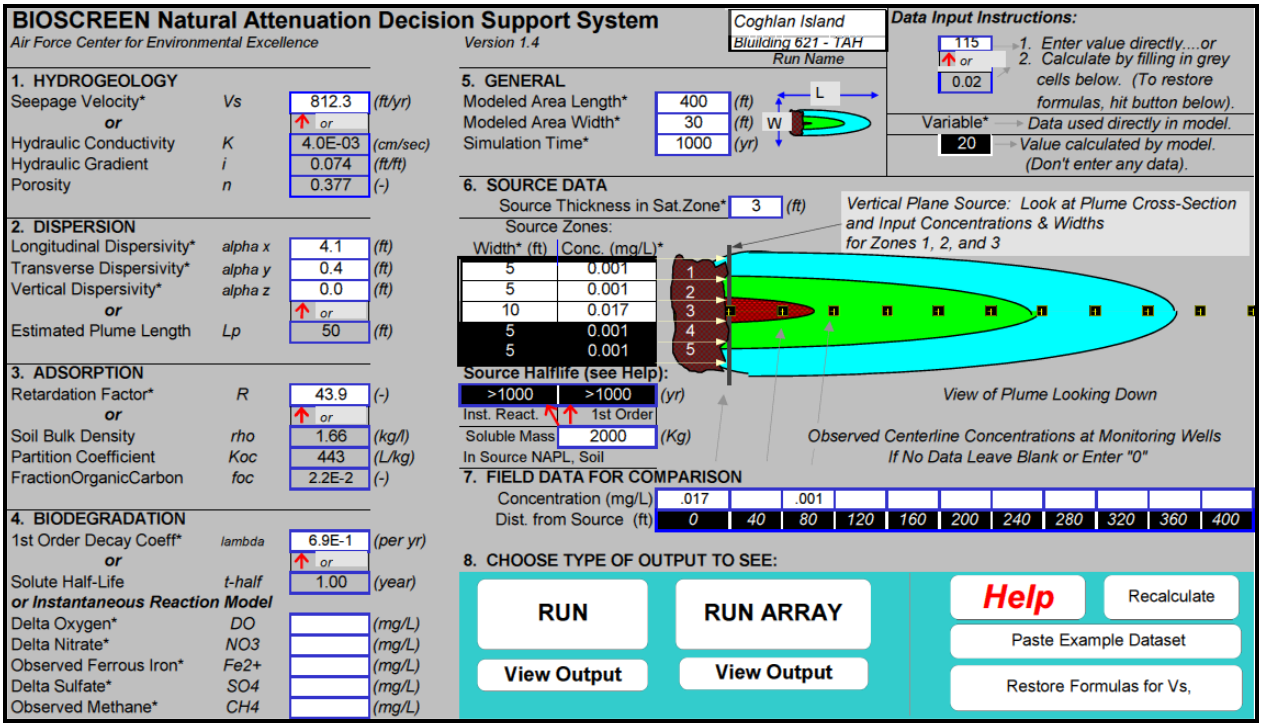
The source zone width at the Building 621/Former Pump House area is approximately 30 feet wide. The distance to the high-tide mark downgradient from the estimated edge of the source zone is approximately 500 feet. A conservative estimate of 400 feet is used in the BIOSCREEN model.

In section 6, Source Data, of the BIOSCREEN model input screen, the Source Width is the total source zone width partitioned into three concentration zones. The BIOSCREEN model uses a maximum concentration center width with outlying concentric widths for the resulting modeled plume flowing outside of the source zone. For this simulation, approximately 50% of source width is considered concentrated in the center and the two outer concentric plume borders each represent 25% of the source width. For example, a source area with a total width of 30 feet will have a center width of 10 feet. The next concentric ellipse will have 5 feet on each side of the 10-foot center, and the outer ellipse will also have 5 feet on each side for a total source zone width of 30 feet.

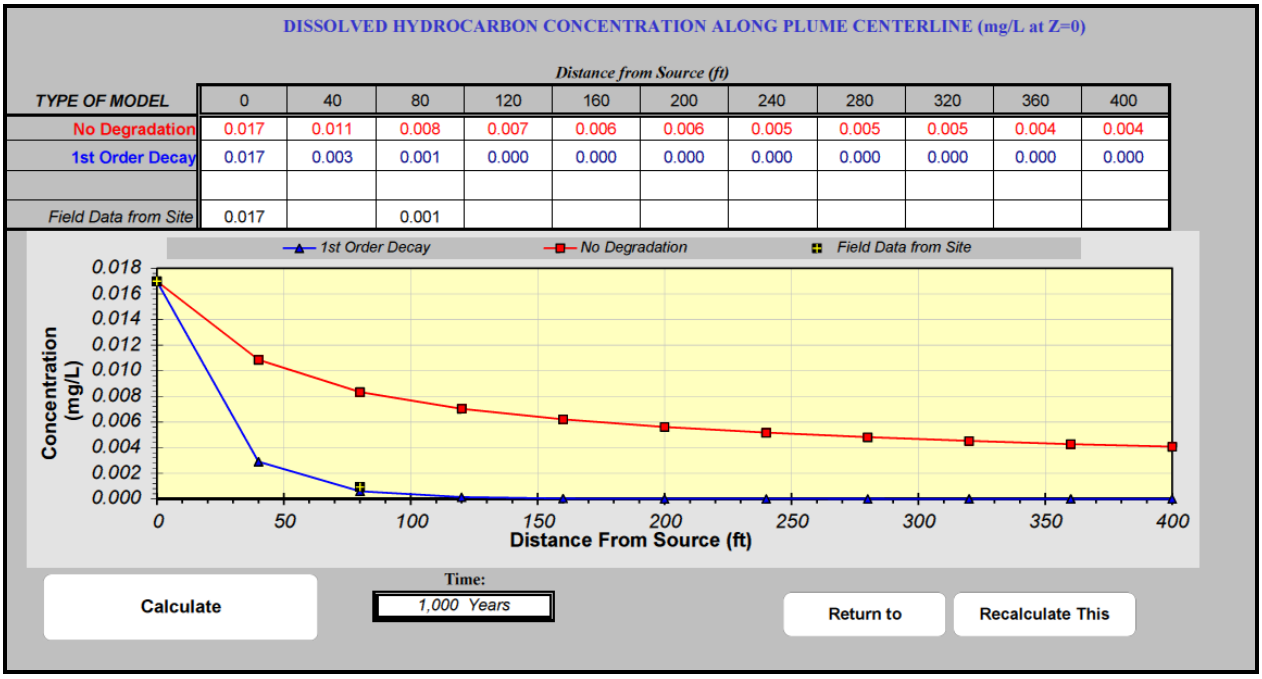
For the purpose of this decision document, the maximum TAH concentration of 0.017 mg/L was entered for the majority of the total source zone width and an estimated concentration of 0.01 mg/L was used for the outer limits of the source zone. Entering the maximum concentration for the majority of the source width is meant to represent an extreme condition simulation.

Table 4 – BIOSCREEN – Building 621 TAH Simulation Values and References Natural Attenuation Decision Support System		
1. HYDROGEOLOGY		
BIOSCREEN Parameter	**Model Input**	**Reference**
Seepage Velocity (ft/yr)	812.3	Calculated by BIOSCREEN using site-specific **Hydraulic Conductivity**, **Hydraulic Gradient**, and **Porosity** inputs
Hydraulic Conductivity (cm/sec)	0.004	Calculated using Alyamani & Sen Equation (Odong, 2007)
Hydraulic Gradient (ft/ft)	0.074	Calculated from field data collected during 2012 RI
Porosity (unitless)	0.377	Calculated using ADEC-approved Hydrocarbon Risk Calculator (HRC)
2. DISPERSION		
BIOSCREEN Parameter	**Model Input**	**Reference**
Longitudinal Dispersivity (ft)	4.1	Calculated by BIOSCREEN using site-specific **Estimated Plume Length** inputs
Transverse Dispersivity (ft)	0.4	Calculated by BIOSCREEN using site-specific **Estimated Plume Length** inputs
Vertical Dispersivity (ft)	0.0	Calculated by BIOSCREEN using site-specific **Estimated Plume Length** inputs
Estimated Plume Length (ft)	50	Estimated length of dissolved phase plume
3. ADSORPTION		
BIOSCREEN Parameter	**Model Input**	**Reference**
Retardation Factor (unitless)	43.9	Calculated by BIOSCREEN using site-specific **Soil Bulk Density**, **Partition Coefficient**, and **Fraction Organic Carbon** inputs
Soil Bulk Density (kg/l)	1.66	Field data results from physical properties analysis
Organic Carbon Partition Coefficient (L/kg)	443	Default value from HRC, based on TAH risk-driving BTEX analyte = Total Xylenes.
Fraction Organic Carbon (unitless)	0.022	Calculated in HRC from TOC results
4. BIODEGRADATION		
BIOSCREEN Parameter	**Model Input**	**Reference**
1st Order Decay Coefficient (yr)	0.69	Calculated by BIOSCREEN using analyte-specific Solute Half-Life input
Solute Half-Life (yr)	1	Rounded up from the literature value of the most stable TAH solute, Benzene, from 0.66 years (RSP/DET, 1994)
5. GENERAL		
BIOSCREEN Parameter	**Model Input**	**Reference**
Modeled Area Length (ft)	400	Over-estimated shortest distance from edge of source zone to vegetation line
Modeled Area Width (ft)	30	Estimated source zone width
Simulation Time (yr)	1000	Intended to represent steady state conditions
6. SOURCE DATA		
BIOSCREEN Parameter	**Model Input**	**Reference**
Source Thickness in Saturated Zone (ft)	3	Estimated source thickness in water column
Source Zones: Width (ft)	5/5/10	Measured estimate with 10-foot center and 2 concentric ellipses at 5-foot intervals extending out, total source zone width of 30 feet
Source Zones: Conc. (mg/L)	.01/.01/.017	Highest detected TAH concentration at monitoring well with additional estimated conservative concentrations
Source Half-life (yr)	>1000/>1000	Default value provided by BIOSCREEN, as stated in the BIOSCREEN User's Manual the Source Half-life is not related to the biodegradation half-life. A value of >1000 assumes source contaminant mass does not degrade.
Soluble Mass (kg)	2000	Default value provided by BIOSCREEN
7. FIELD DATA FOR COMPARISON		
BIOSCREEN Parameter	**Model Input**	**Reference**
Concentration (mg/L)	0.017/0.00094	Data collected from MW110, at source, and MW122, approximately 80 feet downgradient of source zone. Further downgradient MW04 analytical results were non-detect, no field data entered for this well.

Model 1 – BIOSCREEN TAH Input Screen



Model 2 – BIOSCREEN TAH Output Screen



3.2.1.2 BIOSCREEN TAH Results

BIOSCREEN calculates concentrations for both No Degradation and 1st Order Decay scenarios. Using the most conservative literature and site-specific values for the TAH compounds, BIOSCREEN indicates that TAH Water Quality Standard, 0.01 mg/L, will be met within 25 feet from the source using the 1st Order Decay Model and within 50 feet assuming No Degradation of contaminants. Because the petroleum contaminants found at the Coghlan Island FAA Station are known to decay, such as the BTEX components, the 1st Order Decay simulation, represented by the line with triangles, is considered the appropriate simulation. The input values are worst-case scenario values and are meant to demonstrate that Water Quality Standards will be met at surface water interfaces on Coghlan Island.

3.2.1.3 Total Aqueous Hydrocarbons

TAqH concentrations, the sum of PAH and BTEX concentrations, was summed from analytical samples collected at each monitoring well from the Building 621/Former Pump House area during the 2012 RI sampling event as shown in Table 2. TAqH compound concentrations ranged from non-detect in several wells to 0.0903 mg/L at MW-110. The TAH concentration at MW-110 was 0.017 mg/L. The sum of the PAH compounds was 0.0735 mg/L with the analytes 1-Methylnaphthalene, 2-Methylnaphthalene, and Naphthalene comprising the majority of the total concentration.

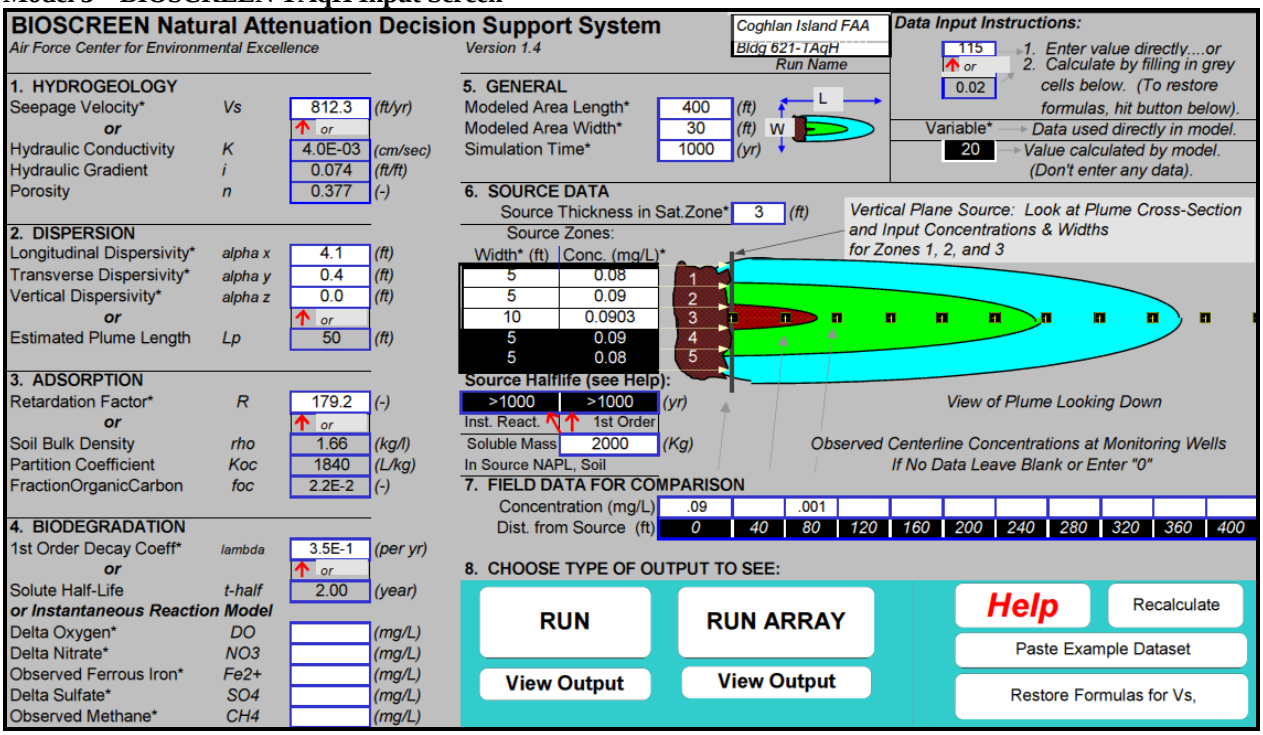
As with the TAH BIOSCREEN model, MW-110 is located in the source zone of the Former Pump House area with a 30-foot wide source zone. The edge of the source zone is approximately 500 feet from the visual high-tide debris line as shown on Figure 3. Figure 3 provides well locations, source zone area, groundwater contour and flow direction, TAqH analytical results, and distance to downgradient high-tide marks of the modeled area of concern (AOC).

A snapshot of the BIOSCREEN TAqH input screen is shown as Model 3. Model 4 provides the output screen, analytical sample results from the 2012 RI, and modeled biodegradation concentrations downgradient of the source.

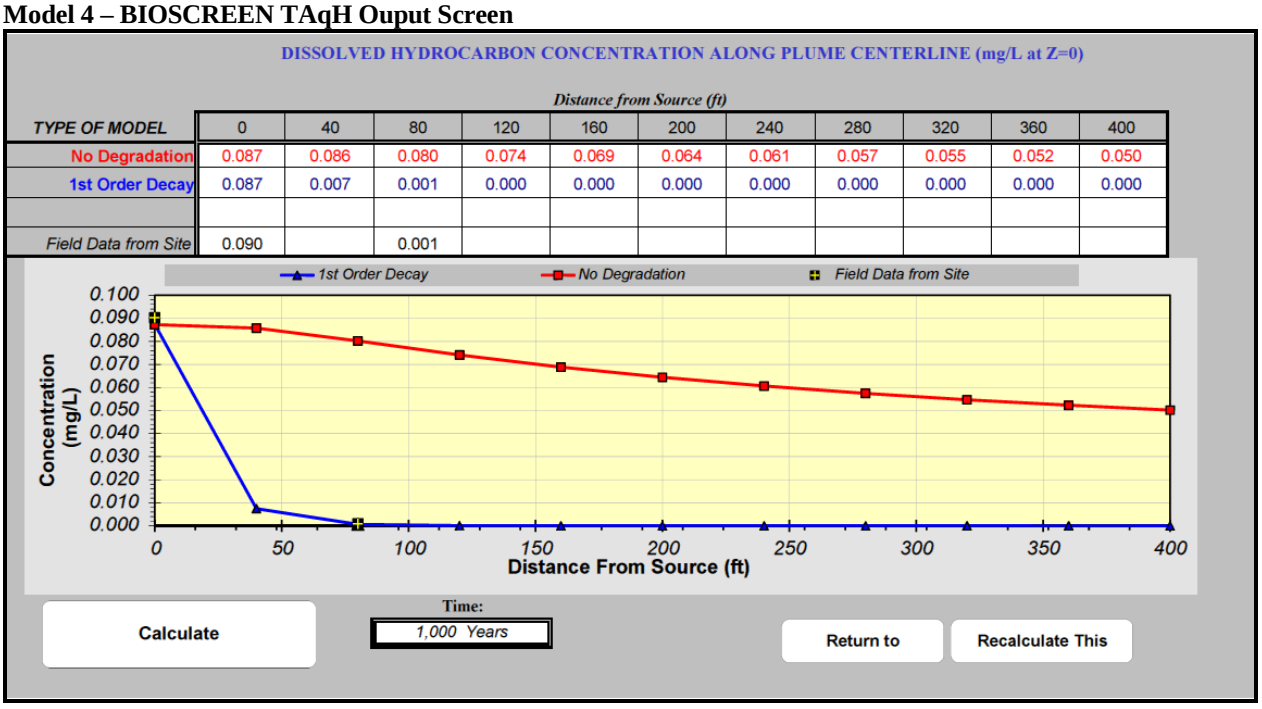
For the purpose of this decision document, the maximum TAqH concentration of 0.0903 mg/L was entered for the majority of the total source zone width and an estimated concentration of 0.08 mg/L was used for the outer limits of the source zone. Entering the maximum concentration for the majority of the source width is meant to represent an extreme condition simulation.

Table 5 – BIOSCREEN – Building 621 TAqH Simulation Values and References Natural Attenuation Decision Support System		
1. HYDROGEOLOGY		
BIOSCREEN Parameter	**Model Input**	**Reference**
Seepage Velocity (ft/yr)	812.3	Calculated by BIOSCREEN using site-specific **Hydraulic Conductivity**, **Hydraulic Gradient**, and **Porosity** inputs
Hydraulic Conductivity (cm/sec)	0.004	Calculated using Alyamani & Sen Equation (Odong, 2007)
Hydraulic Gradient (ft/ft)	0.074	Calculated from field data collected during 2012 RI
Porosity (unitless)	0.377	Calculated using ADEC-approved Hydrocarbon Risk Calculator (HRC)
2. DISPERSION		
BIOSCREEN Parameter	**Model Input**	**Reference**
Longitudinal Dispersivity (ft)	4.1	Calculated by BIOSCREEN using site-specific **Estimated Plume Length** inputs
Transverse Dispersivity (ft)	0.4	Calculated by BIOSCREEN using site-specific **Estimated Plume Length** inputs
Vertical Dispersivity (ft)	0.0	Calculated by BIOSCREEN using site-specific **Estimated Plume Length** inputs
Estimated Plume Length (ft) (outside of source area)	50	Estimated length of downgradient dissolved phase plume to nearest surface water source, measured from edge of source zone to vegetation line
3. ADSORPTION		
BIOSCREEN Parameter	**Model Input**	**Reference**
Retardation Factor (unitless)	179.2	Calculated by BIOSCREEN using site-specific **Soil Bulk Density**, **Partition Coefficient**, and **Fraction Organic Carbon** inputs
Soil Bulk Density (kg/l)	1.66	Physical Property result from sample collected during 2012 RI
Partition Coefficient (L/kg)	1,840	Default value from HRC, based on risk-driving PAH analyte with the highest solubility, 2-Methylnaphthalene.
Fraction Organic Carbon (unitless)	0.022	Calculated from TOC results
4. BIODEGRADATION		
1st Order Decay Coefficient (yr)	0.35	Calculated by BIOSCREEN using analyte-specific **Solute Half-Life** input
Solute Half-Life (yr)	2	Rounded up from the literature average value of PAH half-lives from 570 days/1.56 years (OEHHA, 2000)
5. GENERAL		
BIOSCREEN Parameter	**Model Input**	**Reference**
Modeled Area Length (ft)	400	Measured distance from edge of source zone to vegetation line
Modeled Area Width (ft)	30	Estimated source zone width
Simulation Time (yr)	1000	Intended to represent steady state conditions
6. SOURCE DATA		
BIOSCREEN Parameter	**Model Input**	**Reference**
Source Thickness in Saturated Zone (ft)	3	Overestimated source thickness in water column
Source Zones: Width (ft)	5/5/10	Measured estimate with 10-foot center and 2 concentric ellipses at 5-foot intervals extending out, total source zone width of 30 feet
Source Zones: Conc. (mg/L)	.08/.09/.0903	Highest detected TAH concentration at monitoring well with additional estimated conservative concentrations
Source Half-life (yr)	>1000/>1000	Default value provided by BIOSCREEN, as stated in the BIOSCREEN User's Manual the Source Half-life is <u>not</u> related to the biodegradation half-life. A value of >1000 assumes source contaminant mass does not degrade.
Soluble Mass (kg)	2000	Default value provided by BIOSCREEN
7. FIELD DATA FOR COMPARISON		
BIOSCREEN Parameter	**Model Input**	**Reference**
Concentration (mg/L)	0.09/0.001	Data collected from MW110 and MW122. MW04 analytical results were non-detect, no field data entered in BIOSCREEN

Model 3 – BIOSCREEN TAqH Input Screen



Model 4 – BIOSCREEN TAqH Ouput Screen



3.2.1.4 BIOSCREEN TAqH Results

Using the most conservative literature and site-specific values for the TAqH compounds, BIOSCREEN indicates that the TAqH Water Quality Standard, 0.015 mg/L, will be met within 40 feet from the source. The input values are worst-case scenario values and are meant to demonstrate that Water Quality Standards will be met at the surface water interface on Coghlan Island.

3.2.2 Free-Product Mobility

ADEC Spill Prevention and Response guidance document, *Maximum Allowable Concentration, Residual Saturation, and Free-Product Mobility* (Geosphere Inc. and CH2MHill, 2006), addresses NAPL and groundwater interactions. This guidance document states that "*for continuous oil to be mobile, the oil thickness, measured in monitoring wells near the downgradient edge of the free-product footprint area, must be great enough to overcome the water-displacement pressure (or pore-entry pressure) of the uncontaminated soils adjacent to the soil containing continuous free product*".

In Section 10 of the guidance document, oil thicknesses are calculated using Charbeneau's equation. The parameters for this equation are meant to be measured on a site-specific basis, however the complexity of measuring these parameters, i.e. interfacial tensions and the air-water bubbling pressure of a specific medium, often prevents site-specific calculations. Table 6, shown below, provides an example of observed oil thicknesses required to facilitate free-product mobility.

Table 6 (Geosphere Inc. and CH2MHill, 2006)

Example NAPL Thickness Necessary to Overcome Water Displacement Pressure for Selected Soil Textures (From Charbeneau et.al., 1999)

		NAPL Specific Gravity	
		0.775	0.85
Soil Texture	Air-Water Bubbling Pressure or Pore Entry Pressure (feet of water)	Monitoring Well LNAPL Thicknesses to Overcome Water Displacement Pressures (feet of oil)	
Sand	0.23	0.7	1.0
Loamy Sand	0.27	0.8	1.3
Sandy Loam	0.43	1.4	2.1
Loam	0.92	2.8	3.6
Sandy Clay Loam	0.56	2.3	3.0
Silt Loam	1.64	4.1	5.2
Silt	2.03	4.8	5.9
Clay Loam	1.74	4.4	5.7
Sandy Clay	1.21	3.9	4.9
Silty Clay Loam	3.28	6.1	8.2
Clay	4.10	6.6	9.5
Silty Clay	6.56	8.7	13.8

Table From Charbeneau et. al. (1999)
All Soil Textures Based on USDA/ Soil Conservation Service Soil Classifications
Soil Property Data from Carsel and Parish (1988)

For the purposes of this decision document, the soil texture with the least pore entry pressure, sand, is used to demonstrate the immobility of free-product at the Coghlan Island FAA Station. The shallow unconfined aquifer on Coghlan Island is composed of silty sand with gravel. Therefore, using uniform sand strata as the soil texture of the Coghlan Island FAA Station will be the most conservative representation of the site. Because DRO is the main source of contamination, this decision document will refer to the LNAPL thicknesses with the greater specific gravity that are shown in the guidance document. Table 6 demonstrates that one foot of LNAPL would be required to displace water in a sole sand stratum.

The observed composition of the subsurface strata at the Coghlan Island FAA Station is more complicated in that silts and gravels are present and compaction, infiltration, and vegetation varies throughout the island. In addition, no product was observed in the wells during sampling activities. Therefore, any LNAPL present at the site is considered immobile and will not migrate to surface waters creating floating oil, film, sheen, or discoloration.

No floating oil, film, sheen, or discoloration along the shoreline has been observed or documented.

4.0 Final Recommendation

The shallow groundwater at the Coghlan Island FAA Station meets the conditions detailed in 18 AAC 75.350 to determine that groundwater is not a current or reasonably expected potential future drinking water source or a prospective transport mechanism for hazardous substances.

- The unconfined aquifer at the FAA Station on Coghlan Island is found in the silty gravelly sand strata above a dense till layer that restricts the vertical movement of groundwater to a suspected deeper confined bedrock aquifer.
- Bedrock aquifers in the surrounding areas have produced brackish water that may exceed drinking water regulations.
- The unconfined aquifer thickness extends from ground surface to approximately 3 feet bgs limiting aquifer storativity and may impact groundwater yields.
    a) This shallow aquifer is solely dependent upon precipitation for recharge and may not be reliable as a drinking water source.
    b) The shallow unconfined aquifer is vulnerable to contaminants as site surface water may directly impact water quality.
- The closest preferred alternative drinking sources are found approximately 3 miles north on the mainland.
- Natural attenuation and biodegradation rates exceed the linear extent to major surface waters, Auke Bay.
    a) Analytical groundwater results from downgradient wells have been undetected indicating contaminant migration has not exceeded the FAA site property limits.
    b) No sheen or oil products have been observed on the Coghlan Island shoreline.

Because the shallow groundwater at Coghlan Island is not a current source of drinking water and is not reasonably expected to be a potential future source of drinking water, the groundwater cleanup levels provided in Table C of 18 AAC 75.345 should not apply to this site.

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5.0 References

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Western Regional Climate Center (WRCC), Juneau AP, Alaska. *NCDC 1981-2010 Monthly Normals* <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak4100>, 2012.

Debenham, Melody (DEC)

To: Vreeman, Fred L (DEC)
Subject: RE: Coghlan Island - need email back confirming parks is OK with GW determination

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From: Eberhardt, Michael W (DNR)
Sent: Tuesday, December 23, 2014 4:17 PM
To: Vreeman, Fred L (DEC)
Subject: RE: Coghlan Island - need email back confirming parks is OK with GW determination

Fred,
The land surrounding the site is within the Channel Island State Marine Park and is not planned for any other development other than dispersed public recreation which would never require any ground water usage. The most intensive use that may occur in the vicinity (within ½ mile) would be a Public use Cabin (PUC) and even that would only be a surface water gathering situation. We do not provide water at our remote locations (PUC or otherwise) and I cannot ever see us doing so.
Given the existing environmental conditions and existing and planned public use conditions I have no concerns that any minimal groundwater contamination that may exist would ever impact public use of the area and that you are making the correct determination.

Thanks

Mike Eberhardt

Park Superintendent Southeast Area
400 Willoughby Ave., 5th floor
POB 111071 Juneau Ak. 99811
Ph# (907) 465-2481

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From: Vreeman, Fred L (DEC)
Sent: Tuesday, December 23, 2014 3:33 PM
To: Eberhardt, Michael W (DNR)
Subject: Coghlan Island - need email back confirming parks is OK with GW determination

Hi Mike,

I'm getting ready to make this groundwater determination on this site out at Coghlan Island and wanted to check one more time to make sure you're OK with it. We talked and met on it but I don't have an email on record saying you're OK with it.

I'm pretty sure you couldn't use any of the groundwater here anyway, but just in case you were planning to drill a well I thought I'd ask one more time to be sure.

Basically this determination just says nobody uses the groundwater and it is really not sufficient as a drinking water source. It allows them to leave some contamination in place to biodegrade over time without digging up the whole area.

Fred Vreeman
Environmental Program Manager
Alaska Dept of Environmental Conservation
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Fairbanks, AK 99709
907-451-2181