
Final Report

Site Characterization Report State Street Mystery Site

Prepared for
**Alaska Department of Environmental
Conservation**

September 2003

Prepared by



CH2MHILL

301 West Northern Lights Blvd.
Suite 601
Anchorage, Alaska 99503

Contents

Section	Page
Abbreviations.....	v
1 Introduction.....	1-1
1.1 Overview	1-1
1.2 Background	1-1
2 Preliminary Cleanup Goals.....	2-1
3 Site Characterization Results and Discussion.....	3-1
3.1 Delineation of Source Area and Extent of Contamination	3-1
3.2 Product Recovery Test.....	3-9
3.3 Discussion.....	3-9
4 Groundwater Modeling	4-1
4.1 Hydrogeologic Setting	4-1
4.2 Hydraulic Groundwater Flow Model.....	4-1
4.2.1 Model Code Description.....	4-2
4.2.2 Model Grid	4-2
4.2.3 Model Layering.....	4-2
4.2.4 Boundary Conditions.....	4-2
4.2.5 Model Calibration.....	4-6
4.2.6 Model Simulation Results	4-7
4.3 Contaminant Transport Model.....	4-15
5 Conclusions and Recommendations.....	5-1
5.1 Conclusions	5-1
5.1.1 Site Characterization Conclusions	5-1
5.1.2 Free Product Recovery Conclusions	5-1
5.1.3 Modeling Conclusions.....	5-2
5.2 Recommendations.....	5-2
6 References.....	6-1
Appendix	
A	Well Purge and Sampling Field Sheets
B	Laboratory Reports and Data Quality Review Memoranda
C	Data from Groundwater Level Data Loggers
D	BIOSCREEN Model Results

Table

2-1 Alaska Department of Environmental Conservation Cleanup Goals for Selected Petroleum Hydrocarbons.....2-1

3-1 Survey TOC Elevations for Existing Monitoring Wells 3-2

4-1 Assumed Layer Thickness and Lithology in Skagway Groundwater Model..... 4-5

4-2 Simulated versus Measured Groundwater Elevations near State Street Site 4-7

4-3 City Production Well Construction and Pumping Information 4-15

4-4 Groundwater Geochemistry at Upgradient and Source Area Wells 4-16

4-5 BTEX Concentrations in Downgradient Monitoring Wells and Probes 4-16

Figure

1-1 Site Location Map 1-3

1-2 Investigation Area and Observations of Free Project or Sheen..... 1-5

3-1 Field Parameters 3-3

3-2 Analytical Soil Results 3-5

3-3 Analytical Groundwater Results 3-7

4-1 Groundwater Model Grid 4-3

4-2 Well Locations, Source Area, and Simulated Groundwater Elevations
 Source Area 4-9

4-3 Groundwater Pathlines for Upper 5 Feet of Source Area 4-11

4-4 Groundwater Pathlines for Lower 5 Feet of Source Area 4-13

Abbreviations

AAC	<i>Alaska Administrative Code</i>
ADEC	Alaska Department of Environmental Conservation
BLEVE	boiling liquid/expanding vapor explosion
BTEX	benzene, toluene, ethylbenzene, and xylenes
CFR	<i>Code of Federal Regulations</i>
DRO	diesel-range organic
EPA	U.S. Environmental Protection Agency
°C	degrees Celsius
°F	degrees Fahrenheit
gpm	gallons per minute
GRO	gasoline-range organic
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
PID	photoionization detector
ppm	parts per million
QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
SAP	Sampling and Analysis Plan
TOC	top of casing

Introduction

1.1 Overview

The purpose of this Site Characterization Report is to present the results for soil and groundwater samples that were collected during fieldwork performed from February 26 through March 2, 2003, and provide an evaluation of the potential sources and extent of contamination at the State Street Mystery Site in Skagway, AK. Results of two rounds of groundwater monitoring conducted April and June 2003 and a free product recovery test are also discussed in this report. Based on the site characterization findings, recommendations are provided for future site activities. CH2M HILL is preparing this report for the Alaska Department of Environmental Conservation (ADEC) under Contract No. 18-7000-15.

The site is located near the corner of 20th Avenue and State Street in Skagway, Alaska. The site location is shown in Figure 1-1.

1.2 Background

On November 17, 1998, Sullivan Construction was digging a foundation on a lot owned by Ms. Mary Lou Moe at the northern corner of 20th Avenue and State Street. An excavation area of approximately 40 feet by 75 feet was completed to a depth of five feet with no evidence of contamination. While trying to remove an area of spongy soil in the southeastern corner of the lot, Sullivan Construction intercepted groundwater with free-phase diesel product at seven feet below ground surface (bgs). Sullivan Construction was able to recover approximately 100 gallons of the fuel product (ADEC, 2002a).

Smith Bayliss LeResche, Inc. (SBL), conducted a site investigation for Ms. Moe on December 3, 1998. SBL excavated six test pits around the property (numbered Test Pit 1 through Test Pit 6), sampled soil from five Geoprobe locations (numbered TB-1 through TB-5), and field screened soil samples obtained from the foundation excavation (numbered FS-1 through FS -8). The sampling locations are shown in Figure 1-2. Test Pit 1 contained about three inches of free product at the water table at a depth of 5.4 feet. The excavation crew struck a water line while excavating Test Pit 2 in 20th Avenue. Although there was no free product in this test pit, the presence of contaminated soil along the water line and heavy rainbow sheen on water in that test pit suggested the diesel might be following the utility lines (SBL, 2000). This investigation did not locate the source of the fuel.

The City of Skagway contracted SBL to conduct further Geoprobe investigation near utility lines upgradient of the Moe property. On December 8th and 9th, 1998, nine more Geoprobe borings were made around the water line in State Street and where other lines branch off under 20th and 21st Avenues (GP-1 through GP-9). This investigation was also unable to locate the source of the fuel (SBL, 2000).

In July 1999, SBL began excavating soils under an ADEC-approved Corrective Action Plan, but stopped excavating when free-phase hydrocarbon was noticed flowing into the excavation from the southeast corner of the lot adjoining State Street.

In October 1999, SBL was contracted by the Alaska Department of Transportation and Public Facilities (ADOT&PF) to look for the source and extent of product observed that July. Eight test pits (numbered TP-1 through TP-8) were excavated and four Geoprobe borings (B-1 through B-4) were completed around TP-6 as part of this investigation.

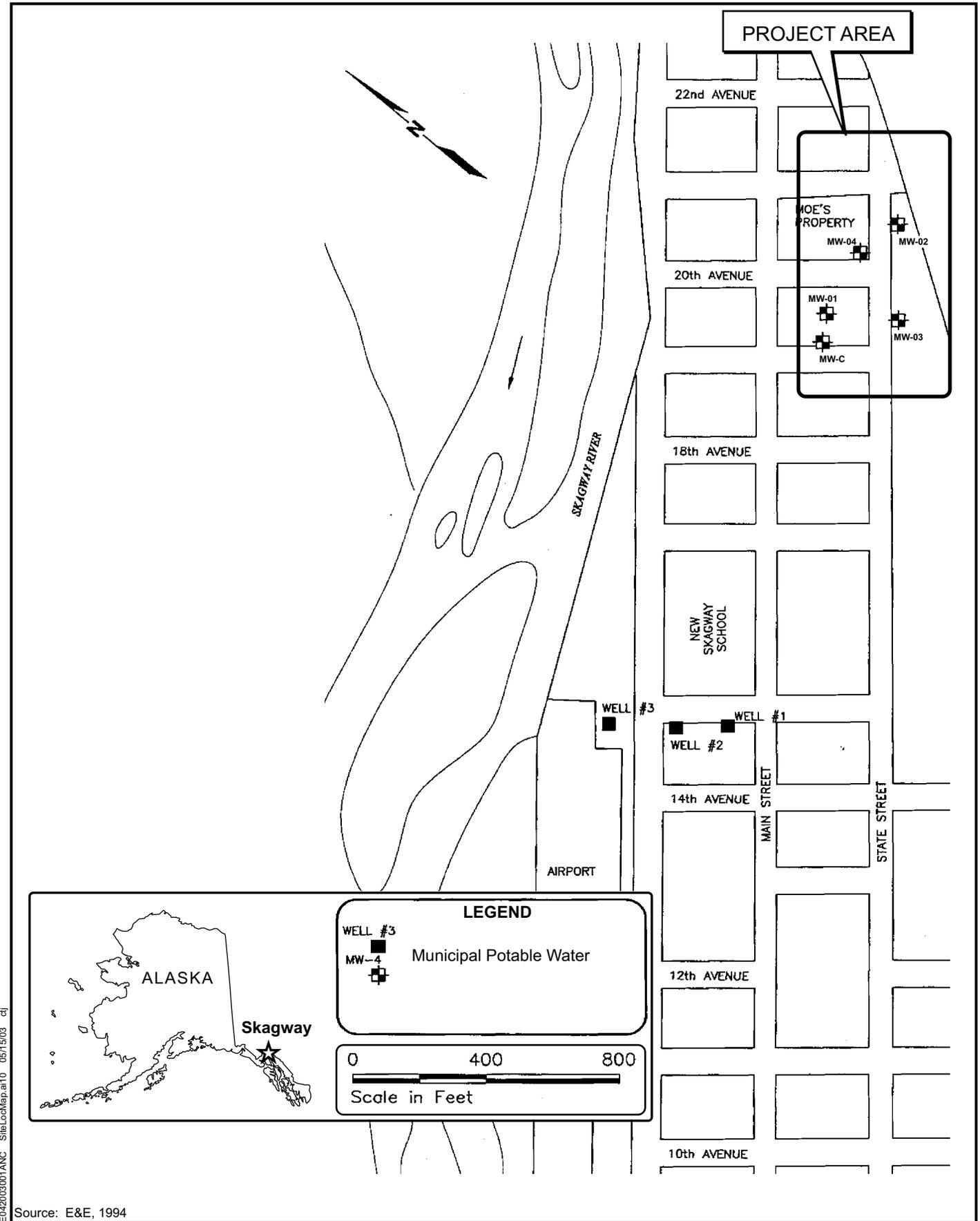
Free product was not present in either TP-1 or TP-2, but sheen was observed in TP-1. Contaminated soil was encountered in TP-3, at a depth of 3.5 feet, just beneath the storm drain culvert piping. No signs of diesel or diesel-contaminated soil were observed within TP-4, located at the northwest corner of 22nd Avenue and State Street. TP-5 was located in the State Street right-of-way in front of the White Pass and Yukon Route railroad yard, north of the 22nd Avenue intersection. Soil samples from TP-5 had a hydrocarbon/solvent odor and a photo-ionization detector (PID) reading of 32 parts per million (ppm); however, no sheen was observed and a soil sample collected from just above the water table was analyzed for diesel-range organics (DRO) by AK102 and was found to have concentrations below the ADEC method one cleanup level. Diesel contaminated soil was encountered at 2.5 feet bgs in TP-6, continuing to the water table at seven feet bgs, where free product was observed. Contamination was not noted at TP-7 and TP-8, located northeast of TP-6. Results of this investigation indicated that diesel fuel entered ADOT&PF property at State Street, north of 21st Avenue from the White Pass and Yukon Route railroad property (SBL, 2000).

The White Pass Railroad and Yukon Railroad contracted Golder Associates to conduct a site characterization at the Coach Cleaning Shop (east of the Moe property). Approximately 150 cubic yards of contaminated soil was removed from the site. However, the extent of contamination was limited and did not appear to be the source of the free-phase hydrocarbon observed at the Moe property (Hart Crowser, 2002).

On September 7, 2001, SBL was contracted once again by Ms. Moe to excavate two additional test pits (Test Pits 7 and 8). One soil sample was collected from each test pit at 7 feet bgs, which was about 6 inches above the groundwater table elevation at the time of sampling. DRO was not detected at Test Pit 7, but the Test Pit 8 soil sample contained DRO at 11,000 mg/kg. The soil appeared to be uncontaminated from the ground surface down to 4 feet bgs (SBL, 2001).

Four monitoring wells (MW-01 through MW-04) were installed in February 2002 by Hart Crowser for the ADEC. MW-01 was installed within the southeast corner of the foundation excavation attempted by Sullivan Construction. MW-02 was installed in an area upgradient of the site, and MW-03 and MW-04 were installed at locations downgradient of the site (Hart Crowser, 2002). Figure 3-1 illustrates the locations of these monitoring wells. MW-C was installed in 1994 by Ecology & Environment; however, it was not located during Hart Crowser's February 2002 investigation and may have been destroyed. Of the four monitoring wells installed, only MW-01 exhibited a measurable product thickness (0.06 feet). Analytical results for MW-02, MW-03, and MW-04 did not reveal the presence of hydrocarbons in groundwater.

All the studies to date have been inconclusive in determining an onsite source for the original diesel fuel discovered at the Moe property in November of 1998.



EQ42003001ANC SiteLocMap.a110 05/15/03 cjl

Source: E&E, 1994



Figure 1-1
 Site Location Map
 State Street Mystery Site
 Skagway, Alaska

ED42003001ANC Investigation_Area.a110_051503.ctb

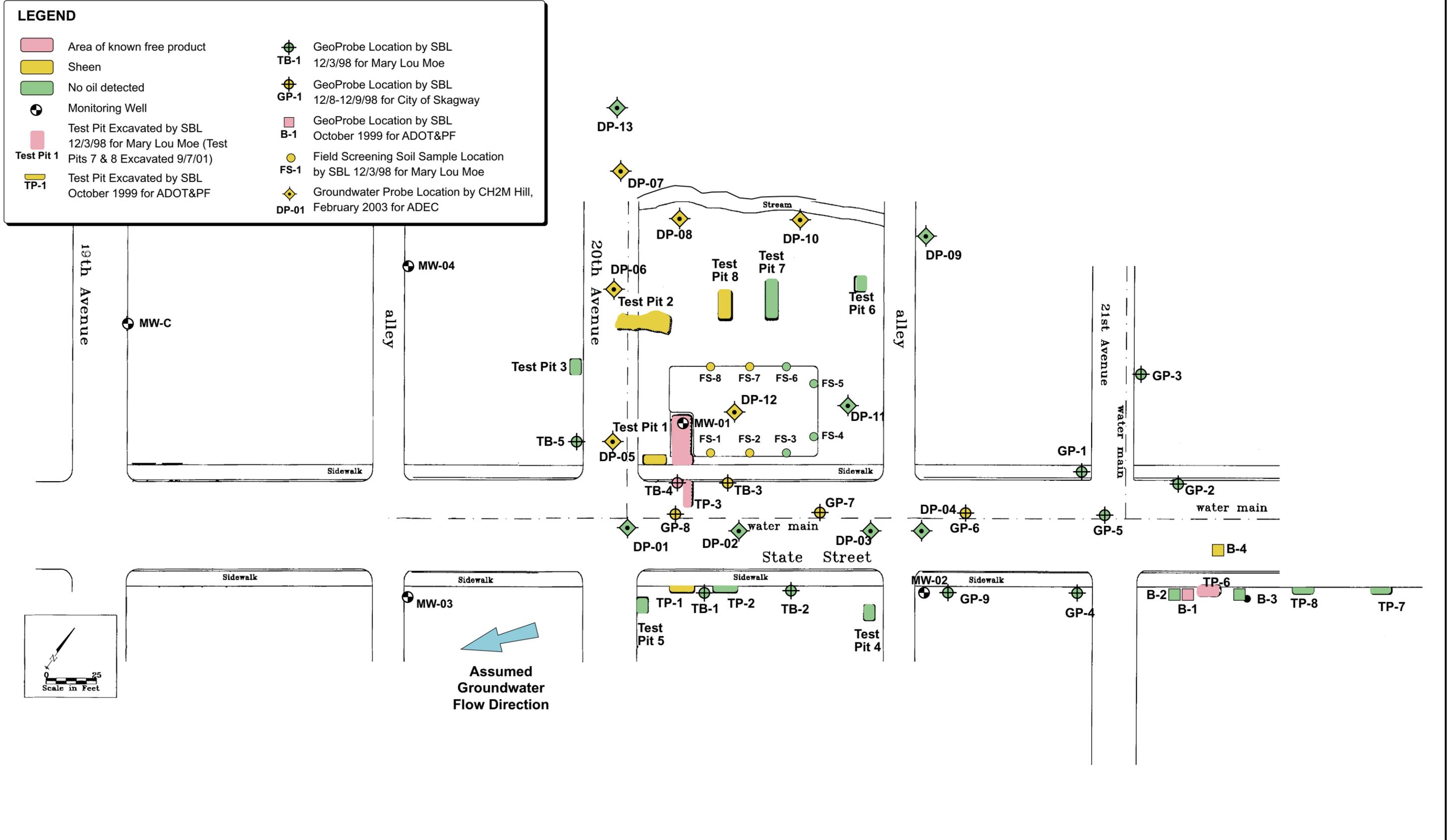


Figure 1-2
Investigation Area and Observations of Free Product or Sheen
State Street Mystery Site
Skagway, Alaska

SECTION 2

Preliminary Cleanup Goals

Title 18, Chapter 75, Article 3 of the *Alaska Administrative Code* (AAC), Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances (as amended through January 30, 2003), has been used to evaluate preliminary cleanup action goals for the site. The ADEC 18 AAC 75 regulations present a tiered approach to determining cleanup levels that include both conservative default cleanup values and options for developing site-specific values through risk assessment. The numerical cleanup standards for soil presented in Method 2 (Tables B1 and B2) of the 18 AAC 75 regulations are the most stringent standards potentially applicable to the site. Table B2 includes petroleum hydrocarbon cleanup standards for gasoline, diesel, and residual range petroleum hydrocarbons that include both the total carbon molecule chain and separate aliphatic (straight chain) and aromatic (ring structure) hydrocarbon chain structures. In addition to Method 2 cleanup standards, Method 3 regulations allow calculation of site-specific alternate cleanup standards with the use of site-specific soil data and input parameters approved by ADEC. Method 4 may also be used to develop a site-specific risk assessment to calculate alternate cleanup levels according to ADEC risk assessment procedures.

Groundwater cleanup standards for specific hazardous substances are included in 18 AAC 75.345, Table C, for groundwater that is currently used or could reasonably be used as a drinking water source.

Table 2-1 summarizes the preliminary cleanup goals for soil and groundwater with respect to the contaminants of concern (DRO and benzene). The annual average total precipitation for the Skagway area is 26.45 inches (Western Regional Climate Center, 2003), which places the site in the “under-40-inch” precipitation zone. The “migration to groundwater” pathway goals are the lowest soil cleanup goals applicable to the site. Cleanup goals for other contaminants are specified in the referenced regulations.

TABLE 2-1
Alaska Department of Environmental Conservation Cleanup Goals for Selected Petroleum Hydrocarbons

Petroleum Hydrocarbon Range	Soil (mg/kg)			Groundwater (mg/L)
	Ingestion	Inhalation	Migration to Groundwater	
Benzene	150	9	0.02	0.005
Diesel-Range Organics	10,250	12,500	250	1.5

mg/kg = milligrams per kilogram
mg/L = milligrams per liter

Site Characterization Results and Discussion

The site characterization fieldwork included collecting soil and groundwater samples to evaluate the extent of contamination and installing groundwater level data loggers in monitoring wells MW-02, MW-03, and MW-04 to evaluate seasonal fluctuations in groundwater table elevation and flow direction. This section summarizes the results of these activities.

3.1 Delineation of Source Area and Extent of Contamination

The approach to delineating the source and extent of contamination was to use driven samplers and probes to obtain soil and groundwater samples. Thirteen locations were sampled:

- Four locations (DP-01 through DP-04) near the water main beneath State Street
- Four locations (DP-05 through DP-07 and DP-13) in 20th Avenue
- Four locations (DP-08 and DP-10 through DP-12) on the Moe property
- One location (DP-09) across the alley from the northern corner of the Moe property

The probe sampling locations are shown in Figure 3-1.

Samplers were driven continuously from or near the ground surface to below the groundwater table to examine the vertical distribution of contamination and identify potential surface source areas for the free product. The soil samples were screened visually and with a PID. The PID screening results are summarized in Figure 3-1. An ADEC-approved laboratory (Analytica Alaska in Juneau and Anchorage) analyzed the selected samples for benzene, toluene, ethylbenzene, and xylenes (BTEX) and DRO compounds. Analytical soil results are presented in Figure 3-2.

Perforated probes were driven into the holes to allow collection of groundwater samples. The probes were left in place overnight to allow the free product and water levels to equilibrate within the wells; however, it appeared that fine grained soils partially plugged some of the probes and not all the water levels came to equilibrium during the sampling event. Measurable product thickness was observed in only one of the thirteen probes installed (0.01 foot at DP-06). Due to an obstruction at 2.69 feet deep in DP-09, product thickness and water level measurements were not obtainable at this location. Measured groundwater elevations are provided in Figure 3-3 and are referenced to an assumed elevation of 100.00 feet on the top nut of the fire hydrant located near monitoring well MW-01. TOC elevations were also surveyed for the existing monitoring wells MW-01 through MW-04 and are presented in Table 3-1.

TABLE 3-1
Survey TOC Elevations for Existing Monitoring Wells

Monitoring Well ID	TOC Elevation (ft)
MW-01	97.87
MW-02	98.81
MW-03	96.21
MW-04	96.69

Note: Vertical datum referenced to top nut of fire hydrant near MW-01, assumed 100.00 feet

Groundwater samples were collected from each driven probe (with exception of DP-09 due to obstruction) using a peristaltic pump. Due to slow groundwater recharge rates in some of the probes, conventional low-flow sampling techniques as outlined in the Work Plan and Quality Assurance Program Plan (CH2MHILL, 2003a) were not practicable. In most cases, pumping groundwater from the probes achieved complete drawdown during sampling and required multiple attempts over the course of several hours to obtain adequate sample volume. Field screening parameters (dissolved oxygen, oxidation-reduction potential, pH, conductivity, temperature, and turbidity) were not collected from groundwater obtained from the driven probes. After groundwater samples and measurements were obtained, the probes were removed and the holes backfilled with bentonite. Holes that were installed in State Street or 20th Avenue were patched with asphalt to match the existing road surface.

Conventional low-flow sampling techniques were employed in sampling the four existing groundwater monitoring wells (MW-01 through MW-04) using a peristaltic pump. The well purge and sampling field sheets containing the results of field screening are included in Appendix A.

The laboratory analyzed groundwater samples from the probes and the four existing site-monitoring wells for BTEX and DRO compounds. Samples from DP-05 through DP-08 were also submitted for analysis of gasoline-range organic (GRO) compounds. In addition, samples for geochemical analyses (nitrate, dissolved iron and manganese, sulfate, methane, and alkalinity) were collected from MW-01 and MW-02 to provide data for natural attenuation modeling. Figure 3-3 summarizes the analytical results. Laboratory reports and data quality review memorandum are provided in Appendix B.

Data loggers were installed in monitoring wells MW-02 through MW-04 on March 2, 2003, to record groundwater level information once every twelve hours. The data loggers were downloaded on June 27, 2003, and a summary of the data are provided in Appendix C. This data is used to assess changes over time in groundwater table elevation, flow direction and gradient. The data collected over the 140-day period between installation and download indicated that the groundwater elevation varied approximately one foot. During March 2003, the groundwater elevation decreased by approximately 0.3 feet, and the groundwater flow direction and gradient remained approximately constant at 223° from north and 0.0087 ft/ft. Between April 5 and 16, a change of elevation at MW-04 suggests a possible change in groundwater flow direction up to 241° from north, while the gradient was approximately 0.0085 ft/ft. From April 16 to June 27, the groundwater elevation increased

LEGEND

-  Monitoring Well
-  Groundwater Probe

DP-13	
Depth = 4-6'	Feb-03
DRO	4.9
Benzene	0.002
Ethylbenzene	0.007
Toluene	0.010
Xylenes	0.029

DP-08	
Depth = 4-6'	Feb-03
DRO	11,000
Benzene	0.075
Ethylbenzene	1.7
Toluene	0.60
Xylenes	11

DP-10	
Depth = 4-6'	Feb-03
DRO	510
Benzene	0.008
Ethylbenzene	0.025
Toluene	0.028
Xylenes	0.37

DP-09	
Depth = 4-6'	Feb-03
DRO	ND (0.63)
Benzene	0.003
Ethylbenzene	0.007
Toluene	0.010
Xylenes	0.029

DP-11	
Depth = 4-6'	Feb-03
DRO	20
Benzene	0.003
Ethylbenzene	0.023
Toluene	0.16
Xylenes	0.055

DP-07	
Depth = 5-7'	Feb-03
DRO	220
Benzene	0.012
Ethylbenzene	0.14
Toluene	0.048
Xylenes	0.66

DP-06	
Depth = 5-7'	Feb-03
DRO	1,500
Benzene	0.027
Ethylbenzene	1.9
Toluene	0.08
Xylenes	10

DP-05	
Depth = 4.5-6.5'	Feb-03
DRO	250
Benzene	0.006
Ethylbenzene	0.043
Toluene	0.012
Xylenes	0.17

DP-06	
Depth = 5-7'	Feb-03
DRO	1,500
Benzene	0.027
Ethylbenzene	1.9
Toluene	0.08
Xylenes	10

DP-05	
Depth = 4.5-6.5'	Feb-03
DRO	250
Benzene	0.006
Ethylbenzene	0.043
Toluene	0.012
Xylenes	0.17

DP-01	
Depth = 4.5-6.5'	Feb-03
DRO	11
Benzene	0.002
Ethylbenzene	0.005
Toluene	0.007
Xylenes	0.015

DP-01	
Depth = 4.5-6.5'	Feb-03
DRO	11
Benzene	0.002
Ethylbenzene	0.005
Toluene	0.007
Xylenes	0.015

DP-02	
Depth = 4.5-6.5'	Feb-03
DRO	20
Benzene	0.003
Ethylbenzene	0.006
Toluene	0.007
Xylenes	0.019

DP-02	
Depth = 4.5-6.5'	Feb-03
DRO	20
Benzene	0.003
Ethylbenzene	0.006
Toluene	0.007
Xylenes	0.019

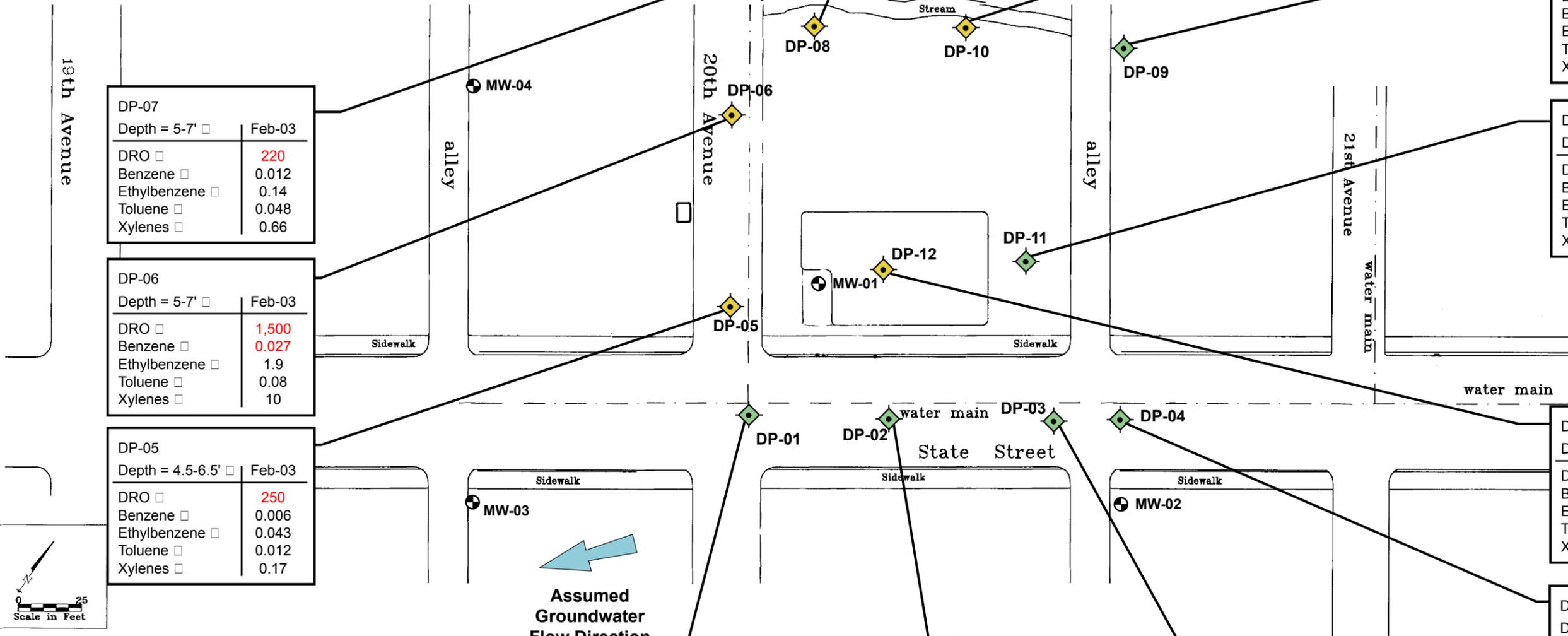
DP-03	
Depth = 4.5-6.5'	Feb-03
DRO	ND (1.4)
Benzene	0.003
Ethylbenzene	0.007
Toluene	0.009
Xylenes	0.026

DP-03	
Depth = 4.5-6.5'	Feb-03
DRO	ND (1.4)
Benzene	0.003
Ethylbenzene	0.007
Toluene	0.009
Xylenes	0.026

DP-12	
Depth = 4-6'	Feb-03
DRO	530
Benzene	0.003
Ethylbenzene	0.047
Toluene	0.016
Xylenes	0.30

DP-04	
Depth = 4.5-6.5'	Feb-03
DRO	5.4
Benzene	0.003
Ethylbenzene	0.007
Toluene	0.010
Xylenes	0.023

DP-04	
Depth = 4.5-6.5'	Feb-03
DRO	5.4
Benzene	0.003
Ethylbenzene	0.007
Toluene	0.010
Xylenes	0.023



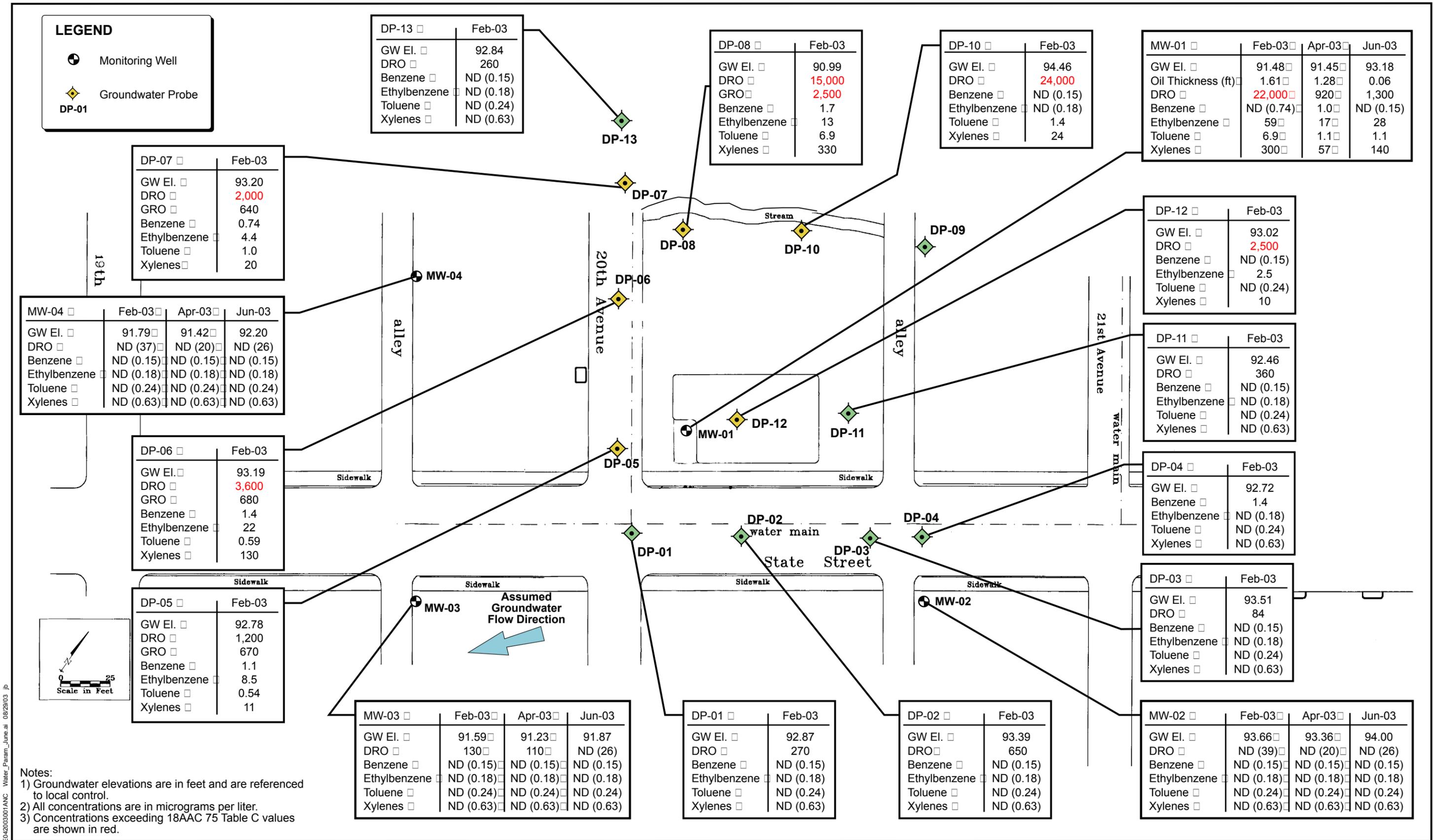
**Assumed
Groundwater
Flow Direction**

Notes:
 1) All concentrations are in milligrams per kilogram.
 2) Concentrations exceeding 18AAC 75 Table B2 values for migration to groundwater pathway in the under 40-inch zone are shown in red.

E04-2003001ANC Soil_Parameters.a110 05/14/03 cfj



Figure 3-2
 Analytical Soil Results
 State Street Mystery Site
 Skagway, Alaska



Notes:
 1) Groundwater elevations are in feet and are referenced to local control.
 2) All concentrations are in micrograms per liter.
 3) Concentrations exceeding 18AAC 75 Table C values are shown in red.

E042003001ANC Water_Param_June.ai 08/29/03 .jb



Figure 3-3
 Analytical Groundwater Results
 State Street Mystery Site
 Skagway, Alaska

approximately 0.8 feet and the flow direction and gradient was approximately 222° from north and 0.0084 ft/ft.

Monitoring wells MW-01 through MW-04 were sampled for DRO and BTEX compounds on April 2/3 and June 26/27, 2003. The results for these events are also presented in Figure 3-3. The well purge and sampling field sheets and data quality review memorandums are included in Appendixes A and B, respectively.

3.2 Product Recovery Test

Free product has been observed in MW-01 located at the northern corner of 20th Avenue and State Street. This well was installed on February 8, 2002, and the measured product thickness was initially 0.06 feet (Hart Crowser, 2002). CH2M HILL remeasured the product thickness and found 1.61 feet on March 1, 2003, and 1.37 feet on April 3, 2003.

Approximately 1 liter of product was pumped out of the well on April 3, reducing the thickness to 0.04 feet, and several measurements were made to determine how quickly the product flowed back into the well. Within 5 minutes, the product thickness rebounded to 0.11 feet. Over the following 24 hours, the thickness rebounded to 0.44 feet.

A product skimmer pump (Magnum Spill Buster pump manufactured by Clean Earth Technology, Inc.) was installed in MW-01 on May 15 and operated until June 26, 2003. Less than 1 gallon of product was recovered during this period. The recovered product was turned over to the City of Skagway Department of Public Works for reuse in their oil-fired heater and the skimmer pump was demobilized on June 27, 2003.

3.3 Discussion

The site characterization work performed to date has attempted to delineate the extent of contamination and determine potential sources for the free product observed in monitoring wells and test pits at the Moe property. The current investigation expanded the evaluation of the bedding material around the water mains in 20th Avenue and State Street as potential conduits for migration of free product, and further evaluated the contamination on the northern portion of the Moe lot, just south of a stream that crosses the lot. The extent of site contamination appears to have now been delineated on three sides; the southwest side of 20th Avenue (Test Pit 3 and TB-5), the southeast side of State Street (DP-01 through DP-04), and the northeast side of the Moe lot (Test Pits 6 and 7, DP-09 and DP-11) all had no sheen on groundwater samples and low or non-detectable soil contamination. The northwestern portion of the Moe lot on the south side of the stream appears to have the highest soil contamination detected to date (11,000 mg/kg DRO was detected in samples from both Test Pit 8 and DP-08). Groundwater samples from this area also had high concentrations of DRO (15,000 µg/L at DP-08 and 24,000 µg/L at DP-10). Further investigation on the north side of the stream was not continued because this was off the Moe property. One probe installed further north on 20th Avenue (DP-13) appeared to delineate the extent of contamination in this direction.

The site characterization results suggest that the source of contamination may be near the northwestern portion of the Moe lot or from an area north of the Moe property, across the stream and/or the alley. A trailer fire was reported to have occurred at the site in January

1997. The trailer was located at the northwest corner of the Moe property, with the diesel heating oil tank located off of the northwest side of the trailer (SBL, 2001). The City of Skagway Fire Department reported that the heating oil tank underwent a boiling liquid/expanding vapor explosion (BLEVE). It is unknown how much of the oil volatilized and how much spilled on the ground during the explosion. It is expected that low molecular weight, high volatility compounds such as benzene would have evaporated or burned to a greater extent than the high molecular weight, low volatility diesel components. Field screening of soil samples indicated shallow soil contamination above the groundwater table at 2 to 4 feet deep in DP-08, suggesting that the contamination came from a surface source at this location. It is unknown if any clean fill material was placed over the site during cleanup of debris after the trailer fire.

If the source of the free product was the northwestern portion of the Moe lot or from an area north of the Moe property, the product appears to have migrated to the southeastern corner of the lot near MW-01. A sheen has been observed on the groundwater at other probe and test pit locations around MW-01, but not a substantial thickness of free product. The geology around MW-01 (poorly graded sandy gravel) may be conducive for product to accumulate at greater thickness than at other areas around the site with finer-grained sand and silt soils.

Groundwater Modeling

This section describes groundwater flow and contaminant transport modeling that was performed to evaluate the potential for hydrocarbon contamination detected at the site near 20th Avenue and State Street to impact City water supply wells in the future. Specifically, the modeling addresses the following questions:

- Is groundwater passing through the site eventually captured by the City of Skagway municipal water supply wells?
- Do site contaminants naturally attenuate to non-detectable concentrations before they could reach the municipal water supply wells?

4.1 Hydrogeologic Setting

Skagway is in a large glacial valley on parts of the delta and lower valley floor of the Skagway River. The geologic units exposed in the area are composed of intrusives (bedrock) and overlying unconsolidated deposits (Yehle and Lemke, 1972). The intrusive rocks are mostly Jurassic and Cretaceous quartz diorite and granodiorite but include some basalt and aplite dikes. Metamorphic rocks are also present, but in limited amounts (Balding, 1975).

In the Skagway River valley, the bedrock is covered by unconsolidated surficial deposits of Pleistocene and Holocene age. The unconsolidated deposits include alluvium, glacial drift, colluvium, and manmade fill. Alluvial deposits include terrace and flood-plain alluvium of the Skagway River, deltaic deposits of the intertidal zone, and alluvial-fan deposits. The alluvial deposits may contain well sorted to poorly sorted subrounded boulders, cobbles, gravel, sand, and silt. Colluvial deposits include generally loose, unsorted, angular material that has moved downslope or is moving downslope under the influence of gravity. They are composed of talus and other types of landslide deposits (rockfalls, rockslides, earthflows, and avalanche debris).

Geophysical measurements near First Avenue indicate that there is about 585 feet of alluvial fill in that part of the valley. The general lithologic sequence includes about 25 feet of alluvium overlying 120 feet of sandy, deltaic deposits that, in turn, overlie 440 feet of glacial and glaciomarine deposits (Balding, 1975).

4.2 Hydraulic Groundwater Flow Model

This section describes the development of the groundwater flow model grid, the assignment of boundary conditions, the selection of the aquifer properties used in the modeling effort, and the results of the model simulations performed.

4.2.1 Model Code Description

Micro-FEM is a fully integrated, three-dimensional, finite-element groundwater flow modeling package. As a pre-processor it is used to prepare a groundwater model based on the grid data produced through one of the two Micro-FEM grid generators, and by specifying the number of layers and the values for all hydraulic parameters. After preparation, the model data can be saved and processed for determination of steady-state or transient groundwater heads, and to calculate three-dimensional flowlines. As a post-processor, Micro-FEM is used for the graphical interpretation of results such as heads, draw-downs, flow-vectors, flow lines, and vertical flow components. Water balances can be computed for any selected node or model area. The current version of Micro-Fem, Version 3.60, is capable of simulating groundwater flow with a model grid of up to 50,000 surface nodes and 25 layers (Hemker, 2003).

4.2.2 Model Grid

The groundwater flow model grid is oriented along the length of the Skagway River. The grid extends from the downstream end of the Skagway River Valley at the Taiya Inlet approximately 20,500 feet up the valley. The grid is delimited on the canyon edges by outcrops of igneous bedrock. The extent of the model grid is shown in Figure 4-1.

The model grid spacing was selected to provide more detailed resolution of groundwater levels in areas of specific interest. The finite grid node spacing is approximately 10 feet in the vicinity of the State Street site as well as in the vicinity of the three City of Skagway production wells. The model node spacing increases to approximately 100 feet or more in remote areas of the model grid, where less resolution is required.

4.2.3 Model Layering

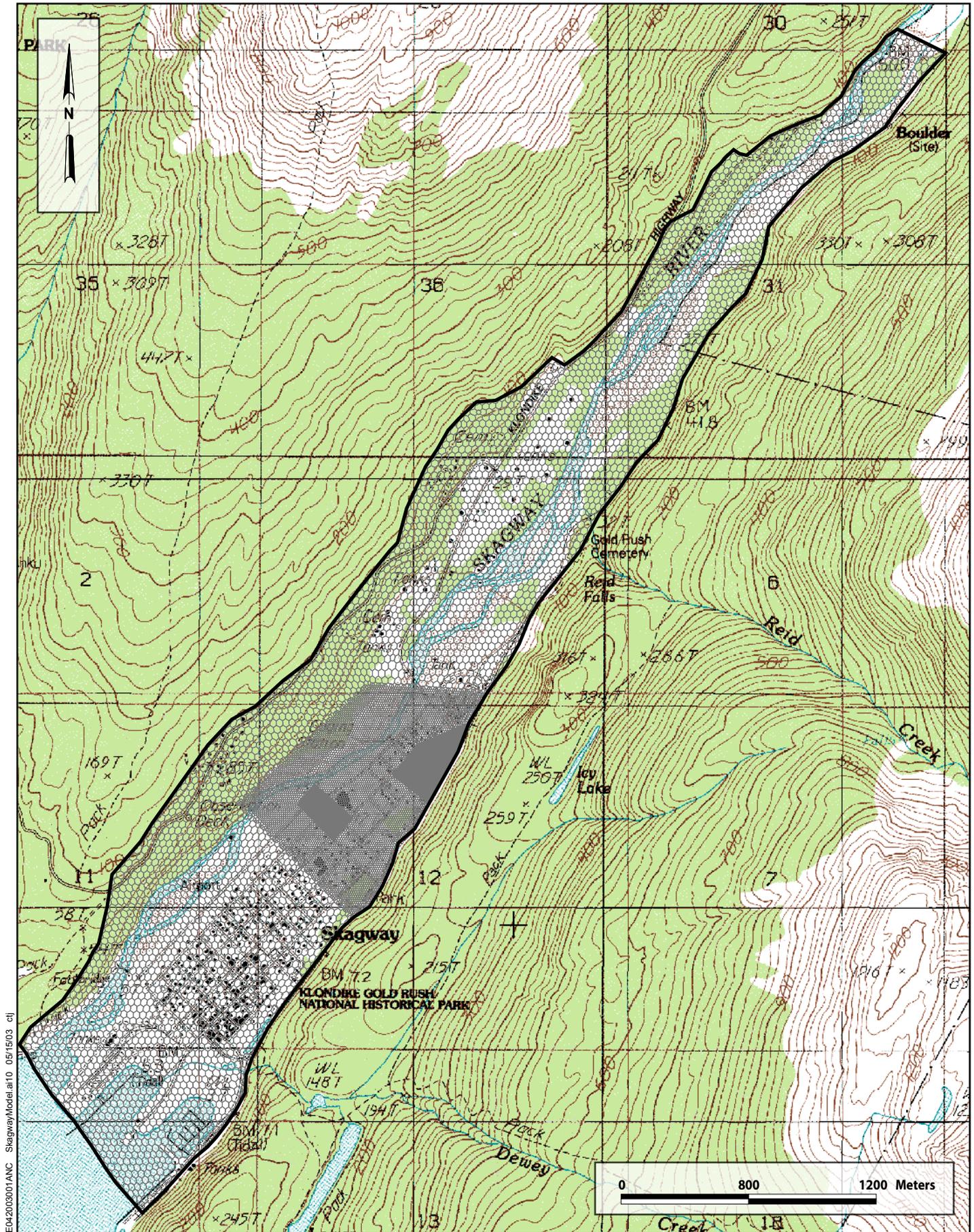
The Skagway model was developed as a 12 layer model. The shallow layers were assigned small thicknesses to provide more detailed vertical resolution of groundwater flow conditions in the upper portions of the aquifer, where groundwater contamination resides. Model layers 1 through 5 represent the alluvial materials, layers 6 through 11 represent the deltaic deposits, and layer 12 represents the glaciomarine deposits. The layer thicknesses and compositions assumed in the model are summarized in Table 4-1.

4.2.4 Boundary Conditions

Model boundary conditions define the flux of water or hydraulic head at each of the model boundaries. The boundary conditions used in the Skagway model consist of a combination of no-flow, specified flux, and head dependent boundary conditions as described below.

Specified Flux Boundaries

The upstream edge of the model was defined as specified flux boundary representing the movement of groundwater into the model from areas upgradient of the model boundary. The specified flux values were calculated based on a Darcy's Law calculation incorporating the assumed transmissivity of each layer, the horizontal hydraulic gradient present in that location of the model, and the width of each model element where the flux was specified. Flux values were applied to all 12 model layers.



EO42003001ANC SkagwayModel.d10_05/15/03 cj

Figure 4-1
 Groundwater Model Grid
 State Street Mystery Site
 Skagway, Alaska

TABLE 4-1
Assumed Layer Thickness and Lithology in Skagway Groundwater Model

Model Layer	Thickness (feet)	Lithology
1	5	Alluvium
2	5	Alluvium
3	5	Alluvium
4	5	Alluvium
5	5	Alluvium
6	10	Deltaic Deposits
7	20	Deltaic Deposits
8	20	Deltaic Deposits
9	25	Deltaic Deposits
10	25	Deltaic Deposits
11	25	Deltaic Deposits
12	400	Glaciomarine Deposits

The second set of specified flux boundaries were applied to the lateral edges of the model along the canyon walls, representing the recharge to the groundwater aquifer from the run-off of rainfall and snowmelt from the surrounding mountains. This flux was calculated by assuming that the surrounding mountains have a slightly higher precipitation quantity than the City of Skagway; 40 inches per year as opposed to 26 inches measured in the city. It was further assumed that 50 percent of the precipitation was consumed by evapotranspiration and the remaining 50 percent was available for run-off. A simple geometric calculation was then performed based on the distance from the model boundary to the watershed divide, and that quantity of water was applied to the model edge along the valley walls. The specified flux was only applied to model layer 1. To verify that these assumptions were reasonable, the total recharge to the groundwater aquifer from this boundary was totaled and compared to the baseflow in the Skagway river. The groundwater recharge rates should be somewhat less than the baseflow in the river because additional sources of recharge contribute to baseflow such as flow from upstream river reaches and recharge of precipitation falling in the valley. The calculations discussed above resulted in an estimate of 14 cubic feet per second (cfs) recharging the model from this boundary. The measured baseflow in the Skagway river varies from 21 to 58 cfs, with a mean of about 29 cfs (Balding, 1975).

The final specified flux boundary was the recharge of rainfall and snowmelt falling within the model area. It was assumed that 10 inches of the 26.3 inches of precipitation recharges the groundwater aquifer.

Constant Head Boundaries

The only constant head boundary in the model is specified at the Taiya Inlet to reflect the presence of the coastal boundary. The model head was set at 0 feet MSL. Tidal fluctuations were ignored in the modeling effort, as the site of concern is a significant distance upstream of the inlet, and small variations in the sea level at the inlet will have an insignificant impact on the groundwater flow conditions in the vicinity of the City supply wells.

Head Dependent Boundaries

The Skagway river was represented in the model as a head dependent boundary condition. The flux of groundwater into or out of the model at this boundary is dependent on the difference in hydraulic heads between the river stage and the groundwater levels in the underlying aquifer. If the river stage is higher than underlying groundwater levels, surface water will recharge the groundwater system. If the groundwater levels in the aquifer are higher than the river stage, then groundwater will discharge to the river system. The flux of water at each river element depends not only on the magnitude of the head difference, but also on the river geometry and the permeability of the riverbed sediments. The river stage was assigned to each river element based on elevation data obtained from the USGS Skagway (B-1) NW, Alaska quad sheet. The permeability of the river bed was assumed to be equal to the hydraulic conductivity of the shallow sediments in model layers 1 through 5 (100 feet/day) with a 100 to 1 horizontal to vertical anisotropy. Therefore, the vertical riverbed hydraulic conductivity assumed in the model was 1 ft/day.

No-flow Boundaries

The only no-flow boundary in the model is the bottom boundary. This boundary was assigned a no-flow condition as it represents the low permeability bedrock underlying the alluvial valley fill, and a relatively small quantity of groundwater likely moves across that boundary.

4.2.5 Model Calibration

The calibration of the groundwater flow model was performed by comparing model predictions to two site features; measured groundwater elevations, and observed horizontal hydraulic gradients.

Groundwater Elevations

The comparison of model simulated and measured groundwater elevations at the site was complicated by the fact that no formal geographic survey has been performed to establish local benchmarks. Previous work in the area performed by Hart Crowser uses a local coordinate system that is based on a temporary benchmark located on the southeast abutment of the Skagway River Bridge. The temporary benchmark was assigned an elevation of 74.00 feet based on as-built drawings and the plan geometry of the abutment (Hart Crowser, 1991). Subsequent work performed by Hart Crowser assumed a temporary benchmark at a fire hydrant located at the intersection of 20th Avenue and State Street with an arbitrary assigned elevation of 100.00 feet (Hart Crowser, 2002).

For the purposes of this modeling effort, the temporary benchmark established by Hart Crowser at the Skagway River Bridge was assumed to be sufficiently accurate to provide a

basis for comparison between model simulated and measured groundwater elevations. The groundwater elevation at the well nearest the State Street Site, MW1990-1A, was reported to be 52.49 feet MSL on November 28, 1990 (Hart Crowser, 1991). [Note that “1990” was added to the well identifiers for wells installed by Hart Crowser in November 1990 to differentiate these wells from wells MW-01 through MW-04 that Hart Crowser installed at the 20th Avenue and State Street site in February 2002.] Groundwater elevations simulated by the groundwater model at that same location are about 52.8 feet MSL. A comparison of simulated and measured groundwater elevations at several other monitoring wells that span an area between the City production wells and the rail yard northeast of the site are summarized in Table 4-2. The locations of these wells are shown on Figure 4-2. Although this water level comparison is approximate, the flow model provides simulated groundwater elevations that compare favorably with measured groundwater elevations in the area of concern between the City water supply wells and the State Street Site.

Horizontal Hydraulic Gradients

The comparison of measured and simulated horizontal hydraulic gradients was used as an additional measure of calibration of the groundwater model. The calculated hydraulic gradient based on groundwater levels measured in wells MW-01 through MW-04 at the site

TABLE 4-2
Simulated versus Measured Groundwater Elevations near State Street Site

Monitoring Well	Measured Groundwater Elevation	Simulated Groundwater Elevation
MW1990-1A	52.49	52.8
MW1990-2	57.32	56.2
MW1990-3	60.39	59.5
MW1990-4	43.40	43.3

Notes:

1. Measured groundwater elevations relative to a temporary benchmark established on the Skagway River Bridge. See Hart Crowser, 1991, for further information.
2. Groundwater elevations measured November 28, 1990.

in February and March 2003, suggest a gradient of 0.0087 foot per foot. Horizontal hydraulic gradients in the groundwater flow model at that location are 0.0072 foot per foot.

4.2.6 Model Simulation Results

Groundwater Conditions

The groundwater elevations simulated by the groundwater flow model and the associated groundwater flow directions are shown on Figure 4-2. It can be seen that groundwater in the vicinity of the site flows in a southwesterly direction, paralleling the general orientation of the Skagway River. This flow regime is typical for alluvial valleys dominated by a braided stream system. Groundwater simulations predict that the groundwater flow

velocity in the shallow alluvial sediments is approximately 4.0 feet per day or 1,460 feet per year. This velocity estimate assumes an aquifer transport porosity of 0.2.

Groundwater Flowpath Analysis

To evaluate the potential for contaminated groundwater present at the site to reach the City of Skagway production wells, a groundwater flowpath analysis was performed. The first step in this process was to define the extent of non-aqueous phase liquid (NAPL) at the site, commonly known as the source area. The extent of the source area for the State Street site, shown on Figure 4-2, was based on observations of sheen or free product in wells and probes sampled by CH2M HILL in February 2003. The definition of a source area also requires an assumption of the depth of groundwater contamination. No definitive data from the site is available to estimate the overall depth of the hydrocarbon contaminant plume. For the purposes of this evaluation, two plume depths were assumed-- 5 feet and 10 feet beneath the water table.

Once a source area was defined, the groundwater flow model was used to track the flowpaths and travel time of groundwater originating within the source area. These groundwater flowpaths were tracked downgradient to determine whether the potential exists for contaminated groundwater to reach the City production wells.

The construction specifications and operating flow rates for the City production wells were obtained from the City of Skagway. The well construction specifications were obtained from the Drinking Water Total Coliform Monitoring Plan (City of Skagway, undated), while the well production rates were obtained by personal communication with Tim Gladden with the City of Skagway. The well construction data and flow rates utilized in the model are summarized in Table 4-3.

To conduct the groundwater flowpath analysis, the groundwater production from City wells No. 1 and 2 were assigned to model layer 8, while the production from City well No. 3 was assigned to model layers 7 and 8. The distribution of City Well No. 3 pumping between model layers 7 and 8 was determined based on the relative transmissivity of each layer.

Evaluation Results Assuming a 5-Foot Plume Thickness

The results of the groundwater flowpath analysis assuming a 5-foot plume thickness are shown on Figure 4-3. It is clear from this figure that groundwater originating within the source area eventually flows to the City well field. The flowpath analysis indicates that the shallow groundwater from within the source area will be captured by only City Well No. 2. Simulations suggest that groundwater from the source area is too shallow to be captured by City Well Nos. 1 and 3 as it passes this area. The estimated travel time between the source area and the City wells varies from 0.8 to 1.6 years assuming an aquifer transport porosity of 0.2.

Evaluation Results Assuming a 10-Foot Plume Thickness

The results of the groundwater flowpath analysis assuming a 10 foot plume thickness are shown on Figures 4-3 and 4-4. The flowpaths of the groundwater in the upper 5 feet of the source area, as discussed above, are shown on Figure 4-3. The flowpaths taken by the groundwater in the bottom 5 feet of the source area are shown on Figure 4-4. Note that because the groundwater in the lower 5 feet of the source area starts at a greater depth, the

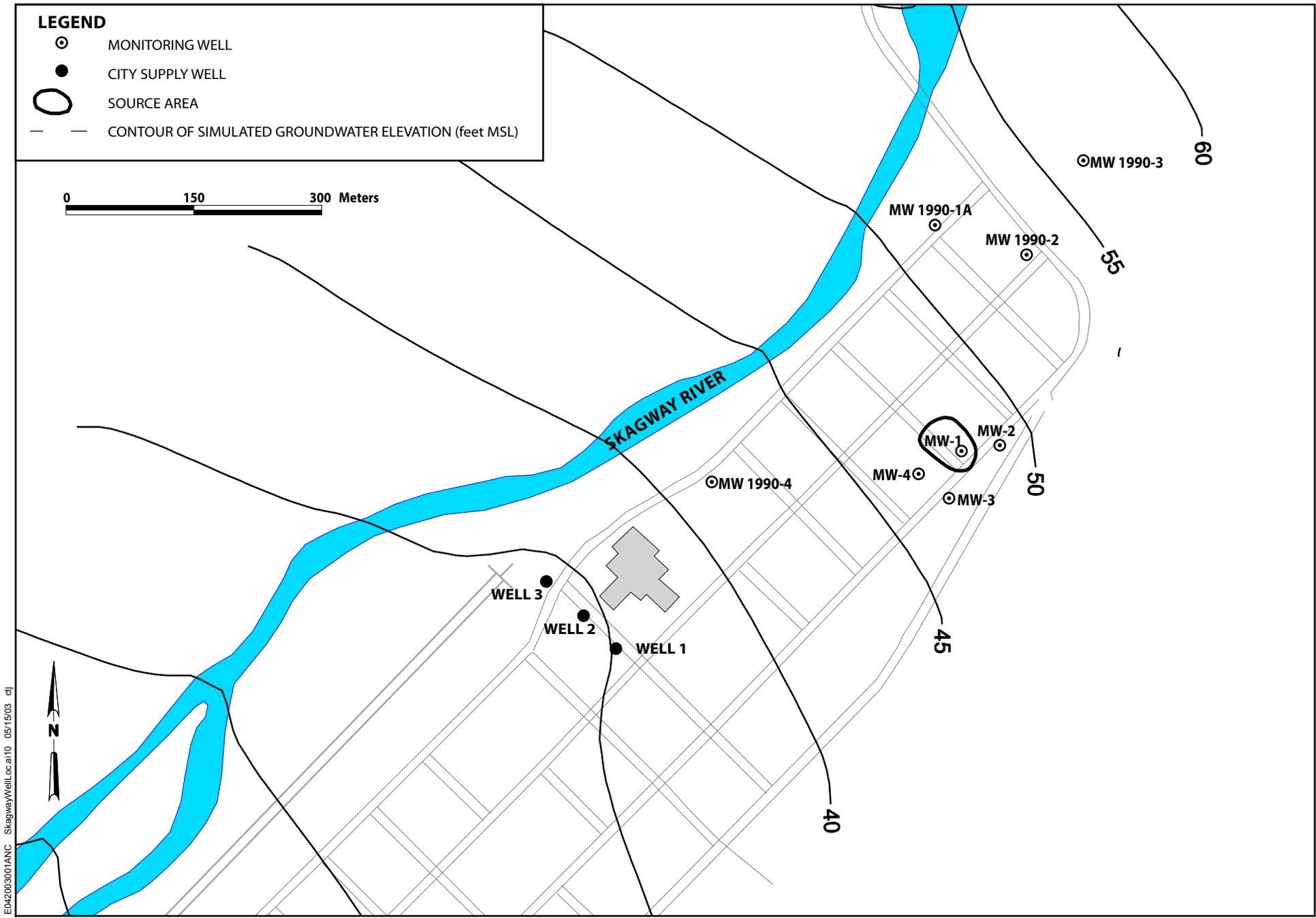
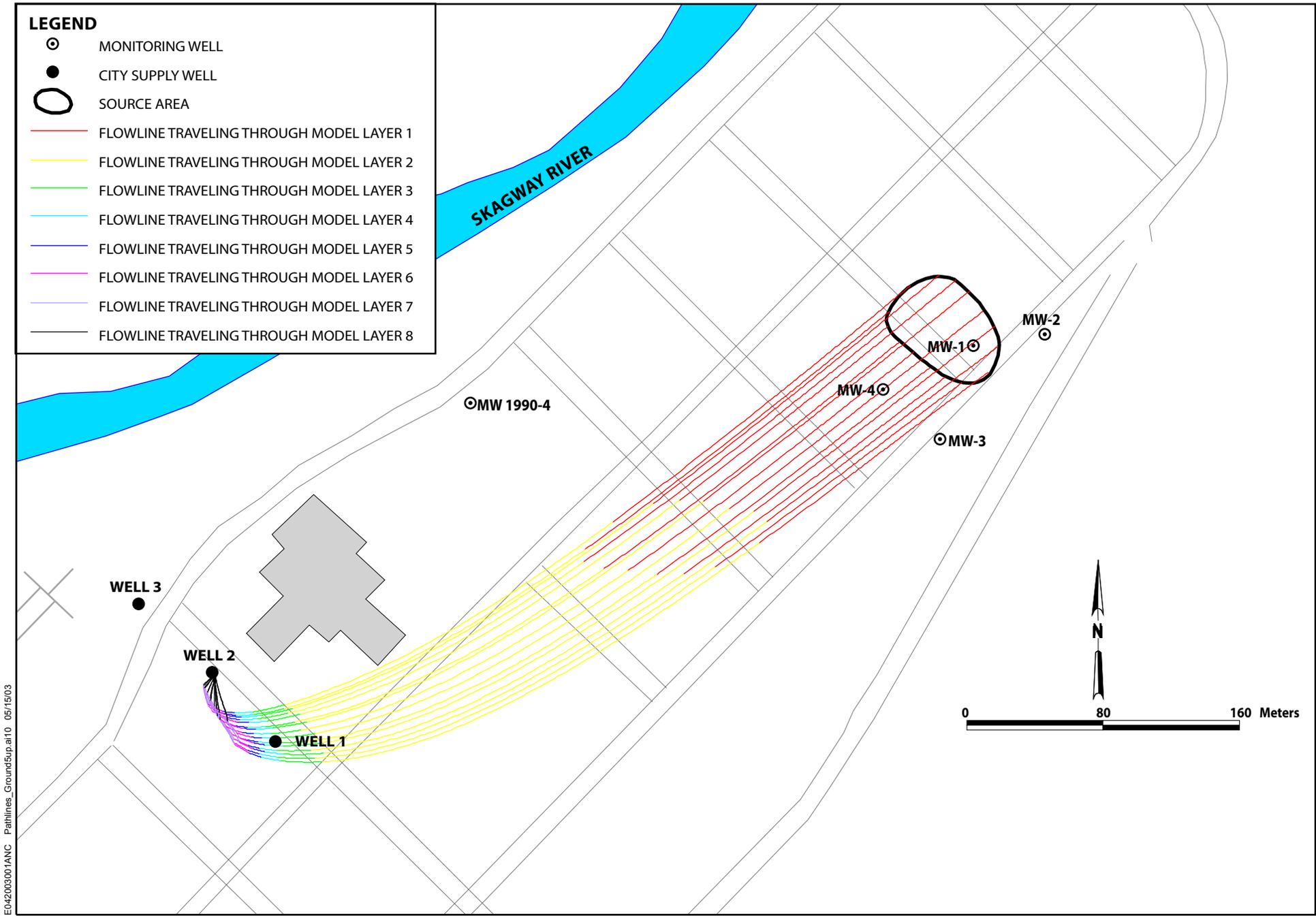
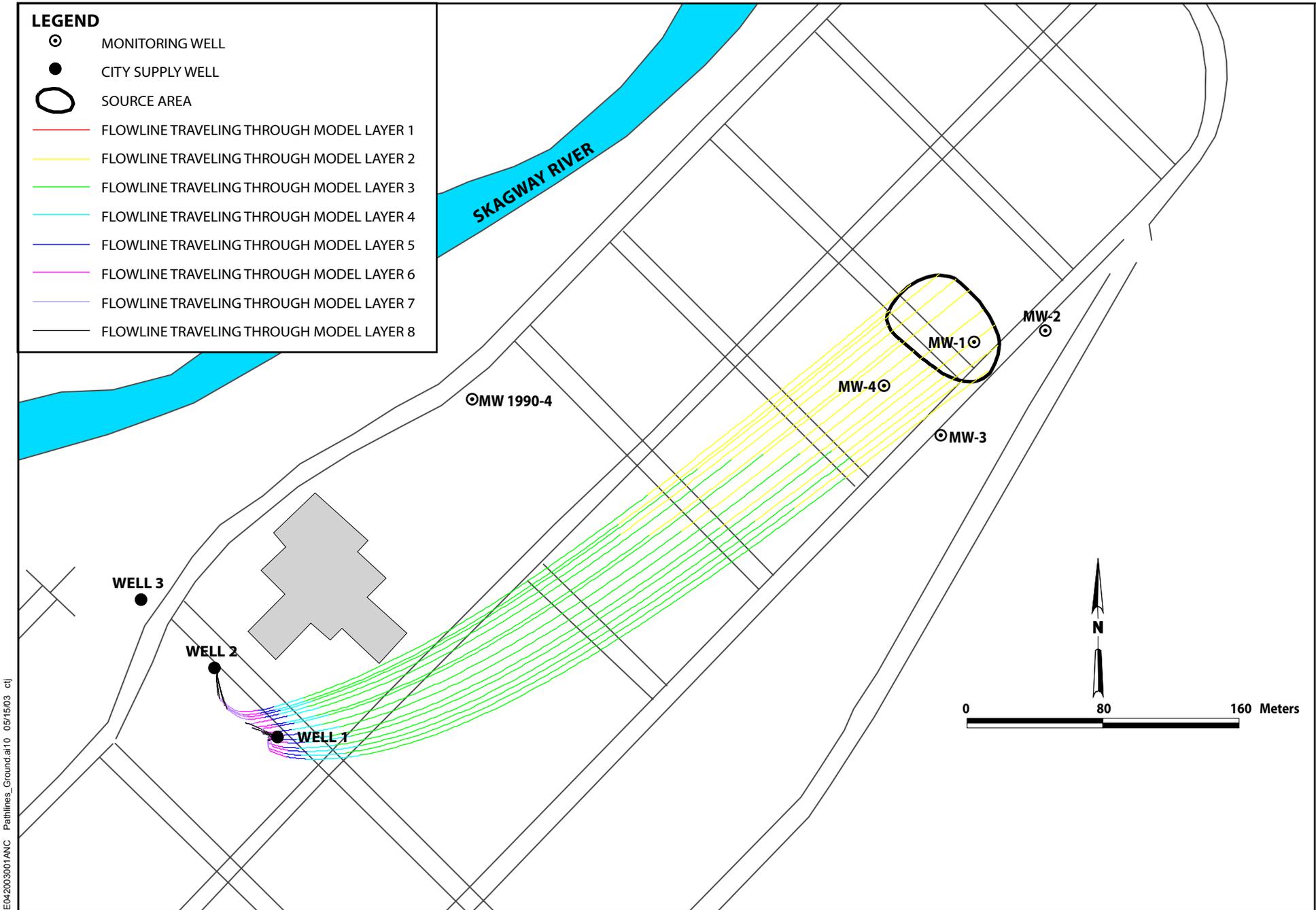


Figure 4-2
Well Locations, Source Area, and Simulated Groundwater Elevations Source Area
State Street Mystery Site
Skagway, Alaska



E042003001ANC Pathlines_Ground5up.ai10 05/15/03

Figure 4-3
 Groundwater Pathlines for Upper 5 Feet of Source Area
 State Street Mystery Site
 Skagway, Alaska



E042003001/ANC_Pathlines_Ground.a110_05/15/03_cj

Figure 4-4
 Groundwater Pathlines for Lower 5 Feet of Source Area
 State Street Mystery Site
 Skagway, Alaska

TABLE 4-3
City Production Well Construction and Pumping Information

Well	Total Depth (ft)	Screened Interval (ft bgs)	Maximum Flow Rate (gpm)
City Well No. 1	80	50 to 80	228
City Well No. 2	75	45 to 75	220
City Well No. 3	120	37 to 67	549

water is deeper when it encounters the area around City Well No. 1, and some of this groundwater is captured by Well No. 1. The remainder of the groundwater originating within the source area is captured by City Well No. 2, and none of this deeper groundwater reaches City Well No. 3.

4.3 Contaminant Transport Model

Groundwater contaminant concentrations are observed to decrease at most sites as the contaminants migrate away from the source area. The reduction in contaminant concentration is due to several fate and transport processes, including dilution, dispersion, sorption, abiotic oxidation, hydrolysis, volatilization, and biodegradation. These naturally occurring processes are collectively referred to as natural attenuation.

Evidence of natural attenuation at the site is found in the geochemical data from the upgradient and source area wells. Near the center of a contaminant plume, the groundwater would be expected to be depleted of electron acceptors (oxygen, nitrate, and sulfate) and enriched in metabolic by-products (reduced manganese, ferrous iron, and methane) as a result of biodegradation processes. Two wells at the site were sampled for geochemical parameters: MW-01, located within the free product area, and MW-02, located east and upgradient of MW-01 in an uncontaminated area. Both wells did not have any detectable dissolved oxygen or nitrate. The increased concentration of ferrous iron, decreased sulfate, and increased methane within the groundwater plume are all consistent with biodegradation involving iron reducers, sulfate reducers, and methanogens. Table 4-4 summarizes the observed changes in groundwater geochemistry at the site.

Additional evidence of natural attenuation is observed in the diminishing concentrations of hydrocarbons in the downgradient wells. Table 4-5 summarizes the BTEX concentrations in two groups of wells that are aligned approximately parallel to the groundwater flow direction. The BTEX concentrations are shown to diminish from approximately 350 µg/L in the source area wells to non-detect within 130 to 160 feet downgradient.

The natural attenuation of BTEX in the groundwater plume at the State Street Mystery Site was modeled using BIOSCREEN (Newell et al., 1997). BIOSCREEN is a screening model for simulating natural attenuation of petroleum hydrocarbons and has the ability to simulate one-dimensional advection, three-dimensional dispersion, linear adsorption, and first-order or instantaneous reaction biodegradation. The model can be used to simulate changes in BTEX concentrations as a function of distance downgradient of the NAPL source area.

TABLE 4-4
Groundwater Geochemistry at Upgradient and Source Area Wells

Indicator	Upgradient Groundwater at MW-02 (mg/L)	NAPL Source Area Groundwater at MW-01 (mg/L)
BTEX	ND	0.366
DRO	ND	22
Oxygen (O ₂)	ND	ND
Nitrate (NO ₃ ⁻)	ND	ND
Manganese (Mn ⁺²)	2.02	1.95
Ferrous Iron (Fe ⁺²)	6.83	22.2
Sulfate (SO ₄ ⁻²)	7.44	2.78
Methane (CH ₄)	0.28	0.44
Alkalinity (HCO ₃ ⁻ + 2CO ₃ ⁻² + OH ⁻ - H ⁺)	110	101

TABLE 4-5
BTEX Concentrations in Downgradient Monitoring Wells and Probes

Well	Downgradient Distance (feet)	BTEX Concentration (micrograms per liter)
Flowpath A		
DP-08	0	351.6
DP-06	38	154
MW-04	132	ND
Flowpath B		
MW-01	0	365.9
DP-05	34	21.14
MW-03	155	ND

Note: ND = not detected

During the model setup, assumptions were made as to the age of the spill (10 years); the initial source area BTEX concentration at the time of the spill (0.4 mg/L), and the soluble mass of NAPL in the source area (100 kg). The groundwater flow velocity calculated by the hydraulic groundwater flow model described in Section 4.2 was also used as input to the BIOSCREEN model. The model was calibrated to the field data presented in Table 4-5, using a trial and error process to estimate the first-order biodegradation rate for BTEX. For Flowpath A (downgradient of Well DP-08), the estimated biodegradation rate was 0.047 day⁻¹, and for Flowpath B (downgradient of Well MW-01), the estimated biodegradation rate was 0.189 day⁻¹. These rates are within the range of literature values for

anaerobic field studies reported by Suarez and Rafai (1999). The input and output screens for the BIOSCREEN runs are shown in Appendix D.

The BIOSCREEN simulations predict that the plume is at steady state and is not expanding beyond its current length of less than 130 feet downgradient of MW-01 and less than 160 feet downgradient of DP-08. The model results also show what the predicted plume length and concentrations would be if no biodegradation was occurring. Without biodegradation, the model predicts that the BTEX plume would be more than 400 feet in length, which is not seen in the field data from sampling downgradient wells MW-03 and MW-04. This indicates that dilution and sorption alone do not explain the observed plume attenuation and, therefore, biodegradation is occurring.

Based on the field data and groundwater modeling results, the dissolved-phase hydrocarbon plume is less than 160 feet long and the plume is not expected to impact the City of Skagway water supply wells, which are approximately 1,600 feet from the site.

Conclusions and Recommendations

5.1 Conclusions

Data collected during the site characterization at the State Street Mystery Site in February 2003 were evaluated as follows:

- To further characterize the extent of contamination
- To identify potential sources for free product observed in soil and groundwater at the site
- To determine if groundwater passing through the site eventually captured by the City of Skagway municipal water supply wells
- To determine if site contaminants naturally attenuate to non-detectable concentrations before they could reach the municipal water supply wells

The following conclusions are presented based on the data collected and this evaluation.

5.1.1 Site Characterization Conclusions

Soil and groundwater samples were collected from 13 driven probe locations, and three rounds of groundwater sampling were performed at the 4 existing monitoring wells. Conclusions from the evaluation of this new data along with data collected from previous investigations include the following:

- The extent of site contamination appears to have now been delineated on three sides; the southwest side of 20th Avenue (Test Pit 3 and TB-5), the southeast side of State Street (DP-01 through DP-04), and the northeast side of the Moe lot (Test Pits 6 and 7, DP-09 and DP-11) all had no sheen on groundwater samples and low or non-detectable soil contamination.
- The northwestern portion of the Moe lot on the south side of the stream appears to have the highest soil contamination detected to date (11,000 mg/kg DRO was detected in samples from both Test Pit 8 and DP-08). Groundwater samples from this area also had high concentrations of DRO (15,000 µg/L at DP-08 and 24,000 µg/L at DP-10).
- The site characterization results suggest that the source of contamination may be near the northwestern portion of the Moe lot where a trailer fire and heating oil tank explosion occurred in January 1997, or from an area north of the Moe property, across the stream and/or the alley.

5.1.2 Free Product Recovery Conclusions

Free product recovery was conducted at MW-01 between May 15 and June 26, 2003. Although an initial pumpdown – rebound test suggested that product flowed freely into the

well, the skimmer pump recovered less than one gallon during the 43-day operating period. Due to the low recovery volume, the product recovery system was demobilized.

5.1.3 Modeling Conclusions

A groundwater flow model of the Skagway Valley was constructed and calibrated to available hydraulic data. The model was used to evaluate the groundwater flow conditions in the area, and to investigate the potential for existing groundwater contamination to impact City of Skagway water supply wells. Specific conclusions from the analysis include:

- Groundwater flow directions in the vicinity of the State Street site are to the southwest, generally paralleling the orientation of the Skagway River
- Groundwater flow velocities in the area are about 4 feet per day or 1,460 feet per year
- Groundwater originating in the contaminated area of the State Street site will eventually be captured by the City of Skagway production wells located approximately 1,600 feet downgradient of the site
- The groundwater travel time between the site and the City wells is between 0.8 and 1.6 years
- Model simulations predict that if the source area at the State Street site extends 5 feet beneath the water table, groundwater that passes through this area will be captured by City Well No. 2.
- Model simulations further predict that if the source area at the State Street site extends 10 feet beneath the water table, then groundwater passing through this area will be captured by City Wells No 1 and No. 2.

Further modeling was used to evaluate the stability of the petroleum hydrocarbon plume and evaluate if detectable contamination would migrate to the City wells. The results of the contaminant transport modeling were the following:

- Biodegradation of petroleum hydrocarbons is taking place by naturally-occurring microorganisms.
- The groundwater plume is at steady state (not expanding).
- Contaminated groundwater from the site attenuates to non-detectable levels less than 130 feet downgradient of MW-01 and less than 160 feet downgradient of DP-08.
- The contaminated groundwater is not expected to impact the City wells located approximately 1,600 feet from the site.

5.2 Recommendations

The extent of contamination has not been fully delineated in an area north of the Moe property across a small stream and alley. Additional investigation in this area would help determine if the free product observed on the Moe property is potentially coming from an offsite source. Further sampling is also recommended in the northwest portion of the Moe

lot where a trailer fire and heating oil tank explosion occurred and contamination was detected at 2 to 4 feet deep at probe location DP-08.

SECTION 6

References

ADEC, 2002a. *Request for Proposal, Site Characterization Work Plan, State Street Mystery Site, Skagway, Alaska*. November 7, 2002.

ADEC, 2002b. *18 AAC 75, Article 3, Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances*. January 30, 2003.

Balding, G.O., 1975, *Water Resources Data for Skagway, Alaska*. United States Geological Survey open-file report, 34 pp.

CH2MHILL, 2003a. *Final Work Plan, Site Characterization Plan, State Street Mystery Site*. February 2003.

CH2MHILL, 2003b. *Free Product Recovery Plan, State Street Mystery Site*. April 2003.

Hart Crowser, 2002. *Soil and Groundwater Assessment Report, State Street and 20th Avenue, Skagway, Alaska*. March, 2002.

Hemker, C.J., and R.G. de Boer, 2003. *Groundwater Flow Modeling using Micro-Fem, Version 3*.

Smith Bayliss LeResche, 2000. *Site Assessment Report, Petroleum Contamination at State Street, Skagway, Alaska*. January 13, 2000.

Smith Bayliss LeResche, 2001. *Site Assessment Report, Moe Property, Lot 119 City of Skagway, Alaska*. October 5, 2001.

Western Regional Climate Center. *Period of Record Monthly Climate Summary: 7/1/1965 to 6/30/2001*. Skagway 2, Alaska (508528). Retrieved January 29, 2003.

<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?akskag>

Yehle, L.A., and Lemke, R.W., 1972, *Reconnaissance engineering geology of the Skagway area, Alaska, with emphasis on evaluation of earthquake and other geologic hazards*: U.S. Geological Survey open-file report, 108pp.

Appendix A

Well Purge and Sampling Field Sheets



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery

PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):	4.78	CASING DIAMETER	L/FT OF CASING	SAMPLE ID	55MØ3 WAØ2, 1703
Depth to Oil/Water Interface (FTOC):	6.39	1.25 IN	0.2411	WELL ID	MW-Ø1
Depth to Water (FTOC):		2 IN.	0.6178	INTERVAL	
Sheen on Water?		4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	12.32	6 IN.	5.5600	DATE	3/1/03
Casing Volume (gallons):	~1.5	8 IN.	9.8837	TIME	1700 - 1705 (DUP)

METHOD OF PURGING (circle one)

PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1630 - 1707	BAILER VOL. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS: _____
PUMP TIME (min): _____	VOL. PURGED (gals): _____
TOTAL VOL PURGED (L): _____	OTHER: _____

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME	1713	1715	1717	1719		
Water Level						
Volume Purged (L)						
pH (s.units)	6.42	6.39	6.38	6.38		
TEMP (C)	3.0	3.0	3.0	3.0		
COND (mcu/cm)	0.282	0.282	0.281	0.282		
TURBIDITY (NTU)	477	474	474	472		
REDOX (-/+ mV)	-27	-29	-30	-31		
DO (mg/L)	2.00	0.00	0.00	0.00		

SAMPLE PARAMETERS:

SAMPLE TYPE: PROJECT DUPLICATE QA EQUIPMENT BLANK OTHER: WAIT

FILTERED? Y / N . 1.0um 0.45um OTHER:

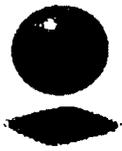
OBSERVATIONS

COLOR: CLEAR AMBER , TAN , BROWN , GREY , MILKY WHITE , OTHER:

ODOR: NONE , LOW , MEDIUM , HIGH , VERY STRONG H2S , FUEL LIKE , CHEMICAL ? , UNKNOWN

TURBIDITY: NONE , LOW , MEDIUM , HIGH , VERY TURBID. HEAVY SILTS

COMMENTS:



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery

PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):	—	CASING DIAMETER	L/FT OF CASING	SAMPLE ID	SSM ϕ 3WA ϕ 2 ϕ 3
Depth to Oil/Water Interface (FTOC):	—	1.25 IN	0.2411	WELL ID	MW- ϕ 2 ϕ 2
Depth to Water (FTOC):	5.14	2 IN.	0.6178	INTERVAL	
Sheen on Water?	NO	4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	13.81	6 IN.	5.5600	DATE	3/2/03
Casing Volume (gallons):	~ 2.3 L	8 IN.	9.8837	TIME	1530

METHOD OF PURGING (circle one)

PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1535	BAILER VOL.. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS: _____
PUMP TIME (min): _____	VOL. PURGED (gals): _____
TOTAL VOL PURGED (L): _____	OTHER: _____

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME :	1538	1540	1541	1542	1543	
Water Level	5.17	5.17	5.17	5.17	5.17	
Volume Purged (L)	1.0	~1.5	~1.8	~2.1	~2.4	
pH (s.units)	6.42	6.41	6.40	6.39	6.39	
TEMP (C)	5.5	5.5	5.5	5.5	5.5	
COND (mb/cm)	0.280	0.279	0.279	0.279	0.279	
TURBIDITY (NTU)	5.7	4.4	2.0	0.9	0.9	
REDOX (-/+ mV)	12	11	9	8	7	
DO (mg/L)	0.00	0.00	0.00	0.00	0.00	

SAMPLE PARAMETERS:

SAMPLE TYPE: PROJECT _____ DUPLICATE _____ QA _____ EQUIPMENT BLANK _____ OTHER: _____

FILTERED? (Y) N 1.0um (0.45um) OTHER: AFTER PRESERVATION

OBSERVATIONS

COLOR: CLEAR, AMBER, TAN, BROWN, GREY, MILKY WHITE, OTHER: _____

ODOR: NONE, LOW, MEDIUM, HIGH, VERY STRONG, H2S, FUEL LIKE, CHEMICAL?, UNKNOWN

TURBIDITY: NONE, LOW, MEDIUM, HIGH, VERY TURBID. HEAVY SILTS

COMMENTS: _____



WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery
PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):		CASING DIAMETER	L/FT OF CASING	SAMPLE ID	SSMØ3 WA19
Depth to Oil/Water Interface (FTOC):		1.25 IN	0.2411	WELL ID	MW-Ø3
Depth to Water (FTOC):	4.62	2 IN.	0.6178	INTERVAL	
Sheen on Water?		4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	13.51	6 IN.	5.5600	DATE	3/2/03
Casing Volume (gallons):		8 IN.	9.8837	TIME	1230

METHOD OF PURGING (circle one)

PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1214	BAILER VOL.. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS:
PUMP TIME (min):	VOL. PURGED (gals):
TOTAL VOL PURGED (L):	OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME	1218	1219	1220	1221	1223	
Water Level	4.65	4.66	4.67	4.67	4.66	
Volume Purged (L)						
pH (s.units)	6.31	6.32	6.32	6.33	6.32	
TEMP (C)	3.9	3.8	3.8	3.8	3.8	
COND (mS/cm)	0.368	0.368	0.367	0.367	0.367	
TURBIDITY (NTU)	71	60	49	42	35	
REDOX (-/+ mV)	5	3	-0	-2	-3	
DO (mg/L)	2.57	0.00	0.00	0.00	0.00	

SAMPLE PARAMETERS:

SAMPLE TYPE: PROJECT DUPLICATE QA EQUIPMENT BLANK OTHER:

FILTERED? Y / N . 1.0um 0.45um OTHER:

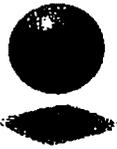
OBSERVATIONS

COLOR: CLEAR, AMBER, TAN, BROWN, GREY, MILKY WHITE, OTHER:

ODOR: NONE, LOW, MEDIUM, HIGH, VERY STRONG (H2S), FUEL LIKE, CHEMICAL?, UNKNOWN

TURBIDITY: NONE, LOW, MEDIUM, HIGH, VERY TURBID. HEAVY SILTS

COMMENTS:



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery

PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):	5.14	CASING DIAMETER	L/FT OF CASING	SAMPLE ID	55MØ3WA24 (DUP WA25)
Depth to Oil/Water Interface (FTOC):	6.42	1.25 IN	0.2411	WELL ID	MWØ1
Depth to Water (FTOC):		2 IN.	0.6178	INTERVAL	~ 10' FTOC
Sheen on Water?	Y	4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	~ 14' (NM)	6 IN.	5.5600	DATE	4/2/03
Casing Volume (gallons):	~ 5L	8 IN.	9.8837	TIME	1505 (1510-DUP)

METHOD OF PURGING (circle one)

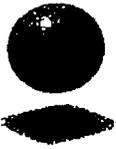
PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1445	BAILER VOL. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS:
PUMP TIME (min): 18	VOL. PURGED (gals):
TOTAL VOL PURGED (L): 6	OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME	1448	1451	1454	1457	1500	1503
Water Level	NM	_____ →				
Volume Purged (L)	1	2	3	4	5	6
pH (s.units)	6.13	6.14	6.18	6.21	6.23	6.24
TEMP (C)	3.15	3.16	3.13	3.13	3.10	3.12
COND (ms/cm)	0.292	0.296	0.296	0.295	0.295	0.295
TURBIDITY (NTU)	157	160	136	111	93	85
REDOX (-/+ mV)	-38	-44	-57	-64	-70	-72
DO (mg/L)	6.00	2.51	0.71	0.25	0.09	0.00

SAMPLE PARAMETERS:	DRO (AK 102)	BTEX 8021B			
SAMPLE TYPE:	PROJECT	DUPLICATE	QA	EQUIPMENT BLANK	OTHER:
FILTERED? Y / (N)	1.0um	0.45um	OTHER:		

OBSERVATIONS

COLOR:	CLEAR	AMBER	TAN	BROWN	GREY	MILKY WHITE	OTHER:		
ODOR:	NONE	LOW	MEDIUM	HIGH	VERY STRONG	H2S	FUEL LIKE	CHEMICAL ?	UNKNOWN
TURBIDITY:	NONE	LOW	MEDIUM	HIGH	VERY TURBID	HEAVY SILTS			
COMMENTS:									



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery

PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):		CASING DIAMETER	L/FT OF CASING	SAMPLE ID	SSMØ3WA21
Depth to Oil/Water Interface (FTOC):		1.25 IN	0.2411	WELL ID	MW-Ø2
Depth to Water (FTOC):	5.45	2 IN.	0.6178	INTERVAL	
Sheen on Water?		4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	13.81	6 IN.	5.5600	DATE	4/2/03
Casing Volume (LITERS/gallons):	5.16	8 IN.	9.8837	TIME	10005

METHOD OF PURGING (circle one)

PUMP: SUB CENT (PERIST) OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 0945	BAILER VOL.. (gal) .25 / .33
FLOW RATE (Lpm): 20.3	REQUIRED PULLS:
PUMP TIME (min): 18	VOL. PURGED (gals):
TOTAL VOL PURGED (L): 6	OTHER:

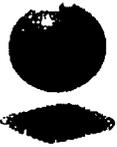
FIELD MEASUREMENTS

FIELD PARAMETERS	1st	2nd	3rd	4th	5th	6th
TIME	0948	0951	0954	0957	1000	1003
Water Level	5.47	5.48	5.48	5.48	5.48	5.48
Volume Purged (L)	1	2	3	4	5	6
pH (s.units)	5.77	5.86	5.94	6.04	6.07	6.09
TEMP (C)	3.90	3.82	3.86	3.90	3.90	3.90
COND (mb/cm)	0.361	0.350	0.336	0.325	0.323	0.322
TURBIDITY (NTU)	55.3	51.9	42.0	33.5	31.3	25.5
REDOX (-/+ mV)	29	23	13	-0	-3	-7
DO (mg/L)	2.75	1.50	0.85	0.11	0.10	0.00

SAMPLE PARAMETERS: NO. BTEX
SAMPLE TYPE: PROJECT DUPLICATE QA EQUIPMENT BLANK OTHER:
FILTERED? Y / N 1.0um 0.45um OTHER:

OBSERVATIONS

COLOR: CLEAR, AMBER, TAN, BROWN, GREY, MILKY WHITE, OTHER:
ODOR: NONE, LOW, MEDIUM, HIGH, VERY STRONG, H2S, FUEL LIKE, CHEMICAL?, UNKNOWN
TURBIDITY: NONE, LOW, MEDIUM, HIGH, VERY TURBID. HEAVY SILTS
COMMENTS:



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery

PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):		CASING DIAMETER	L/FT OF CASING	SAMPLE ID	SSMØ3 WA 22
Depth to Oil/Water Interface (FTOC):		1.25 IN	0.2411	WELL ID	MW-03
Depth to Water (FTOC):	4.98	2 IN	0.6178	INTERVAL	
Sheen on Water?		4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	13.46	6 IN.	5.5600	DATE	4/2/03
Casing Volume (gallons):	5.24	8 IN.	9.8837	TIME	1150

METHOD OF PURGING (circle one)

PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1130	BAILER VOL. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS:
PUMP TIME (min): 18	VOL. PURGED (gals):
TOTAL VOL PURGED (L): 6	OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME	1133	1136	1139	1142	1145	1148
Water Level	5.03	5.02	5.01	5.01	5.02	5.01
Volume Purged (L)	1	2	3	4	5	6
pH (s.units)	6.12	6.14	6.18	6.20	6.21	6.23
TEMP (C)	4.26	3.81	3.28	3.25	3.20	3.24
COND (m ² /cm)	0.395	0.397	0.398	0.397	0.398	0.397
TURBIDITY (NTU)	100	100	33.1	28.0	23.0	22.5
REDOX (-/+ mV)	-16	-18	-29	-33	-37	-39
DO (mg/L)	2.40	1.87	0.54	0.99	1.16	0.67

SAMPLE PARAMETERS:	DRO (AK102)	STEX (8021 B)
SAMPLE TYPE:	PROJECT	DUPLICATE QA EQUIPMENT BLANK OTHER:
FILTERED?	Y / (N)	1.0um 0.45um OTHER:

OBSERVATIONS

COLOR:	CLEAR	AMBER	TAN	BROWN	GREY	MILKY WHITE	OTHER:		
ODOR:	NONE	LOW	MEDIUM	HIGH	VERY STRONG	H ₂ S	FUEL LIKE	CHEMICAL ?	UNKNOWN
TURBIDITY:	NONE	LOW	MEDIUM	HIGH	VERY TURBID	HEAVY SILTS			
COMMENTS:									



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery

PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):		CASING DIAMETER	L/FT OF CASING	SAMPLE ID	55MØ3WA23
Depth to Oil/Water Interface (FTOC):		1.25 IN	0.2411	WELL ID	MW-04
Depth to Water (FTOC):	5.27	2 IN.	0.6178	INTERVAL	~ 10' FTOC
Sheen on Water?		4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	13.91	6 IN.	5.5600	DATE	4/2/03
Casing Volume (gallons):	5.34	8 IN.	9.8837	TIME	1340

METHOD OF PURGING (circle one)

PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1320	BAILER VOL.. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS:
PUMP TIME (min): 18	VOL. PURGED (gals):
TOTAL VOL PURGED (L): 6	OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME	1323	1326	1329	1332	1335	1338
Water Level	5.38	5.35	5.36	5.36	5.31	5.37
Volume Purged (L)	1	2	3	4	5	6
pH (s.units)	5.91	5.83	5.81	5.82	5.82	5.83
TEMP (C)	3.09	2.89	2.74	2.66	2.60	2.59
COND (mS/cm)	0.388	0.379	0.368	0.358	0.356	0.353
TURBIDITY (NTU)	>999	830	312	157	132	135
REDOX (-/+ mV)	17	71	59	52	46	43
DO (mg/L)	1.80	0.30	0.00	0.00	0.00	0.00

SAMPLE PARAMETERS: DRO (A1K 102) + BTEX (8021B)

SAMPLE TYPE: PROJECT DUPLICATE QA EQUIPMENT BLANK OTHER:

FILTERED? Y / N 1.0um 0.45um OTHER:

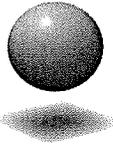
OBSERVATIONS

COLOR: CLEAR, AMBER, TAN, BROWN, GREY, MILKY WHITE, OTHER:

ODOR: NONE, LOW, MEDIUM, HIGH, VERY STRONG, H2S, FUEL LIKE, CHEMICAL?, UNKNOWN

TURBIDITY: NONE, LOW, MEDIUM, HIGH, VERY TURBID. HEAVY SILTS

COMMENTS:



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery
PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):	4.63'	CASING DIAMETER	L/FT OF CASING	SAMPLE ID	SSM Ø3 WA 26
Depth to Oil/Water Interface (FTOC):	4.69'	1.25 IN	0.2411	WELL ID	MW-Ø1
Depth to Water (FTOC):		2 IN.	0.6178	INTERVAL	~ 85' FTOC
Sheen on Water?	No	4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	12.3'	6 IN.	5.5600	DATE	JUNE 26, 2003
Casing Volume (gallons):	4.7	8 IN.	9.8837	TIME	³ 1645 1640

METHOD OF PURGING (circle one)

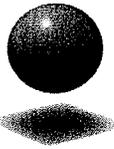
PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1627	BAILER VOL.. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS:
PUMP TIME (min): 12	VOL. PURGED (gals):
TOTAL VOL PURGED (L): 4	OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME	1630	1633	1636	1639		
Water Level TOP OWI	4.67 4.76	4.67 4.76	4.66 4.76	4.65 4.75		
Volume Purged (L)	1	2	3	4		
pH (s.units)	5.86	5.82	5.80	5.81		
TEMP (C)	8.31 8.315	8.27	8.21	8.12		
COND (mS/cm)	0.238	0.236	0.231	0.229		
TURBIDITY (NTU)	12.8	7.6	4.8	3.1		
REDOX (-/+ mV)	-38	-45	-55	-64		
DO (mg/L)	0.90	0.68	0.60	0.58		

SAMPLE PARAMETERS: DRO, BTEX
SAMPLE TYPE: PROJECT DUPLICATE QA EQUIPMENT BLANK OTHER:
FILTERED? Y / N 1.0um 0.45um OTHER:

OBSERVATIONS

COLOR: CLEAR, AMBER, TAN, BROWN, GREY, MILKY WHITE, OTHER:
ODOR: NONE, LOW, MEDIUM HIGH, VERY STRONG, H2S FUEL LIKE, CHEMICAL?, UNKNOWN
TURBIDITY: NONE, LOW, MEDIUM, HIGH, VERY TURBID. HEAVY SILTS
COMMENTS: COLLECTED DUPLICATE SSM Ø3 WA 27 @ 1645.



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery

PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):	—	CASING DIAMETER	L/FT OF CASING	SAMPLE ID	SSM Ø3 WA 28
Depth to Oil/Water Interface (FTOC):	—	1.25 IN	0.2411	WELL ID	MW-Ø2
Depth to Water (FTOC):	4.81	2 IN.	0.6178	INTERVAL	~ 9.5' FTOC
Sheen on Water?	NO 13.81-3	4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	13.81	6 IN.	5.5600	DATE	6/27/03
Casing Volume (gallons):	5.6	8 IN.	9.8837	TIME	1105

METHOD OF PURGING (circle one)

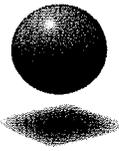
PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1050	BAILER VOL.. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS:
PUMP TIME (min): 12	VOL. PURGED (gals):
TOTAL VOL PURGED (L): 4	OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME	1053	1056	1059	1102		
Water Level	4.82	4.82	4.82	4.82		
Volume Purged (L)	1	2	3	4		
pH (s.units)	5.62	5.69	5.71	5.72		
TEMP (C)	6.50	6.36	6.34	6.33		
COND (mS/cm)	0.291	0.279	0.276	0.274		
TURBIDITY (NTU)	4.9	5.0	4.6	4.3		
REDOX (-/+ mV)	52	42	38	35		
DO (mg/L)	HORIBA YSI	0.30 1.00	0.00 0.88	0.00 0.89	0.00 0.87	

SAMPLE PARAMETERS: DRO, BTEX
SAMPLE TYPE: PROJECT DUPLICATE QA EQUIPMENT BLANK OTHER:
FILTERED? Y / (N) 1.0um 0.45um OTHER:

OBSERVATIONS

COLOR: CLEAR, AMBER, TAN, BROWN, GREY, MILKY WHITE, OTHER:
ODOR: NONE, LOW, MEDIUM, HIGH, VERY STRONG, H2S, FUEL LIKE, CHEMICAL?, UNKNOWN
TURBIDITY: NONE, LOW, MEDIUM, HIGH, VERY TURBID. HEAVY SILTS
COMMENTS:



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery

PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):	—	CASING DIAMETER	L/FT OF CASING	SAMPLE ID	SSM Ø3 WA 29
Depth to Oil/Water Interface (FTOC):	—	1.25 IN	0.2411	WELL ID	MW-Ø4
Depth to Water (FTOC):	4.49	2 IN.	0.6178	INTERVAL	~ 8.7'
Sheen on Water?	NO	4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	13.91	6 IN.	5.5600	DATE	6/27/03
Casing Volume (gallons):	5.8	8 IN.	9.8837	TIME	1200

METHOD OF PURGING (circle one)

PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1140	BAILER VOL.. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS:
PUMP TIME (min): 15	VOL. PURGED (gals):
TOTAL VOL PURGED (L): 5	OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME	1143	1146	1149	1152	1155	1158 ^{SB}
Water Level	4.54	4.55	4.55	4.55	4.56	
Volume Purged (L)	1	2	3	4	5	
pH (s.units)	5.42	5.27	5.19	5.17	5.19	
TEMP (C)	9.08	9.16	9.27	9.28	9.38	
COND (mS/cm)	0.349	0.348	0.346	0.343	0.341	
TURBIDITY (NTU)	170	125	74	41	28	
REDOX (-/+ mV)	152	157	164	167	166	
DO (mg/L)	HORIBA YSI 0.83 1.22	0.24 1.13	0.03 1.06	0.00 1.10	0.00 1.12	

SAMPLE PARAMETERS: DRO, BTEX

SAMPLE TYPE: PROJECT DUPLICATE QA EQUIPMENT BLANK OTHER:

FILTERED? Y / (N) 1.0um 0.45um OTHER:

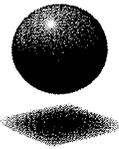
OBSERVATIONS

COLOR: CLEAR, AMBER, TAN, BROWN, GREY, MILKY WHITE, OTHER:

ODOR: NONE, LOW, MEDIUM, HIGH, VERY STRONG, H2S, FUEL LIKE, CHEMICAL?, UNKNOWN

TURBIDITY: NONE, LOW, MEDIUM, HIGH, VERY TURBID. HEAVY SILTS

COMMENTS:



CH2MHILL

WELL PURGE AND SAMPLING FIELD SHEET

PROJECT SITE: State Street Mystery

PROJECT # 178859.A1.20

Depth to Top of Product (FTOC):	—	CASING DIAMETER	L/FT OF CASING	SAMPLE ID	
Depth to Oil/Water Interface (FTOC):	—	1.25 IN	0.2411	WELL ID	
Depth to Water (FTOC):	4.34'	2 IN.	0.6178	INTERVAL	~8.8' FTOC
Sheen on Water?	NO	4 IN.	2.4711	SAMPLER	J. Blei
Total Depth (FTOC):	13.46	6 IN.	5.5600	DATE	6/27/03
Casing Volume (gallons):	5.6	8 IN.	9.8837	TIME	1240

METHOD OF PURGING (circle one)

PUMP: SUB CENT PERIST OTHER:	BAILER: TEFLON SS OTHER:
TIME ON: 1225	BAILER VOL.. (gal) .25 / .33
FLOW RATE (Lpm): 0.3	REQUIRED PULLS:
PUMP TIME (min): 15	VOL. PURGED (gals):
TOTAL VOL PURGED (L): 5	OTHER:

FIELD PARAMETERS	FIELD MEASUREMENTS					
	1st	2nd	3rd	4th	5th	6th
TIME	1228	1231	1234	1237	1240	
Water Level	4.35	4.35	4.35	4.35	4.35	
Volume Purged (L)	1	2	3	4	5	
pH (s.units)	6.35	6.25	6.15	6.07	5.99	
TEMP (C)	7.93	7.28	7.23	7.23	7.17	
COND (mS/cm)	0.381	0.379	0.378	0.378	0.378	
TURBIDITY (NTU)	68	25	22	18	16	
REDOX (-/+ mV)	3	-2	2	6	10	
DO (mg/L)	HORIBA YSI	2.10 1.16	0.00 0.96	0.00 0.95	0.00 0.95	0.00 0.95

SAMPLE PARAMETERS: DRD, BTEX

SAMPLE TYPE: PROJECT DUPLICATE QA EQUIPMENT BLANK OTHER:

FILTERED? Y / (N) 1.0um 0.45um OTHER:

OBSERVATIONS

COLOR: (CLEAR), AMBER, TAN, BROWN, GREY, MILKY WHITE, OTHER:

ODOR: (NONE), LOW, MEDIUM, HIGH, VERY STRONG, H2S, FUEL LIKE, CHEMICAL?, UNKNOWN

TURBIDITY: (NONE), LOW, MEDIUM, HIGH, VERY TURBID. HEAVY SILTS

COMMENTS:

Appendix B
Laboratory Reports and Data Quality
Review Memoranda

Review of Quality Assurance/Quality Control (QA/QC) Data for the Skagway State Street Mystery Site Investigation, February, 2003 Soil and Groundwater Sampling, Skagway, Alaska

TO: Jeremy Blei
COPIES: Project Notebooks
FROM: Anthony Pennino
DATE: March 27, 2003

Summary

Overall, the data is usable for the purpose of the site investigation outlined in the *Skagway State Street Mystery Site Remedial Investigation Work Plan* (CH2M Hill, 2003). Nonconformances are identified and discussed in this report.

Introduction

A review has been conducted on data submitted for the Mystery Site Investigation Project in Anchorage, Alaska. This report summarizes the results of the QA/QC data associated with the analysis of gasoline range organics (GRO), benzene, toluene, ethylbenzene, and xylenes (BTEX) and diesel range organics (DRO). The samples were collected from February 26th through March 2nd 2003. The review focuses on criteria for the following QA/QC parameters and their overall effect on the data.

- Holding times
- Sample handling (chain-of-custody)
- Method blanks
- Sensitivity
- Surrogate spike recovery
- Spike/spike recovery
- Field QA/QC (trip blanks and field duplicates)

A total of 15 soil samples were collected from February 26-27th. The 15 soil samples, consisting of 13 samples and two field duplicates, were analyzed for BTEX by GC (EPA method 8021B), and DRO by GC (AK 102). A total of 18 groundwater samples were collected from February 28th- March 2nd. The 18 samples, consisting of 16 samples and two field duplicates, were analyzed for GRO/BTEX, and DRO. In addition, several samples were analyzed for various inorganic analysis, but those analysis will not be covered in this data assessment.. All soil and groundwater analyses for DRO, and GRO/BTEX were performed by Analytica Alaska (AA) in Anchorage, Alaska. Samples were analyzed in accordance with

ADEC Methods for GRO/BTEX and DRO. U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (February 1994), provided guidelines for data qualification, where applicable.

The level of reporting from the laboratory was QAL's Level II; which includes sample and method blank results, field QC sample results, surrogate recoveries, spike recoveries, chromatograms, and quantitation reports. **The laboratory case narrative stated that all acceptance criteria for calibrations, method blanks, surrogates, spikes, and samples were met; and that all analyses proceeded normally.**

Holding Times

Holding time criteria monitors sample integrity that may be compromised over time. For all soil and groundwater samples submitted, extraction were completed within a seven day period, thus meeting the holding time requirements.

Sampling Handling

Proper sample handling and chain-of-custody procedures help monitor the integrity of the samples.

The chain-of-custody and laboratory case narrative were reviewed to determine if any sample handling procedures might impact the integrity of the samples and the quality of the resulting data.

Cooler temperatures for the samples that were sent in three coolers to the AA laboratory were 2.7, 1.6 and 3.0°C, respectively. These temperatures are within the acceptable limits of 4°C +\ - 2°C.

Method Blanks

Method Blank criteria monitor the existence and magnitude of contamination resulting from sample handling processes and/or instrument carry-over.

The method blank for soil samples had detected levels of BTEX above the MDL but below the PQL. This is most likely due to laboratory contamination, which could have possibly carried over to analyzed samples. Therefore, all samples results between the PQL and MDL were flagged "J" for being possibly biased high due to similar method contamination.

Sensitivity

Sensitivity criteria monitor achievement of method reporting limits.

All samples met their respective method reporting limits.

Surrogate Spike Recovery

Surrogate spike recovery monitors instrument specificity and accuracy. The high native DRO concentrations in soil sample SSM03SL08 caused the sample to be diluted several times, and the surrogate was not detectable at these levels. The same scenario was also seen in soil samples SSM03SL06, SSM03SL07, SSM03SL08, and SSM03SL10 for BTEX. No surrogate discrepancies were noted for any of the water samples analyzed.

Field QA/QC

Field QA/QC monitor for sample contamination and overall sampling and analytical precision.

Trip blanks and field duplicates were the field QA/QC samples outlined in the SAP. One trip blank accompanied the each cooler containing water and soil samples for GRO/BTEX, which were the only volatile water samples collected. Two field duplicates for soil and two field duplicates for groundwater samples were also collected. These quantities satisfy the required one duplicate sample per ten samples collected criteria.

Trip Blanks

Trip blanks are shipped in a cooler containing samples for volatiles analysis. Trip blanks should not contain analytes of interest above the method reporting limit.

Two trip blanks was supplied by the laboratory for GRO/BTEX analysis. The water trip blank was found to contain levels of toluene slightly above the MRL. This contamination is most likely not due to sample contamination, since the majority of the samples associated with the trip blank did not contain any high levels of toluene. It is most likely that this contamination occurred either during the preparation of the trip blank or during its analysis.

Review of Quality Assurance/Quality Control (QA/QC) Data for the Skagway State Street Mystery Site Investigation, June 2003 Groundwater Sampling, Skagway, Alaska

TO: Jeremy Blei
COPIES: Project File
FROM: Anthony Pennino
DATE: August 28, 2003

Summary

Overall, the data is usable for the purpose of the site investigation outlined in the *State Street Mystery Site Characterization Work Plan* (CH2M Hill, 2003). Nonconformances are identified and discussed in this report.

Introduction

A review has been conducted on data submitted for the State Street Mystery Site Investigation Project in Anchorage, Alaska. This report summarizes the results of the QA/QC data associated with the analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and diesel range organics (DRO). The samples were collected June 26th and 27th 2003. This review focuses on criteria for the following QA/QC parameters and their overall effect on the data.

- Holding times
- Sample handling (chain-of-custody)
- Method blanks
- Sensitivity
- Surrogate spike recovery
- Spike/spike recovery
- Field QA/QC (trip blanks and field duplicates)

A total of 5 groundwater samples were collected. The 5 samples, consisting of 4 samples and one field duplicate, were analyzed for BTEX and DRO. All analyses were performed by Analytica Alaska (AA) in Anchorage, Alaska. Samples were analyzed in accordance with ADEC Methods for BTEX and DRO. U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (February 1994), provided guidelines for data qualification, where applicable.

The laboratory case narrative stated that all acceptance criteria for calibrations, method blanks, surrogates, spikes, and samples were met; and that all analyses proceeded normally.

Holding Times

Holding time criteria monitors sample integrity that may be compromised over time. For all samples submitted, extractions were completed within a fourteen-day period, thus meeting the holding time requirements.

Sampling Handling

Proper sample handling and chain-of-custody procedures help monitor the integrity of the samples.

The chain-of-custody and laboratory case narrative were reviewed to determine if any sample handling procedures might impact the integrity of the samples and the quality of the resulting data.

The cooler temperature for the samples that were sent in one cooler to the AA laboratory was 5.7° C. This temperature is within the acceptable limits of 4° C +\ - 2° C.

Method Blanks

Method Blank criteria monitor the existence and magnitude of contamination resulting from sample handling processes and/or instrument carry-over.

The method blank for soil samples had no detectable levels of BTEX.

Sensitivity

Sensitivity criteria monitor achievement of method reporting limits.

All samples met their respective method reporting limits.

Surrogate Spike Recovery

Surrogate spike recovery monitors instrument specificity and accuracy. No surrogate discrepancies were noted for any of the water samples analyzed.

Field QA/QC

Field QA/QC monitors for sample contamination and overall sampling and analytical precision.

Trip blanks and field duplicates were the field QA/QC samples outlined in the SAP. One trip blank and one field duplicate accompanied the cooler containing samples. These quantities satisfy the required one duplicate sample per ten samples collected and one trip blank per cooler criteria.

No BTEX compounds were detected in the trip blank sample and the relative percent difference in results associated with the duplicate sample and its project sample are within acceptable limits.



Analytica Alaska Southeast
5438 Shaune Drive
Juneau, AK 99801
(907) 780-6668
Fax (907) 780-6670

3/14/2003

CH2M Hill of Alaska
301 W. Northern Lights Blvd.
Suite 601
Anchorage, AK 99503
Attn: Win Westervelt

Work Order #: J0303002
Date: 3/14/2003
Work ID: Skagway State Street Mystery
Date Received: 2/28/2003

Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
J0303002-01	SSM03SL01 -DP-01	J0303002-02	SSM03SL02 -DP-02
J0303002-03	SSM03SL03 -DP-03	J0303002-04	SSM03SL04 DP-04
J0303002-05	SSM03SL05	J0303002-06	SSM03SL06
J0303002-07	SSM03SL07	J0303002-08	SSM03SL08
J0303002-09	SSM03SL09	J0303002-10	SSM03SL10
J0303002-11	SSM03SL11	J0303002-12	SSM03SL12
J0303002-13	SSM03SL13	J0303002-14	SSM03SL14
J0303002-15	SSM03SL15	J0303002-16	trip blank

Enclosed are the analytical results for the submitted sample(s). Please review the CASE NARRATIVE for a discussion of any data and/or quality control issues. Listings of data qualifiers, analytical codes, key dates, and QC relationships are provided at the end of the report.

Sincerely,

Jason Gray
Project Manager

"The Science of Analysis, The Art of Service"

Case Narrative

Analytica Alaska Southeast

Work Order: J0303002

Samples were prepared and analyzed by EPA or equivalent methods in the following references:

Test Methods for Evaluating Solid Waste, USEPA SW-846, Third Ed., Rev.4, December 1996.

ADEC Method AK102 For the Determination of Diesel Range Organics.

SAMPLE RECEIPT:

There were 16 samples initially received at Analytica-Juneau on 2/28/2002. Samples were received at a temperature of 3.7°C in one cooler in good condition and in order per chain of custody.

All samples were subsequently transferred to Analytica-Anchorage (ADEC Laboratory Approval Number: UST-014) where they were received on 3/4/2003 in one cooler at temperature of 4.1°C in good condition and in order per chain of custody.

REVIEW FOR COMPLIANCE WITH ANALYTICA QA PLAN

A summary of our review is shown below, organized by test:

Test Method: ADEC AK102 - (DRO) - Solid

HOLDING TIMES:

Holding times were met for this Test.

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.

CONTINUING CALIBRATIONS:

Continuing calibrations were within method criteria.

SURROGATE RECOVERIES:

Surrogate recovery for samples were within the test method acceptance criteria with the following noted explanation; AK102 DRO sample SSM03SL08 (J0303002-08A) contained high levels of hydrocarbon that required the sample extracts to be diluted to bring the extract concentration within the instrument calibration range. At the diluted level, it was not feasible to recover and detect the spiked surrogates above the high background contamination present in the sample. These unrecovered surrogate results are flagged with DIL to indicate loss by dilution. These diluted surrogate samples are considered in control with the methodology and no further action was taken.

METHOD BLANK OUTLIERS:

There were no MB outliers, batch MB sample had no detected DRO above PQL.

LCS/LCSD OUTLIERS:

There are no LCS/LCSD outliers.

MS/MSD OUTLIERS:

No samples of this delivery were requested for MS/MSD preparation.

Test Method: Aromatic VOCs by GC/FID via method 8021B - BTEX - Solid

HOLDING TIMES:

Holding times were met for this Test.

Case Narrative

Analytica Alaska Southeast

Work Order: J0303002

(continued)

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.

CONTINUING CALIBRATIONS:

Continuing calibrations were within method criteria.

SURROGATE RECOVERIES:

Surrogate recovery for samples were within the test method acceptance criteria with the following noted explanation; BTEX samples shown below had high levels of hydrocarbon contamination that required the sample extracts be diluted to bring the extract concentration within the instrument calibration range and to prevent damage to the instrument from overloading the detector with hydrocarbon.. At the diluted level, it was not feasible to recover and detect the spiked concentration of surrogate Bromofluorobenzene above the high background contamination present in the sample. These unrecovered surrogate results are flagged with DIL to indicate loss by dilution. These diluted surrogate samples are considered in control with the methodology and no further action was taken. Reporting limits for BTEX compounds are similarly elevated by this necessary dilution of the sample extract.

Sample	LabID	Surrogate	Recovery	LCL	UCL
SSM03SL06	J0303002-06B	Bromofluorobenzene	0	50	150 Complete
SSM03SL07	J0303002-07B	Bromofluorobenzene	0	50	150 Complete
SSM03SL08	J0303002-08B	Bromofluorobenzene	0	50	150 Complete
SSM03SL10	J0303002-10B	Bromofluorobenzene	0	50	150 Complete

METHOD BLANK OUTLIERS:

Associated batch MB sample had detected levels of BTEX as shown below. Detected BTEX in the MB sample was below the PQL reporting limit requirement so is considered in control as per methodology and no further corrective action was taken. All associated field sample with estimate results reported below the PQL (J-flagged results) should be considered as possibly biased high due to similar method contamination.

MB Batch	Analyte	Result	PQL	MDL
A030306001	Toluene	0.0105	0.016	0.00214
A030306001	Ethylbenzene	0.00525	0.016	0.00164
A030306001	Xylenes, Total	0.0278	0.032	0.00458

LCS/LCSD OUTLIERS:

There are no LCS/LCSD outliers.

MS/MSD OUTLIERS:

No samples of this delivery were requested for MS/MSD preparation.

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03SL01

Matrix: Soil Collection Date: 2/26/2003 9:30:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-01A	Analysis Date:	3/14/2003 1:06:00AM
Prep Date:	3/10/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3031386.D
Prep Method ID:	3550	Dilution Factor:	1
Prep Batch Number:	A030310002	Percent Moisture:	18
Report Basis:	Dry Weight Basis	Analyst Initials:	GD
Sample prep wt./vol:	24.11 g	Prep Extract Vol:	1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>
Diesel Range Organics	n/a	11		mg/Kg	5.0	0.78				1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	2.1		mg/Kg	0.24	0.047	2.5	84.9	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-01A	Analysis Date:	3/10/2003 8:54:00AM
Prep Date:	3/10/2003	Instrument:	SCALE
Analytical Method ID:	ASTM D2216 - % moisture	File Name:	
Prep Method ID:	D2216	Dilution Factor:	1
Prep Batch Number:	A030311003	Percent Moisture:	
Report Basis:	As Received	Analyst Initials:	HW
Sample prep wt./vol:	12.86 g	Prep Extract Vol:	10.77 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>
Moisture	na	18		%	0.042	0.0084				1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-01B	Analysis Date:	3/6/2003 11:53:00AM
Prep Date:	3/6/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3030607.D
Prep Method ID:	5035	Dilution Factor:	1
Prep Batch Number:	A030306001	Percent Moisture:	18
Report Basis:	Dry Weight Basis	Analyst Initials:	STE
Sample prep wt./vol:	88.62 g	Prep Extract Vol:	25.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>
Benzene	71-43-2	0.0015	J	mg/Kg	0.0055	0.00060				1
Ethylbenzene	100-41-4	0.0045	J	mg/Kg	0.0055	0.00056				
Toluene	108-88-3	0.0065		mg/Kg	0.0055	0.00073				
Xylenes, Total	1330-20-7	0.015		mg/Kg	0.011	0.0016				

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	0.62		mg/Kg	0.14	0.017	0.86	72.5	50	150	1
Difluorobenzene(PID)	540-36-3	0.42		mg/Kg	0.0055	0.00068	0.43	98.1	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03SL02**

Matrix: Soil Collection Date: 2/26/2003 10:45:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-02A Analysis Date: 3/14/2003 1:33:00AM
Prep Date: 3/10/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3031387.D
Prep Method ID: 3550 Dilution Factor: 1
Prep Batch Number: A030310002 Percent Moisture: 23
Report Basis: Dry Weight Basis Analyst Initials: GD
Sample prep wt./vol: 25.03 g Prep Extract Vol: 1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	20		mg/Kg	5.2	0.80				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	2.0		mg/Kg	0.24	0.049	2.6	77.2	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-02A Analysis Date: 3/10/2003 8:54:00AM
Prep Date: 3/10/2003 Instrument: SCALE
Analytical Method ID: ASTM D2216 - % moisture File Name:
Prep Method ID: D2216 Dilution Factor: 1
Prep Batch Number: A030311003 Percent Moisture:
Report Basis: As Received Analyst Initials: HW
Sample prep wt./vol: 12.37 g Prep Extract Vol: 9.79 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:
Moisture	na	23		%	0.040	0.0079				1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-02B Analysis Date: 3/6/2003 12:23:00PM
Prep Date: 3/6/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3030608.D
Prep Method ID: 5035 Dilution Factor: 1
Prep Batch Number: A030306001 Percent Moisture: 23
Report Basis: Dry Weight Basis Analyst Initials: STE
Sample prep wt./vol: 67.49 g Prep Extract Vol: 25.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL					Rerun #:
Benzene	71-43-2	0.0028	J	mg/Kg	0.0077	0.00084					1
Ethylbenzene	100-41-4	0.0060	J	mg/Kg	0.0077	0.00079					
Toluene	108-88-3	0.0068	J	mg/Kg	0.0077	0.0010					
Xylenes, Total	1330-20-7	0.019		mg/Kg	0.015	0.0022					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	0.89		mg/Kg	0.19	0.024	1.2	74.0	50	150	1
Difluorobenzene(PID)	540-36-3	0.59		mg/Kg	0.0077	0.00096	0.60	98.6	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03SL03**

Matrix: Soil Collection Date: 2/26/2003 11:30:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-03A Analysis Date: 3/13/2003 8:59:00PM
Prep Date: 3/10/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3031377.D
Prep Method ID: 3550 Dilution Factor: 1
Prep Batch Number: A030310002 Percent Moisture: 21
Report Basis: Dry Weight Basis Analyst Initials: GD
Sample prep wt./vol: 13.61 g Prep Extract Vol: 1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	ND		mg/Kg	9.3	1.4				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	4.4		mg/Kg	0.44	0.087	4.7	94.7	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-03A Analysis Date: 3/10/2003 8:54:00AM
Prep Date: 3/10/2003 Instrument: SCALE
Analytical Method ID: ASTM D2216 - % moisture File Name:
Prep Method ID: D2216 Dilution Factor: 1
Prep Batch Number: A030311003 Percent Moisture
Report Basis: As Received Analyst Initials: HW
Sample prep wt./vol: 13.22 g Prep Extract Vol: 10.63 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Moisture	na	21		%	0.040	0.0081					1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-03B Analysis Date: 3/6/2003 12:52:00PM
Prep Date: 3/6/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3030609.D
Prep Method ID: 5035 Dilution Factor: 1
Prep Batch Number: A030306001 Percent Moisture: 21
Report Basis: Dry Weight Basis Analyst Initials: STE
Sample prep wt./vol: 53.37 g Prep Extract Vol: 25.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL					Rerun #:
Benzene	71-43-2	0.0027	J	mg/Kg	0.0095	0.0010					1
Ethylbenzene	100-41-4	0.0068	J	mg/Kg	0.0095	0.00097					
Toluene	108-88-3	0.0085	J	mg/Kg	0.0095	0.0013					
Xylenes, Total	1330-20-7	0.026		mg/Kg	0.019	0.0027					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	1.0		mg/Kg	0.24	0.030	1.5	67.8	50	150	1
Difluorobenzene(PID)	540-36-3	0.72		mg/Kg	0.0095	0.0012	0.74	97.1	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name:

SSM03SL04

Matrix: Soil

Collection Date: 2/26/2003 12:15:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-04A
Prep Date: 3/10/2003
Analytical Method ID: ADEC AK102 - (DRO)
Prep Method ID: 3550
Prep Batch Number: A030310002
Report Basis: Dry Weight Basis
Sample prep wt./vol: 25.27 g

Analysis Date: 3/13/2003 7:36:00PM
Instrument: Roo
File Name: R3031374.D
Dilution Factor: 1
Percent Moisture: 19
Analyst Initials: GD
Prep Extract Vol: 1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	5.4		mg/Kg	4.9	0.75				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	1.9		mg/Kg	0.23	0.046	2.4	76.4	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-04A
Prep Date: 3/10/2003
Analytical Method ID: ASTM D2216 - % moisture
Prep Method ID: D2216
Prep Batch Number: A030311003
Report Basis: As Received
Sample prep wt./vol: 11.62 g

Analysis Date: 3/10/2003 8:54:00AM
Instrument: SCALE
File Name:
Dilution Factor: 1
Percent Moisture:
Analyst Initials: HW
Prep Extract Vol: 9.63 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:
Moisture	na	19		%	0.041	0.0083				1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-04B
Prep Date: 3/6/2003
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX
Prep Method ID: 5035
Prep Batch Number: A030306001
Report Basis: Dry Weight Basis
Sample prep wt./vol: 59.98 g

Analysis Date: 3/6/2003 1:21:00PM
Instrument: Natasha
File Name: N3030610.D
Dilution Factor: 1
Percent Moisture: 19
Analyst Initials: STE
Prep Extract Vol: 25.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Benzene	71-43-2	0.0027	J	mg/Kg	0.0082	0.00090				1	
Ethylbenzene	100-41-4	0.0065	J	mg/Kg	0.0082	0.00084					
Toluene	108-88-3	0.0096		mg/Kg	0.0082	0.0011					
Xylenes, Total	1330-20-7	0.023		mg/Kg	0.016	0.0024					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	0.87		mg/Kg	0.21	0.026	1.3	68.2	50	150	1
Difluorobenzene(PID)	540-36-3	0.62		mg/Kg	0.0082	0.0010	0.64	97.4	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name:

SSM03SL05

Matrix: Soil

Collection Date: 2/26/2003 2:00:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-05A
Prep Date: 3/10/2003
Analytical Method ID: ADEC AK102 - (DRO)
Prep Method ID: 3550
Prep Batch Number: A030310002
Report Basis: Dry Weight Basis
Sample prep wt./vol: 25.13 g

Analysis Date: 3/14/2003 2:01:00AM
Instrument: Roo
File Name: R3031388.D
Dilution Factor: 1
Percent Moisture: 17
Analyst Initials: GD
Prep Extract Vol: 1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	250		mg/Kg	4.8	0.74				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	1.8		mg/Kg	0.23	0.045	2.4	73.2	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-05A
Prep Date: 3/10/2003
Analytical Method ID: ASTM D2216 - % moisture
Prep Method ID: D2216
Prep Batch Number: A030311003
Report Basis: As Received
Sample prep wt./vol: 13.02 g

Analysis Date: 3/10/2003 8:54:00AM
Instrument: SCALE
File Name:
Dilution Factor: 1
Percent Moisture:
Analyst Initials: HW
Prep Extract Vol: 10.96 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:
Moisture	na	17		%	0.042	0.0084				1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-05B
Prep Date: 3/6/2003
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX
Prep Method ID: 5035
Prep Batch Number: A030306001
Report Basis: Dry Weight Basis
Sample prep wt./vol: 76.46 g

Analysis Date: 3/6/2003 1:51:00PM
Instrument: Natasha
File Name: N3030611.D
Dilution Factor: 1
Percent Moisture: 17
Analyst Initials: STE
Prep Extract Vol: 25.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Benzene	71-43-2	0.0057	J	mg/Kg	0.0063	0.00069				1	
Ethylbenzene	100-41-4	0.043		mg/Kg	0.0063	0.00065					
Toluene	108-88-3	0.012		mg/Kg	0.0063	0.00084					
Xylenes, Total	1330-20-7	0.17		mg/Kg	0.013	0.0018					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	0.72		mg/Kg	0.16	0.020	0.99	73.5	50	150	1
Difluorobenzene(PID)	540-36-3	0.49		mg/Kg	0.0063	0.00079	0.49	99.3	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03SL06

Matrix: Soil Collection Date: 2/26/2003 3:10:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-06A	Analysis Date:	3/14/2003 12:11:00AM
Prep Date:	3/10/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3031384.D
Prep Method ID:	3550	Dilution Factor:	10
Prep Batch Number:	A030310002	Percent Moisture	20
Report Basis:	Dry Weight Basis	Analyst Initials:	GD
Sample prep wt./vol:	25.37 g	Prep Extract Vol:	1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>
Diesel Range Organics	n/a	1,500		mg/Kg	49	7.6				1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	2.4		mg/Kg	2.3	0.46	2.5	96.2	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-06A	Analysis Date:	3/10/2003 8:54:00AM
Prep Date:	3/10/2003	Instrument:	SCALE
Analytical Method ID:	ASTM D2216 - % moisture	File Name:	
Prep Method ID:	D2216	Dilution Factor:	1
Prep Batch Number:	A030311003	Percent Moisture	
Report Basis:	As Received	Analyst Initials:	HW
Sample prep wt./vol:	12.28 g	Prep Extract Vol:	10.04 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>
Moisture	na	20		%	0.041	0.0082				1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-06B	Analysis Date:	3/6/2003 2:20:00PM
Prep Date:	3/6/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3030612.D
Prep Method ID:	5035	Dilution Factor:	4
Prep Batch Number:	A030306001	Percent Moisture	20
Report Basis:	Dry Weight Basis	Analyst Initials:	STE
Sample prep wt./vol:	51.02 g	Prep Extract Vol:	25.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>
Benzene	71-43-2	0.027	J	mg/Kg	0.039	0.0043				1
Ethylbenzene	100-41-4	1.9		mg/Kg	0.039	0.0040				
Toluene	108-88-3	0.080		mg/Kg	0.039	0.0052				
Xylenes, Total	1330-20-7	10		mg/Kg	0.078	0.011				

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	ND		mg/Kg	0.98	0.12	1.5	0.00	50	150	1 DIL
Difluorobenzene(PID)	540-36-3	3.0		mg/Kg	0.039	0.0049	3.1	99.4	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03SL07

Matrix: Soil Collection Date: 2/26/2003 4:20:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-07A Analysis Date: 3/14/2003 2:28:00AM
Prep Date: 3/10/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3031389.D
Prep Method ID: 3550 Dilution Factor: 1
Prep Batch Number: A030310002 Percent Moisture: 10
Report Basis: Dry Weight Basis Analyst Initials: GD
Sample prep wt./vol: 24.24 g Prep Extract Vol: 1.00 ml

Table with 10 columns: Analyte, CASNo, Result, Flags, Units, PQL, MDL, Spike, % Recov, LCL, UCL, Rerun #. Rows include Diesel Range Organics and o-Terphenyl.

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-07A Analysis Date: 3/10/2003 8:54:00AM
Prep Date: 3/10/2003 Instrument: SCALE
Analytical Method ID: ASTM D2216 - % moisture File Name:
Prep Method ID: D2216 Dilution Factor: 1
Prep Batch Number: A030311003 Percent Moisture:
Report Basis: As Received Analyst Initials: HW
Sample prep wt./vol: 11.30 g Prep Extract Vol: 10.23 ml

Table with 10 columns: Analyte, CASNo, Result, Flags, Units, PQL, MDL, Spike, % Recov, LCL, UCL, Rerun #. Row includes Moisture.

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-07B Analysis Date: 3/6/2003 2:49:00PM
Prep Date: 3/6/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3030613.D
Prep Method ID: 5035 Dilution Factor: 4
Prep Batch Number: A030306001 Percent Moisture: 10
Report Basis: Dry Weight Basis Analyst Initials: STE
Sample prep wt./vol: 64.00 g Prep Extract Vol: 25.00 ml

Table with 10 columns: Analyte, CASNo, Result, Flags, Units, PQL, MDL, Spike, % Recov, LCL, UCL, Rerun #. Rows include Benzene, Ethylbenzene, Toluene, Xylenes, Total, Bromofluorobenzene(PID), and Difluorobenzene(PID).

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03SL08

Matrix: Soil Collection Date: 2/26/2003 5:15:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-08A	Analysis Date:	3/14/2003 12:38:00AM
Prep Date:	3/10/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3031385.D
Prep Method ID:	3550	Dilution Factor:	20
Prep Batch Number:	A030310002	Percent Moisture:	46
Report Basis:	Dry Weight Basis	Analyst Initials:	GD
Sample prep wt./vol:	24.63 g	Prep Extract Vol:	1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Diesel Range Organics	n/a	11,000		mg/Kg	150	23		1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	ND		mg/Kg	7.0	1.4	3.7	0.00	50	150	1 DIL

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-08A	Analysis Date:	3/10/2003 8:54:00AM
Prep Date:	3/10/2003	Instrument:	SCALE
Analytical Method ID:	ASTM D2216 - % moisture	File Name:	
Prep Method ID:	D2216	Dilution Factor:	1
Prep Batch Number:	A030311003	Percent Moisture:	
Report Basis:	As Received	Analyst Initials:	HW
Sample prep wt./vol:	14.57 g	Prep Extract Vol:	8.34 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Moisture	na	46		%	0.029	0.0057	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-08B	Analysis Date:	3/6/2003 4:17:00PM
Prep Date:	3/6/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3030616.D
Prep Method ID:	5035	Dilution Factor:	20
Prep Batch Number:	A030306001	Percent Moisture:	46
Report Basis:	Dry Weight Basis	Analyst Initials:	STE
Sample prep wt./vol:	58.07 g	Prep Extract Vol:	25.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Benzene	71-43-2	0.075	J	mg/Kg	0.25	0.028		1
Ethylbenzene	100-41-4	1.7		mg/Kg	0.25	0.026		
Toluene	108-88-3	0.60		mg/Kg	0.25	0.034		
Xylenes, Total	1330-20-7	11		mg/Kg	0.51	0.073		

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	ND		mg/Kg	6.3	0.79	2.0	0.00	50	150	1 DIL
Difluorobenzene(PID)	540-36-3	19		mg/Kg	0.25	0.032	20	96.7	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03SL09

Matrix: Soil Collection Date: 2/26/2003 6:00:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-09A	Analysis Date:	3/13/2003 8:04:00PM
Prep Date:	3/10/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3031375.D
Prep Method ID:	3550	Dilution Factor:	1
Prep Batch Number:	A030310002	Percent Moisture:	8.66
Report Basis:	Dry Weight Basis	Analyst Initials:	GD
Sample prep wt./vol:	26.87 g	Prep Extract Vol:	1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Diesel Range Organics	n/a	ND		mg/Kg	4.1	0.63		1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	1.7		mg/Kg	0.19	0.038	2.0	84.6	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-09A	Analysis Date:	3/10/2003 8:54:00AM
Prep Date:	3/10/2003	Instrument:	SCALE
Analytical Method ID:	ASTM D2216 - % moisture	File Name:	
Prep Method ID:	D2216	Dilution Factor:	1
Prep Batch Number:	A030311003	Percent Moisture:	
Report Basis:	As Received	Analyst Initials:	HW
Sample prep wt./vol:	11.38 g	Prep Extract Vol:	10.48 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Moisture	na	8.7		%	0.046	0.0092	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-09B	Analysis Date:	3/6/2003 4:47:00PM
Prep Date:	3/6/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3030617.D
Prep Method ID:	5035	Dilution Factor:	1
Prep Batch Number:	A030306001	Percent Moisture:	8.66
Report Basis:	Dry Weight Basis	Analyst Initials:	STE
Sample prep wt./vol:	58.96 g	Prep Extract Vol:	25.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Benzene	71-43-2	0.0026	J	mg/Kg	0.0074	0.00082		1
Ethylbenzene	100-41-4	0.0067	J	mg/Kg	0.0074	0.00076		
Toluene	108-88-3	0.010		mg/Kg	0.0074	0.00099		
Xylenes, Total	1330-20-7	0.029		mg/Kg	0.015	0.0021		

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	0.91		mg/Kg	0.19	0.023	1.2	78.6	50	150	1
Difluorobenzene(PID)	540-36-3	0.56		mg/Kg	0.0074	0.00093	0.58	96.7	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03SL10**

Matrix: Soil Collection Date: 2/27/2003 8:00:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-10A Analysis Date: 3/13/2003 8:32:00PM
Prep Date: 3/10/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3031376.D
Prep Method ID: 3550 Dilution Factor: 1
Prep Batch Number: A030310002 Percent Moisture: 8.51
Report Basis: Dry Weight Basis Analyst Initials: GD
Sample prep wt./vol: 24.30 g Prep Extract Vol: 1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	510		mg/Kg	4.5	0.70				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	2.2		mg/Kg	0.21	0.042	2.2	99.4	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-10A Analysis Date: 3/10/2003 8:54:00AM
Prep Date: 3/10/2003 Instrument: SCALE
Analytical Method ID: ASTM D2216 - % moisture File Name:
Prep Method ID: D2216 Dilution Factor: 1
Prep Batch Number: A030311003 Percent Moisture:
Report Basis: As Received Analyst Initials: HW
Sample prep wt./vol: 11.54 g Prep Extract Vol: 10.64 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:
Moisture	na	8.5		%	0.046	0.0092				1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-10B Analysis Date: 3/6/2003 5:16:00PM
Prep Date: 3/6/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3030618.D
Prep Method ID: 5035 Dilution Factor: 4
Prep Batch Number: A030306001 Percent Moisture: 8.51
Report Basis: Dry Weight Basis Analyst Initials: STE
Sample prep wt./vol: 53.93 g Prep Extract Vol: 25.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Benzene	71-43-2	0.0076	J	mg/Kg	0.032	0.0036				1	
Ethylbenzene	100-41-4	0.025	J	mg/Kg	0.032	0.0033					
Toluene	108-88-3	0.028	J	mg/Kg	0.032	0.0043					
Xylenes, Total	1330-20-7	0.37		mg/Kg	0.065	0.0093					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	ND		mg/Kg	0.81	0.10	1.3	0.00	50	150	1 DIL
Difluorobenzene(PID)	540-36-3	2.5		mg/Kg	0.032	0.0041	2.5	97.0	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03SL11**

Matrix: Soil Collection Date: 2/27/2003 8:05:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-11A Analysis Date: 3/13/2003 9:27:00PM
Prep Date: 3/10/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3031378.D
Prep Method ID: 3550 Dilution Factor: 1
Prep Batch Number: A030310002 Percent Moisture: 3.71
Report Basis: Dry Weight Basis Analyst Initials: GD
Sample prep wt./vol: 21.37 g Prep Extract Vol: 1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	640		mg/Kg	4.9	0.75				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	2.5		mg/Kg	0.23	0.046	2.4	101	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-11A Analysis Date: 3/10/2003 8:54:00AM
Prep Date: 3/10/2003 Instrument: SCALE
Analytical Method ID: ASTM D2216 - % moisture File Name:
Prep Method ID: D2216 Dilution Factor: 1
Prep Batch Number: A030311003 Percent Moisture
Report Basis: As Received Analyst Initials: HW
Sample prep wt./vol: 11.13 g Prep Extract Vol: 10.75 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:
Moisture	na	3.7		%	0.048	0.0097				1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-11B Analysis Date: 3/6/2003 5:46:00PM
Prep Date: 3/6/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3030619.D
Prep Method ID: 5035 Dilution Factor: 1
Prep Batch Number: A030306001 Percent Moisture: 3.71
Report Basis: Dry Weight Basis Analyst Initials: STE
Sample prep wt./vol: 59.41 g Prep Extract Vol: 25.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Benzene	71-43-2	0.0020	J	mg/Kg	0.0070	0.00077				1	
Ethylbenzene	100-41-4	0.030		mg/Kg	0.0070	0.00072					
Toluene	108-88-3	0.022		mg/Kg	0.0070	0.00094					
Xylenes, Total	1330-20-7	0.39		mg/Kg	0.014	0.0020					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	1.0		mg/Kg	0.17	0.022	1.1	92.6	50	150	1
Difluorobenzene(PID)	540-36-3	0.53		mg/Kg	0.0070	0.00087	0.55	97.8	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03SL12

Matrix: Soil Collection Date: 2/27/2003 8:35:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-12A	Analysis Date:	3/13/2003 9:54:00PM
Prep Date:	3/10/2003	Instrument:	Ro0
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3031379.D
Prep Method ID:	3550	Dilution Factor:	1
Prep Batch Number:	A030310002	Percent Moisture:	25
Report Basis:	Dry Weight Basis	Analyst Initials:	GD
Sample prep wt./vol:	14.56 g	Prep Extract Vol:	1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Diesel Range Organics	n/a	20		mg/Kg	9.2	1.4		1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	3.8		mg/Kg	0.43	0.086	4.6	82.6	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-12A	Analysis Date:	3/10/2003 8:54:00AM
Prep Date:	3/10/2003	Instrument:	SCALE
Analytical Method ID:	ASTM D2216 - % moisture	File Name:	
Prep Method ID:	D2216	Dilution Factor:	1
Prep Batch Number:	A030311003	Percent Moisture:	
Report Basis:	As Received	Analyst Initials:	HW
Sample prep wt./vol:	11.54 g	Prep Extract Vol:	8.85 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Moisture	na	25		%	0.038	0.0077		1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-12B	Analysis Date:	3/6/2003 6:16:00PM
Prep Date:	3/6/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3030620.D
Prep Method ID:	5035	Dilution Factor:	1
Prep Batch Number:	A030306001	Percent Moisture:	25
Report Basis:	Dry Weight Basis	Analyst Initials:	STE
Sample prep wt./vol:	54.17 g	Prep Extract Vol:	25.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Benzene	71-43-2	0.0028	J	mg/Kg	0.0099	0.0011		1
Ethylbenzene	100-41-4	0.023		mg/Kg	0.0099	0.0010		
Toluene	108-88-3	0.16		mg/Kg	0.0099	0.0013		
Xylenes, Total	1330-20-7	0.055		mg/Kg	0.020	0.0028		

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	1.0		mg/Kg	0.25	0.031	1.5	66.2	50	150	1
Difluorobenzene(PID)	540-36-3	0.74		mg/Kg	0.0099	0.0012	0.77	96.3	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859
Report Section: **Client Sample Report**

Client Sample Name: SSM03SL13

Matrix: Soil Collection Date: 2/27/2003 8:40:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-13A	Analysis Date:	3/13/2003 10:21:00PM
Prep Date:	3/10/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3031380.D
Prep Method ID:	3550	Dilution Factor:	1
Prep Batch Number:	A030310002	Percent Moisture:	25
Report Basis:	Dry Weight Basis	Analyst Initials:	GD
Sample prep wt./vol:	10.64 g	Prep Extract Vol:	1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Diesel Range Organics	n/a	37		mg/Kg	13	1.9		1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	5.4		mg/Kg	0.59	0.12	6.3	86.3	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-13A	Analysis Date:	3/10/2003 8:54:00AM
Prep Date:	3/10/2003	Instrument:	SCALE
Analytical Method ID:	ASTM D2216 - % moisture	File Name:	
Prep Method ID:	D2216	Dilution Factor:	1
Prep Batch Number:	A030311003	Percent Moisture:	
Report Basis:	As Received	Analyst Initials:	HW
Sample prep wt./vol:	13.67 g	Prep Extract Vol:	10.44 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Moisture	na	25		%	0.038	0.0076		1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-13B	Analysis Date:	3/7/2003 11:08:00AM
Prep Date:	3/6/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3030707.D
Prep Method ID:	5035	Dilution Factor:	1
Prep Batch Number:	A030306001	Percent Moisture:	25
Report Basis:	Dry Weight Basis	Analyst Initials:	STE
Sample prep wt./vol:	45.79 g	Prep Extract Vol:	25.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Benzene	71-43-2	0.0042	J	mg/Kg	0.012	0.0013		1
Ethylbenzene	100-41-4	0.016		mg/Kg	0.012	0.0012		
Toluene	108-88-3	0.079		mg/Kg	0.012	0.0016		
Xylenes, Total	1330-20-7	0.046		mg/Kg	0.023	0.0034		

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	1.3		mg/Kg	0.29	0.037	1.8	70.0	50	150	1
Difluorobenzene(PID)	540-36-3	0.91		mg/Kg	0.012	0.0015	0.91	99.6	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03SL14**

Matrix: Soil Collection Date: 2/27/2003 9:15:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-14A Analysis Date: 3/13/2003 10:49:00PM
Prep Date: 3/10/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3031381.D
Prep Method ID: 3550 Dilution Factor: 1
Prep Batch Number: A030310002 Percent Moisture: 22
Report Basis: Dry Weight Basis Analyst Initials: GD
Sample prep wt./vol: 18.17 g Prep Extract Vol: 1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	530		mg/Kg	7.1	1.1				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	2.9		mg/Kg	0.33	0.066	3.5	81.3	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-14A Analysis Date: 3/10/2003 8:54:00AM
Prep Date: 3/10/2003 Instrument: SCALE
Analytical Method ID: ASTM D2216 - % moisture File Name:
Prep Method ID: D2216 Dilution Factor: 1
Prep Batch Number: A030311003 Percent Moisture:
Report Basis: As Received Analyst Initials: HW
Sample prep wt./vol: 12.46 g Prep Extract Vol: 9.94 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:
Moisture	na	22		%	0.040	0.0080				1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303002-14B Analysis Date: 3/6/2003 7:15:00PM
Prep Date: 3/6/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3030622.D
Prep Method ID: 5035 Dilution Factor: 1
Prep Batch Number: A030306001 Percent Moisture: 22
Report Basis: Dry Weight Basis Analyst Initials: STE
Sample prep wt./vol: 61.52 g Prep Extract Vol: 25.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Benzene	71-43-2	0.0031	J	mg/Kg	0.0083	0.00092				1	
Ethylbenzene	100-41-4	0.047		mg/Kg	0.0083	0.00085					
Toluene	108-88-3	0.016		mg/Kg	0.0083	0.0011					
Xylenes, Total	1330-20-7	0.30		mg/Kg	0.017	0.0024					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	0.90		mg/Kg	0.21	0.026	1.3	69.2	50	150	1
Difluorobenzene(PID)	540-36-3	0.64		mg/Kg	0.0083	0.0010	0.65	99.0	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03SL15

Matrix: Soil Collection Date: 2/27/2003 11:30:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-15A	Analysis Date:	3/13/2003 11:16:00PM
Prep Date:	3/10/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3031382.D
Prep Method ID:	3550	Dilution Factor:	1
Prep Batch Number:	A030310002	Percent Moisture:	16
Report Basis:	Dry Weight Basis	Analyst Initials:	GD
Sample prep wt./vol:	24.61 g	Prep Extract Vol:	1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Diesel Range Organics	n/a	4.9		mg/Kg	4.8	0.75		1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	2.3		mg/Kg	0.23	0.045	2.4	94.4	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-15A	Analysis Date:	3/10/2003 8:54:00AM
Prep Date:	3/10/2003	Instrument:	SCALE
Analytical Method ID:	ASTM D2216 - % moisture	File Name:	
Prep Method ID:	D2216	Dilution Factor:	1
Prep Batch Number:	A030311003	Percent Moisture:	
Report Basis:	As Received	Analyst Initials:	HW
Sample prep wt./vol:	12.09 g	Prep Extract Vol:	10.29 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Moisture	na	16		%	0.043	0.0085		1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-15B	Analysis Date:	3/6/2003 7:44:00PM
Prep Date:	3/6/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3030623.D
Prep Method ID:	5035	Dilution Factor:	1
Prep Batch Number:	A030306001	Percent Moisture:	16
Report Basis:	Dry Weight Basis	Analyst Initials:	STE
Sample prep wt./vol:	59.36 g	Prep Extract Vol:	25.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Benzene	71-43-2	0.0024	J	mg/Kg	0.0080	0.00088		1
Ethylbenzene	100-41-4	0.0072	J	mg/Kg	0.0080	0.00082		
Toluene	108-88-3	0.0098		mg/Kg	0.0080	0.0011		
Xylenes, Total	1330-20-7	0.029		mg/Kg	0.016	0.0023		

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	0.94		mg/Kg	0.20	0.025	1.3	74.8	50	150	1
Difluorobenzene(PID)	540-36-3	0.61		mg/Kg	0.0080	0.0010	0.63	97.9	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: trip blank

Matrix: Soil **Collection Date:** 2/26/2003 9:30:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303002-16A	Analysis Date:	3/6/2003 8:13:00PM
Prep Date:	3/6/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3030624.D
Prep Method ID:	5035	Dilution Factor:	1
Prep Batch Number:	A030306001	Percent Moisture	
Report Basis:	As Received	Analyst Initials:	STE
Sample prep wt./vol:	25.94 g	Prep Extract Vol:	25.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>			
Benzene	71-43-2	0.0041	J	mg/Kg	0.015	0.0017		1			
Ethylbenzene	100-41-4	0.0043	J	mg/Kg	0.015	0.0016					
Toluene	108-88-3	0.010	J	mg/Kg	0.015	0.0021					
Xylenes, Total	1330-20-7	0.022	J	mg/Kg	0.031	0.0044					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	1.9		mg/Kg	0.39	0.048	2.4	77.9	50	150	1
Difluorobenzene(PID)	540-36-3	1.1		mg/Kg	0.015	0.0019	1.2	87.9	50	150	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Method Blank Report

Client Sample Name: MB

Matrix: Solid Collection Date: 3/10/2003 12:00:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: A030310002-MB Analysis Date: 3/13/2003 11:52:00AM
Prep Date: 3/10/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3031357.D
Prep Method ID: 3550 Dilution Factor: 1
Prep Batch Number: A030310002 Percent Moisture: NA
Report Basis: Dry Weight Basis Analyst Initials: GD
Sample prep wt./vol: 26.06 g Prep Extract Vol: 1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	ND		mg/Kg	3.8	0.59				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	1.9		mg/Kg	0.18	0.036	1.9	102	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: A030311003-MB Analysis Date: 3/10/2003 8:54:00AM
Prep Date: 3/10/2003 Instrument: SCALE
Analytical Method ID: ASTM D2216 - % moisture File Name:
Prep Method ID: D2216 Dilution Factor: 1
Prep Batch Number: A030311003 Percent Moisture: NA
Report Basis: Dry Weight Basis Analyst Initials: HW
Sample prep wt./vol: 11.18 g Prep Extract Vol: 11.18 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:
Moisture	na	ND		%	0.050	0.010				1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: A030306001-MB Analysis Date: 3/6/2003 10:25:00AM
Prep Date: 3/6/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3030604.D
Prep Method ID: 5035 Dilution Factor: 1
Prep Batch Number: A030306001 Percent Moisture: NA
Report Basis: Dry Weight Basis Analyst Initials: STE
Sample prep wt./vol: 25.00 g Prep Extract Vol: 25.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL					Rerun #:
Benzene	71-43-2	ND		mg/Kg	0.016	0.0018					1
Ethylbenzene	100-41-4	0.0053	J	mg/Kg	0.016	0.0016					
Toluene	108-88-3	0.011	J	mg/Kg	0.016	0.0021					
Xylenes, Total	1330-20-7	0.028	J	mg/Kg	0.032	0.0046					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	2.3		mg/Kg	0.40	0.050	2.5	92.7	50	150	1
Difluorobenzene(PID)	540-36-3	1.2		mg/Kg	0.016	0.0020	1.3	98.5	50	150	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Tests Run at: Analytica Environmental Laboratories - Anchorage, Alaska
Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Project Number:
Prep Batch: A030311003

QUALITY CONTROL REPORT

SAMPLE DUPLICATE REPORT

Analysis: ASTM D2216 - % moisture
Base Sample: J0303002-15A
Prep Date: 3/10/2003
Samp. Anal. Date: 3/10/2003 8:54:00AM
Units: %
DUP Anal. Date: 3/10/2003 8:54:00AM
Matrix: Soil

<u>Analyte Name</u>	<u>SampResult</u>	<u>DUPRes.</u>	<u>RPD</u>	<u>RPDLim</u>	<u>Flag</u>
Moisture	16.1	10.9	38.5	20	OUT

Prep Batch: A030310002

LCS/LCSD REPORT

Analysis: ADEC AK102 - (DRO)
MB: A030310002-MB
Prep Date: 3/10/2003
MB Anal. Date: 3/13/2003 11:52:00AM
Units: mg/Kg
LCS Anal. Date: 3/13/2003 12:19:00PM
LCSD Anal. Date: 3/13/2003 12:46:00PM
Matrix: Solid

<u>Analyte Name</u>	<u>SampResult</u>	<u>LCSRes.</u>	<u>SDRes.</u>	<u>SPLev</u>	<u>SPDLev</u>	<u>Recov.</u>	<u>SD Recov</u>	<u>RPD</u>	<u>Recov Lim</u>	<u>RPDLim</u>	<u>Flag</u>
Diesel Range Organics	ND	83.6	88.5	80.6	83.2	103.7	106.4	5.7	60 - 120	20	

MS/MSD REPORT

Analysis: ADEC AK102 - (DRO)
Parent: J0303002-03A
Prep Date: 3/10/2003
Samp. Anal. Date: 3/13/2003 8:59:00PM
Units: mg/Kg
MS Anal. Date: 3/13/2003 1:13:00PM
MSD Anal. Date: 3/13/2003 1:41:00PM
Matrix: Soil

<u>Analyte Name</u>	<u>SampResult</u>	<u>MSRes.</u>	<u>MSDRes</u>	<u>SPLev</u>	<u>SPDLev</u>	<u>Recov.</u>	<u>MSD Rec.</u>	<u>RPD</u>	<u>Recov Lim</u>	<u>RPDLim</u>	<u>Flag</u>
Diesel Range Organics	ND	223	214	226	224	98.8	95.6	4.1	60 - 140	50	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

FOOTNOTES TO QC REPORT

Note 1: Results are shown to three significant figures to avoid rounding errors in calculations.

Note 2: If the sample concentration is greater than 4 times the spike level, a recovery is not meaningful, and the result should be used as a replicate. In such cases the spike is not as high as expected random measurement variability of the sample result itself.

Note 3: For sample duplicates, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample and duplicate results are not five times the PQL or greater, then the RPD is not expected to fall within the window shown and the comparison should be made on the basis of the absolute difference. Analytica uses the criterion that the absolute difference should be less than the PQL for water or less than 2XPQL for other matrices.

Note 4: For serial dilutions, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample result is not 50 times the MDL or greater, then the fact that the RPD does not meet the 10% criterion has little significance. Otherwise it indicates that a matrix bias may exist at the analytical step.

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Tests Run at: Analytica Environmental Laboratories - Anchorage, Alaska
Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Project Number:
Prep Batch: A030306001

QUALITY CONTROL REPORT

LCS/LCSD REPORT

Analysis: Aromatic VOCs by GC/FID via method 8021B - BTEX MB: A030306001-MB
Prep Date: 3/6/2003
MB Anal. Date: 3/6/2003 10:25:00AM Units: mg/Kg
LCS Anal. Date: 3/6/2003 10:55:00AM LCSD Anal. Date: 3/6/2003 11:24:00AM Matrix: Solid

Analyte Name	SampResult	LCSRes.	SDRes.	SPLev	SPDLev	Recov.	SD Recov	RPD	Recov Lim	RPDLim	Flag
Benzene	ND	0.368	0.353	0.345	0.345	106.7	102.4	4.2	60 - 120	20	
Toluene	0.0105	1.87	1.79	2.11	2.11	88.5	84.7	4.4	60 - 120	20	
Ethylbenzene	0.00525	0.515	0.499	0.507	0.507	101.6	98.4	3.2	60 - 120	20	
Xylenes, Total	0.0278	2.44	2.35	2.48	2.48	98.4	94.8	3.8	60 - 120	20	

FOOTNOTES TO QC REPORT

Note 1: Results are shown to three significant figures to avoid rounding errors in calculations.

Note 2: If the sample concentration is greater than 4 times the spike level, a recovery is not meaningful, and the result should be used as a replicate. In such cases the spike is not as high as expected random measurement variability of the sample result itself.

Note 3: For sample duplicates, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample and duplicate results are not five times the PQL or greater, then the RPD is not expected to fall within the window shown and the comparison should be made on the basis of the absolute difference. Analytica uses the criterion that the absolute difference should be less than the PQL for water or less than 2XPQL for other matrices.

Note 4: For serial dilutions, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample result is not 50 times the MDL or greater, then the fact that the RPD does not meet the 10% criterion has little significance. Otherwise it indicates that a matrix bias may exist at the analytical step.

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

SURROGATE RECOVERY SUMMARY REPORT

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Test Method: ADEC AK102 - (DRO)						
Lab Sample #:	J0303002-04A	Dilution:	1			
Analysis Date:	3/13/2003 7:36:00PM	Client Sample:	SSM03SL04			
Batch Number:	A030310002	Data File:	R3031374.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
o-Terphenyl	76.4	50	150		Complete	
Lab Sample #:	J0303002-09A	Dilution:	1			
Analysis Date:	3/13/2003 8:04:00PM	Client Sample:	SSM03SL09			
Batch Number:	A030310002	Data File:	R3031375.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
o-Terphenyl	84.6	50	150		Complete	
Lab Sample #:	J0303002-10A	Dilution:	1			
Analysis Date:	3/13/2003 8:32:00PM	Client Sample:	SSM03SL10			
Batch Number:	A030310002	Data File:	R3031376.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
o-Terphenyl	99.4	50	150		Complete	
Lab Sample #:	J0303002-03A	Dilution:	1			
Analysis Date:	3/13/2003 8:59:00PM	Client Sample:	SSM03SL03			
Batch Number:	A030310002	Data File:	R3031377.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
o-Terphenyl	94.7	50	150		Complete	
Lab Sample #:	J0303002-11A	Dilution:	1			
Analysis Date:	3/13/2003 9:27:00PM	Client Sample:	SSM03SL11			
Batch Number:	A030310002	Data File:	R3031378.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
o-Terphenyl	101.4	50	150		Complete	
Lab Sample #:	J0303002-12A	Dilution:	1			
Analysis Date:	3/13/2003 9:54:00PM	Client Sample:	SSM03SL12			
Batch Number:	A030310002	Data File:	R3031379.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
o-Terphenyl	82.6	50	150		Complete	
Lab Sample #:	J0303002-13A	Dilution:	1			
Analysis Date:	3/13/2003 10:21:00PM	Client Sample:	SSM03SL13			
Batch Number:	A030310002	Data File:	R3031380.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
o-Terphenyl	86.3	50	150		Complete	
Lab Sample #:	J0303002-14A	Dilution:	1			
Analysis Date:	3/13/2003 10:49:00PM	Client Sample:	SSM03SL14			
Batch Number:	A030310002	Data File:	R3031381.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
o-Terphenyl	81.3	50	150		Complete	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Test Method: ADEC AK102 - (DRO)						
Lab Sample #:	J0303002-15A	Dilution:	1			
Analysis Date:	3/13/2003 11:16:00PM	Client Sample:	SSM03SL15			
Batch Number:	A030310002	Data File:	R3031382.D			
AnalyteName		SSRecov	LCL	UCL	SSFlag	Result Status
o-Terphenyl		94.4	50	150		Complete
Lab Sample #:	J0303002-06A	Dilution:	10			
Analysis Date:	3/14/2003 12:11:00AM	Client Sample:	SSM03SL06			
Batch Number:	A030310002	Data File:	R3031384.D			
AnalyteName		SSRecov	LCL	UCL	SSFlag	Result Status
o-Terphenyl		96.2	50	150		Complete
Lab Sample #:	J0303002-08A	Dilution:	20			
Analysis Date:	3/14/2003 12:38:00AM	Client Sample:	SSM03SL08			
Batch Number:	A030310002	Data File:	R3031385.D			
AnalyteName		SSRecov	LCL	UCL	SSFlag	Result Status
o-Terphenyl		0.0	50	150	LOW DILUTED OUT	Complete
Lab Sample #:	J0303002-01A	Dilution:	1			
Analysis Date:	3/14/2003 1:06:00AM	Client Sample:	SSM03SL01			
Batch Number:	A030310002	Data File:	R3031386.D			
AnalyteName		SSRecov	LCL	UCL	SSFlag	Result Status
o-Terphenyl		84.9	50	150		Complete
Lab Sample #:	J0303002-02A	Dilution:	1			
Analysis Date:	3/14/2003 1:33:00AM	Client Sample:	SSM03SL02			
Batch Number:	A030310002	Data File:	R3031387.D			
AnalyteName		SSRecov	LCL	UCL	SSFlag	Result Status
o-Terphenyl		77.2	50	150		Complete
Lab Sample #:	J0303002-05A	Dilution:	1			
Analysis Date:	3/14/2003 2:01:00AM	Client Sample:	SSM03SL05			
Batch Number:	A030310002	Data File:	R3031388.D			
AnalyteName		SSRecov	LCL	UCL	SSFlag	Result Status
o-Terphenyl		73.2	50	150		Complete
Lab Sample #:	J0303002-07A	Dilution:	1			
Analysis Date:	3/14/2003 2:28:00AM	Client Sample:	SSM03SL07			
Batch Number:	A030310002	Data File:	R3031389.D			
AnalyteName		SSRecov	LCL	UCL	SSFlag	Result Status
o-Terphenyl		76.8	50	150		Complete
Lab Sample #:	A030310002-MB	Dilution:	1			
Analysis Date:	3/13/2003 11:52:00AM	Client Sample:	MB			
Batch Number:	A030310002	Data File:	R3031357.D			
AnalyteName		SSRecov	LCL	UCL	SSFlag	Result Status
o-Terphenyl		101.6	60	120		Complete

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Test Method: ADEC AK102 - (DRO)					
Lab Sample #:	A030310002-LCS	Dilution:	1		
Analysis Date:	3/13/2003 12:19:00PM	Client Sample:	LCS		
Batch Number:	A030310002	Data File:	R3031358.D		
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl	98.7	60	120		Complete
Lab Sample #:	A030310002-LCSD	Dilution:	1		
Analysis Date:	3/13/2003 12:46:00PM	Client Sample:	LCSD		
Batch Number:	A030310002	Data File:	R3031359.D		
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl	102.1	60	120		Complete
Lab Sample #:	J0303002-03A-MS	Dilution:	1		
Analysis Date:	3/13/2003 1:13:00PM	Client Sample:	MS		
Batch Number:	A030310002	Data File:	R3031360.D		
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl	90.3	50	150		Complete
Lab Sample #:	J0303002-03A-MSD	Dilution:	1		
Analysis Date:	3/13/2003 1:41:00PM	Client Sample:	MSD		
Batch Number:	A030310002	Data File:	R3031361.D		
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl	91.6	50	150		Complete

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Test Method: Aromatic VOCs by GC/FID via method 8021B - BTEX						
Lab Sample #:	J0303002-01B	Dilution:	25			
Analysis Date:	3/6/2003 11:53:00AM	Client Sample:	SSM03SL01			
Batch Number:	A030306001	Data File:	N3030607.D			
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>	
Bromofluorobenzene(PID)	72.5	50	150		Complete	
Difluorobenzene(PID)	98.1	50	150		Complete	
Lab Sample #:	J0303002-02B	Dilution:	25			
Analysis Date:	3/6/2003 12:23:00PM	Client Sample:	SSM03SL02			
Batch Number:	A030306001	Data File:	N3030608.D			
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>	
Bromofluorobenzene(PID)	74.0	50	150		Complete	
Difluorobenzene(PID)	98.6	50	150		Complete	
Lab Sample #:	J0303002-03B	Dilution:	25			
Analysis Date:	3/6/2003 12:52:00PM	Client Sample:	SSM03SL03			
Batch Number:	A030306001	Data File:	N3030609.D			
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>	
Bromofluorobenzene(PID)	67.8	50	150		Complete	
Difluorobenzene(PID)	97.1	50	150		Complete	
Lab Sample #:	J0303002-04B	Dilution:	25			
Analysis Date:	3/6/2003 1:21:00PM	Client Sample:	SSM03SL04			
Batch Number:	A030306001	Data File:	N3030610.D			
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>	
Bromofluorobenzene(PID)	68.2	50	150		Complete	
Difluorobenzene(PID)	97.4	50	150		Complete	
Lab Sample #:	J0303002-05B	Dilution:	25			
Analysis Date:	3/6/2003 1:51:00PM	Client Sample:	SSM03SL05			
Batch Number:	A030306001	Data File:	N3030611.D			
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>	
Bromofluorobenzene(PID)	73.5	50	150		Complete	
Difluorobenzene(PID)	99.3	50	150		Complete	
Lab Sample #:	J0303002-06B	Dilution:	100			
Analysis Date:	3/6/2003 2:20:00PM	Client Sample:	SSM03SL06			
Batch Number:	A030306001	Data File:	N3030612.D			
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>	
Bromofluorobenzene(PID)	0.0	50	150	LOW DILUTED OUT	Complete	
Difluorobenzene(PID)	99.4	50	150		Complete	
Lab Sample #:	J0303002-07B	Dilution:	100			
Analysis Date:	3/6/2003 2:49:00PM	Client Sample:	SSM03SL07			
Batch Number:	A030306001	Data File:	N3030613.D			
<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>	
Bromofluorobenzene(PID)	0.0	50	150	LOW DILUTED OUT	Complete	
Difluorobenzene(PID)	97.1	50	150		Complete	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Test Method: Aromatic VOCs by GC/FID via method 8021B - BTEX						
Lab Sample #:	J0303002-08B	Dilution:	500			
Analysis Date:	3/6/2003 4:17:00PM	Client Sample:	SSM03SL08			
Batch Number:	A030306001	Data File:	N3030616.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	0.0	50	150	LOW DILUTED OUT	Complete	
Difluorobenzene(PID)	96.7	50	150		Complete	
Lab Sample #:	J0303002-09B	Dilution:	25			
Analysis Date:	3/6/2003 4:47:00PM	Client Sample:	SSM03SL09			
Batch Number:	A030306001	Data File:	N3030617.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	78.6	50	150		Complete	
Difluorobenzene(PID)	96.7	50	150		Complete	
Lab Sample #:	J0303002-10B	Dilution:	100			
Analysis Date:	3/6/2003 5:16:00PM	Client Sample:	SSM03SL10			
Batch Number:	A030306001	Data File:	N3030618.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	0.0	50	150	LOW DILUTED OUT	Complete	
Difluorobenzene(PID)	97.0	50	150		Complete	
Lab Sample #:	J0303002-11B	Dilution:	25			
Analysis Date:	3/6/2003 5:46:00PM	Client Sample:	SSM03SL11			
Batch Number:	A030306001	Data File:	N3030619.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	92.6	50	150		Complete	
Difluorobenzene(PID)	97.8	50	150		Complete	
Lab Sample #:	J0303002-12B	Dilution:	25			
Analysis Date:	3/6/2003 6:16:00PM	Client Sample:	SSM03SL12			
Batch Number:	A030306001	Data File:	N3030620.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	66.2	50	150		Complete	
Difluorobenzene(PID)	96.3	50	150		Complete	
Lab Sample #:	J0303002-14B	Dilution:	25			
Analysis Date:	3/6/2003 7:15:00PM	Client Sample:	SSM03SL14			
Batch Number:	A030306001	Data File:	N3030622.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	69.2	50	150		Complete	
Difluorobenzene(PID)	99.0	50	150		Complete	
Lab Sample #:	J0303002-15B	Dilution:	25			
Analysis Date:	3/6/2003 7:44:00PM	Client Sample:	SSM03SL15			
Batch Number:	A030306001	Data File:	N3030623.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	74.8	50	150		Complete	
Difluorobenzene(PID)	97.9	50	150		Complete	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Test Method: Aromatic VOCs by GC/FID via method 8021B - BTEX						
Lab Sample #:	J0303002-16A	Dilution:	25			
Analysis Date:	3/6/2003 8:13:00PM	Client Sample:	trip blank			
Batch Number:	A030306001	Data File:	N3030624.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	77.9	50	150		Complete	
Difluorobenzene(PID)	87.9	50	150		Complete	
Lab Sample #:	J0303002-13B	Dilution:	25			
Analysis Date:	3/7/2003 11:08:00AM	Client Sample:	SSM03SL13			
Batch Number:	A030306001	Data File:	N3030707.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	70.0	50	150		Complete	
Difluorobenzene(PID)	99.6	50	150		Complete	
Lab Sample #:	A030306001-MB	Dilution:	25			
Analysis Date:	3/6/2003 10:25:00AM	Client Sample:	MB			
Batch Number:	A030306001	Data File:	N3030604.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	92.7	60	120		Complete	
Difluorobenzene(PID)	98.5	60	120		Complete	
Lab Sample #:	A030306001-LCS	Dilution:	25			
Analysis Date:	3/6/2003 10:55:00AM	Client Sample:	LCS			
Batch Number:	A030306001	Data File:	N3030605.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	95.7	60	120		Complete	
Difluorobenzene(PID)	104.9	60	120		Complete	
Lab Sample #:	A030306001-LCSD	Dilution:	25			
Analysis Date:	3/6/2003 11:24:00AM	Client Sample:	LCSD			
Batch Number:	A030306001	Data File:	N3030606.D			
AnalyteName	SSRecov	LCL	UCL	SSFlag	Result Status	
Bromofluorobenzene(PID)	90.6	60	120		Complete	
Difluorobenzene(PID)	100.6	60	120		Complete	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 15,349 Lab Project Number: J0303002

Prep Date: 3/6/2003

Lab Method Blank Id: A030306001-MB
Prep Batch ID: A030306001
Method: Aromatic VOCs by GC/FID via method 8021B - BTEX

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A030306001-LCS	LCS	N3030605.D	3/6/2003 10:55:00AM
A030306001-LCSD	LCSD	N3030606.D	3/6/2003 11:24:00AM
J0303002-01B	SSM03SL01	N3030607.D	3/6/2003 11:53:00AM
J0303002-02B	SSM03SL02	N3030608.D	3/6/2003 12:23:00PM
J0303002-03B	SSM03SL03	N3030609.D	3/6/2003 12:52:00PM
J0303002-04B	SSM03SL04	N3030610.D	3/6/2003 1:21:00PM
J0303002-05B	SSM03SL05	N3030611.D	3/6/2003 1:51:00PM
J0303002-06B	SSM03SL06	N3030612.D	3/6/2003 2:20:00PM
J0303002-07B	SSM03SL07	N3030613.D	3/6/2003 2:49:00PM
J0303002-08B	SSM03SL08	N3030616.D	3/6/2003 4:17:00PM
J0303002-09B	SSM03SL09	N3030617.D	3/6/2003 4:47:00PM
J0303002-10B	SSM03SL10	N3030618.D	3/6/2003 5:16:00PM
J0303002-11B	SSM03SL11	N3030619.D	3/6/2003 5:46:00PM
J0303002-12B	SSM03SL12	N3030620.D	3/6/2003 6:16:00PM
J0303002-14B	SSM03SL14	N3030622.D	3/6/2003 7:15:00PM
J0303002-15B	SSM03SL15	N3030623.D	3/6/2003 7:44:00PM
J0303002-16A	trip blank	N3030624.D	3/6/2003 8:13:00PM
J0303002-13B	SSM03SL13	N3030707.D	3/7/2003 11:08:00AM

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 15,349 Lab Project Number: J0303002

Prep Date: 3/10/2003

Lab Method Blank Id: A030310002-MB
Prep Batch ID: A030310002
Method: ADEC AK102 - (DRO)

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A030310002-LCS	LCS	R3031358.D	3/13/2003 12:19:00PM
A030310002-LCSD	LCSD	R3031359.D	3/13/2003 12:46:00PM
J0303002-03A-MS	MS	R3031360.D	3/13/2003 1:13:00PM
J0303002-03A-MSD	MSD	R3031361.D	3/13/2003 1:41:00PM
J0303002-04A	SSM03SL04	R3031374.D	3/13/2003 7:36:00PM
J0303002-09A	SSM03SL09	R3031375.D	3/13/2003 8:04:00PM
J0303002-10A	SSM03SL10	R3031376.D	3/13/2003 8:32:00PM
J0303002-03A	SSM03SL03	R3031377.D	3/13/2003 8:59:00PM
J0303002-11A	SSM03SL11	R3031378.D	3/13/2003 9:27:00PM
J0303002-12A	SSM03SL12	R3031379.D	3/13/2003 9:54:00PM
J0303002-13A	SSM03SL13	R3031380.D	3/13/2003 10:21:00PM
J0303002-14A	SSM03SL14	R3031381.D	3/13/2003 10:49:00PM
J0303002-15A	SSM03SL15	R3031382.D	3/13/2003 11:16:00PM
J0303002-06A	SSM03SL06	R3031384.D	3/14/2003 12:11:00AM
J0303002-08A	SSM03SL08	R3031385.D	3/14/2003 12:38:00AM
J0303002-01A	SSM03SL01	R3031386.D	3/14/2003 1:06:00AM
J0303002-02A	SSM03SL02	R3031387.D	3/14/2003 1:33:00AM
J0303002-05A	SSM03SL05	R3031388.D	3/14/2003 2:01:00AM
J0303002-07A	SSM03SL07	R3031389.D	3/14/2003 2:28:00AM

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 15,349 Lab Project Number: J0303002

Prep Date: 3/10/2003

Lab Method Blank Id: A030311003-MB
Prep Batch ID: A030311003
Method: ASTM D2216 - % moisture

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
J0303002-01A	SSM03SL01		3/10/2003 8:54:00AM
J0303002-02A	SSM03SL02		3/10/2003 8:54:00AM
J0303002-03A	SSM03SL03		3/10/2003 8:54:00AM
J0303002-04A	SSM03SL04		3/10/2003 8:54:00AM
J0303002-05A	SSM03SL05		3/10/2003 8:54:00AM
J0303002-06A	SSM03SL06		3/10/2003 8:54:00AM
J0303002-07A	SSM03SL07		3/10/2003 8:54:00AM
J0303002-08A	SSM03SL08		3/10/2003 8:54:00AM
J0303002-09A	SSM03SL09		3/10/2003 8:54:00AM
J0303002-10A	SSM03SL10		3/10/2003 8:54:00AM
J0303002-11A	SSM03SL11		3/10/2003 8:54:00AM
J0303002-12A	SSM03SL12		3/10/2003 8:54:00AM
J0303002-13A	SSM03SL13		3/10/2003 8:54:00AM
J0303002-14A	SSM03SL14		3/10/2003 8:54:00AM
J0303002-15A	SSM03SL15		3/10/2003 8:54:00AM
J0303002-15A-DUP	DUP		3/10/2003 8:54:00AM

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

DATA FLAGS AND DEFINITIONS

The PQL is the Method Quantitation Limit as defined by USACE.

Reporting Limit: Limit below which results are shown as "ND". This may be the PQL, MDL, or a value between. See the report conventions below.

Result Field:

ND = Not Detected at or above the Reporting Limit

NA = Analyte not applicable (see Case Narrative for discussion)

Qualifier Fields:

LOW = Recovery is below Lower Control Limit

HIGH = Recovery, RPD, or other parameter is above Upper Control Limit

E = Reported concentration is above the instrument calibration upper range

Organic Analysis Flags:

B = Analyte was detected in the laboratory method blank

J = Analyte was detected above MDL or Reporting Limit but below the Quant Limit (PQL)

Inorganic Analysis Flags:

J = Analyte was detected above the Reporting Limit but below the Quant Limit (PQL)

W = Post digestion spike did not meet criteria

S = Reported value determined by the Method of Standard Additions (MSA)

Other Flags may be applied. See Case Narrative for Description

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303002

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

REPORTING CONVENTIONS FOR THIS REPORT

J0303002

<u>TestPkgName</u>	<u>Basis</u>	<u># Sig Figs</u>	<u>Reporting Limit</u>
8021/5035 (Solid) - BTEX	Dry Weight Basis	2	Report to 2 x MDL, J qual below PQL
AK102/3550B (Solid) - (DRO)	Dry Weight Basis	2	Report to PQL
ASTMD2216/ASTMD2216 (Solid) - % moisture	As Received	2	Report to PQL



**ANALYTICA
ALASKA Inc.**

Sample Raw Data

--

BTEX by SW-8021B



Cooler Receipt Form

Client: CH2M Hill of Alaska
Project: Skagway State Street Mystery

Client Code: 006120

Order #: J0303002

Cooler ID: 1

A. Preliminary Examination Phase:

Date cooler opened: 2/28/2003
Cooler opened by: KS

Signature: KS

- 1. Was airbill Attached? Yes Airbill #: Wings #7074889 Carrier Name: DHL
- 2. Custody Seals? Yes How many? 1 Location: on cooler Seal Name: JB
- 3. Seals intact? Yes
- 4. Screened for radiation? No
- 5. COC Attached? Yes Properly Completed? Yes Signed by AEL employee? Yes
- 6. Project Identification from custody paper: Skagway State St. Mystery
- 7. Preservative: BlueGel Temperature: 3.7

Designated person initial here to acknowledge receipt:

Kerua Schwedler Date: 3/3/03

COMMENTS:

B. Log-In Phase:

Samples Log-in Date: 3/3/2003

Log-in By: KS

Signature: KS

- 1. Packing Type: Other
- 2. Were samples in separate bags? No
- 3. Were containers intact? Yes Labels agree with COC? Yes
- 4. Number of bottles received: 31 Number of samples received: 16
- 5. Correct containers used? Yes Correct preservatives added? Yes
- 6. Sufficient sample volume? Yes
- 7. Bubbles in VOA samples? No
- 8. Was Project manager called and status discussed? No
- 9. Was anyone called? No Who was called? _____ By whom? _____ Date: _____

COMMENTS:

Request for Analytical Services

Abbreviated Provisions of Sale

(A complete copy of Analytica's General Provision of Sale can be provided upon request.)

Payment. Prepayment is normally required unless a credit line has been approved in advance. Client agrees to provide Analytica a completed business application, within ten (10) business days of request, but no later than five (5) days prior to work being received, along with any other requested information, in order to establish an approved credit line. For Clients with approved credit, Analytica will submit invoices upon completion of the scheduled work. Invoices(s) are due and payable upon receipt. Balances remaining unpaid 30 days after invoice date shall accrue interest at 1.5% per month (18% per annum). Analytica shall receive payments for the Services in accordance with the amount(s) listed in the Quotation provided, when applicable. Client shall be required to pay Analytica's invoice, regardless of reimbursement from their client, and the final billing will be based upon the actual work performed, pursuant to the samples and documents submitted at the time of receipt. If Analytica engages legal counsel to enforce its rights of payment or any other rights under the parties' Agreement, Client will be liable for all costs incurred by Analytica, including reasonable attorney fees.

Changes and Additional Compensation. No changes to this agreement and no changes to the scope of any work will be allowed unless an authorized representative or officer of Analytica specifically agrees to the changes in writing. Client agrees to provide written notice of any requested changes in the scope of work and to reasonably compensate Analytica for any work completed prior to the change request. This written notice shall be provided by a representative of the client that has the authority to approve both changes to the scope of work and the associated charges that may be incurred. Names of such representatives should be made available at the time the order is formalized. Changes, such as substantial differences in sample quantities, may impact costs and turnaround time commitments previously made by Analytica, and may result in additional fees. Client's failure to provide written notice as required in this paragraph shall be a waiver of Client's right to dispute any work performed.

Sample Kits. Bottles will be supplied free of charge as long as samples are received by Analytica for billable analyses. Analytica will provide sample kits, such as sample containers, labels, Chain of Custody forms, custody seals, etc., shipped to one location via regular ground transportation methods upon request. Client agrees to allow 5-7 working days (from the date of Client's request) for Analytica to ship sample kits. Rush delivery charges, including but not limited to, expedited freight charges or administrative fees may be charged by Analytica.

Holding Times. Analytica will initiate sample preparation and/or analysis within the regulated holding time provided samples are received within forty-eight hours of sampling, or with not less than 7 the prescribed holding time remaining, whichever is less. If samples are received outside these parameters, Analytica will make a reasonable effort to meet the holding time. However, expedited turnaround surcharges will be applied to cover additional cost and capacity utilization. Client agrees to indemnify and hold harmless Analytica from any and all claims, including but not limited to, expenses, fines, fees, penalties, resampling costs, etc., resulting from missing a regulated holding time if Client has provided samples outside the stated parameters. Client also agrees to provide a minimum twenty-four (24) hours advance notification to Analytica of sample arrival requiring expedited processing.

Normal Hours of Operation and Sample Receipt. Analytica maintains normal business hours of 8a.m. to 5p.m., Monday through Friday. In observance of recognized holidays, Analytica is closed for business on the following days: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, the day after Thanksgiving and Christmas Day and as required by any governmental agency having jurisdiction. Client agrees to contact Analytica in advance to schedule any sample acceptance and/or analysis during days outside of normal business hours. Expedited turnaround surcharges may be applied. Samples received after 2 p.m. on normal business days, may not be formally accepted until the next business day. Normal business days are used for turnaround time calculations. Weekends, holidays, and after-hours may require expedited turnaround charges. Samples specifically requested or required by the Client to be analyzed or received outside of Analytica's normal business hours may be subject to an additional fee of \$300.00 plus any applicable surcharges. Client agrees to indemnify and hold harmless Analytica from any and all claims, including but not limited to, expenses, fines, fees, penalties, resampling costs, etc., resulting from missing a regulated holding time if Client has provided samples outside the stated parameters.

Non-Standard and Analytical Complications. In order to achieve the lowest possible reporting limits, cleanup procedures may be required when running Methods 8270, 8081, 8082, and 1664. These cleanup procedures may include Fluorosil, Silica Gel, Alumina, Acid/Base, Centrifuge, or GPC and are billed at \$50.00 per procedure. Analytica will notify Client of any analytical complexities requiring cleanups, multiple re-runs or column degradation due to complicated or extremely contaminated samples or matrices. Additional charges may apply and will be discussed at the time of notification. Non-authorization of cleanup procedures by the client will result in the use of a high dilution factor and an elevation in reporting limits. Multi-phased samples will be processed and charged as separate samples.

Trip Blanks. Analytical methods requiring Trip Blank or Temperature Blank sample containers will be supplied by Analytica unless Client specifically requests otherwise. These samples will be received, analyzed and billed as an additional sample, unless other agreements have been made in writing.

Sample Disposal. Analytica's policy is to return residual Client samples to the Client within thirty (30) days after completion of the Services, unless agreed to otherwise in writing. Upon request, Analytica may dispose of Client samples and shall act in a prudent manner in selecting and arranging for the transportation, handling, storage or disposal of hazardous substances or suspected hazardous substances. Analytica will only use contractors considered lawful professionals in the disposal of hazardous substances or suspected hazardous substances. Disposal of Client samples by Analytica may incur a charge of \$10 per sample.

Minimum Orders. Analytica retains the right to impose a minimum order charge of Sixty-Five Dollars (\$65.00) on all deliveries, including but not limited to analytical reports, electronic deliveries, supplies, etc.

Turnaround Times. Analytica's standard turnaround time (TAT) is ten normal business days. Expedited TAT surcharges are applied as follows: 2 Business Days – plus 100% of quoted analysis cost; 3 Business Days – plus 75% of quoted analysis cost; 5 Business Days – plus 50% of quoted analysis cost; 8 Business Days – plus 25% of quoted analysis cost. Samples submitted for expedited analyses or TAT will be reported after the initial run. If samples require re-runs due to QC failure, high contamination, or difficult matrices, these results will be reported at a later time. Every attempt will be made to expedite and report these required reruns as needed. To avoid expedited TAT surcharges, samples with holding times of less than 72 hours must be received by the lab no later than 1 pm on the day of sampling.

Matrix Spike/Matrix Spike Duplicates. All client specified Matrix Spike (MS) and Matrix Spike Duplicate (MSD) samples will be billed at the quoted method unit rate.



Analytica Alaska Southeast
5438 Shaune Drive
Juneau, AK 99801
(907) 780-6668
Fax (907) 780-6670

3/25/2003

CH2M Hill of Alaska
301 W. Northern Lights Blvd.
Suite 601
Anchorage, AK 99503
Attn: Win Westervelt

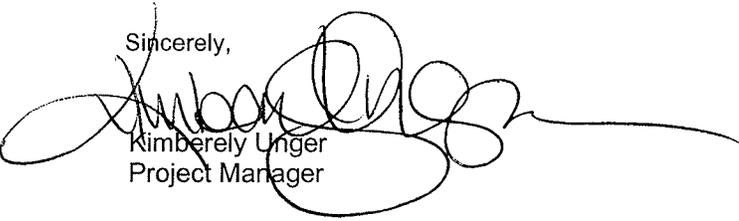
Work Order #: J0303006
Date: 3/25/2003
Work ID: Skagway State Street Mystery
Date Received: 3/4/2003

Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
J0303006-01	SSM03WA01	J0303006-02	SSM03WA04
J0303006-03	SSM03WA05	J0303006-04	SSM03WA06
J0303006-05	SSM03WA07	J0303006-06	SSM03WA08
J0303006-07	SSM03WA09	J0303006-08	SSM03WA10
J0303006-09	SSM03WA11	J0303006-10	SSM03WA12
J0303006-11	SSM03WA13	J0303006-12	SSM03WA14
J0303006-13	SSM03WA15	J0303006-14	SSM03WA02
J0303006-15	SSM03WA17	J0303006-16	SSM03WA18
J0303006-17	SSM03WA19	J0303006-18	SSM03WA03
J0303006-19	trip blank		

Enclosed are the analytical results for the submitted sample(s). Please review the CASE NARRATIVE for a discussion of any data and/or quality control issues. Listings of data qualifiers, analytical codes, key dates, and QC relationships are provided at the end of the report.

Sincerely,



Kimberely Unger
Project Manager

"The Science of Analysis, The Art of Service"

Case Narrative

Analytica Alaska Southeast

Work Order: J0303006

Samples were prepared and analyzed according to EPA or equivalent methods outlined in the following references:

ADEC Method AK101 For the Determination of Gasoline Range Organics.

ADEC Method AK102 For the Determination of Diesel Range Organics.

Test Methods for Evaluating Solid Waste, USEPA SW-846, Third Edition, Rev.4, Dec.1996.

REVIEW FOR COMPLIANCE WITH ANALYTICA QA PLAN

A summary of our review is shown below, organized by test:

SAMPLE RECEIPT:

There were 19 samples received on 3/4/2003.

Samples were received at a temperature of 1.6 deg C.in cooler 1 at Analytica-Juneau.

The cooler was opened on 3/4/2003.

Comments:

samples arrived in three coolers, temps. 2.7, 1.6, 3.0

SSM03WA02 out of hold time for nitrate/nitrite, so ran preserved fraction.

trip blank was broken upon arrival in Skagway; a new trip blank will be sent to Anchorage.

Samples for DRO and GRO/BTEX were transferred to Analytica-Anchorage for analysis where they were received on 3/5/2003 in three coolers at temperatures of 3.2°C, 4.6°C, and 4.2°C. Samples were received in good condition and in order per chain of custody with the following noted exception;Three of the DRO bottles for sample Ids SSM03WA05, SSM03WA07, and SSM03WA02 were broken in transit to AAI Anchorage. Jeremy Blei was notified that the laboratory was unable to proceed with DRO analysis due to lack of sample matrix.

Test Method: 310.1 - Alkalinity, Titrimetric (pH 4.5) - CaCO₃ - Aqueous

HOLDING TIMES:

Holding times were met for this Test

SAMPLE PREPARATION ISSUES AND OBSERVATIONS:

INSTRUMENT PERFORMANCE CHECKS:

Instrument checks were within method criteria.****NOTE - ALTER IF THIS IS NOT

TRUE****

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.****NOTE - ALTER IF THIS IS NOT

TRUE****

CONTINUING CALIBRATIONS:

No Info

METHOD BLANK OUTLIERS:

There are no method blank outliers.

LCS OUTLIERS:

There are no LCS outliers.

MS/MSD and DUP OUTLIERS:

There are no MS/MSD or DUP outliers.

Case Narrative

Analytica Alaska Southeast

Work Order: J0303006

(continued)

Test Method: ADEC AK102 - (DRO) - Aqueous

HOLDING TIMES:

Holding times were met for this Test

SAMPLE PREPARATION ISSUES AND OBSERVATIONS:

INSTRUMENT PERFORMANCE CHECKS:

Instrument checks were within method criteria.

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.

CONTINUING CALIBRATIONS:

Continuing Calibrations were within method criteria.

SURROGATE RECOVERIES:

There were no surrogate outliers.

METHOD BLANK OUTLIERS:

There were no MB outliers; No DRO detected above PQL.

LCS OUTLIERS:

There are no LCS outliers.

MS/MSD and DUP OUTLIERS:

No were samples selected or submitted with this delivery for batch MS/MSD

Test Method: GRO by ADEC AK101 & BTEX by 8021B - Aqueous

HOLDING TIMES:

Holding times were met for this Test

SAMPLE PREPARATION ISSUES AND OBSERVATIONS:

INSTRUMENT PERFORMANCE CHECKS:

Instrument checks were within method criteria.

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.

CONTINUING CALIBRATIONS:

Continuing calibrations were within method criteria.

SURROGATE RECOVERIES:

There were no surrogate outliers.

METHOD BLANK OUTLIERS:

There were no Method Blank outliers, no GRO/BTEX detected above the PQL.

LCS OUTLIERS:

There are no LCS outliers.

MS/MSD and DUP OUTLIERS:

No samples were selected or submitted with this delivery for batch MS/MSD.

Case Narrative

Analytica Alaska Southeast

Work Order: J0303006

(continued)

No samples were selected or submitted with this delivery for batch MS/MSD.

TRIP BLANK:

The water BTEX trip blank sample was found to contain levels of toluene slightly above the method reporting limit. The trip blank sample was re-analyzed and the result was confirmed. It is likely that the trip blank sample was contaminated with this volatile compound during preparation or storage of the trip blank itself as the majority of the field samples with this delivery were found to be non-detectable for this compound. Those field samples, which did produce levels above the reporting limit for toluene, were highly contaminated and contained detectable levels of other volatile compounds as well. For this reason, it is believed that the toluene results for these samples are valid. In addition, this trip blank was not the original trip blank which traveled with the bottle order to the field and back to the lab with the samples. The original trip blank was found to be broken upon receipt at Analytica-Juneau. At this time, another trip blank was prepared and included in with the BTEX samples which were shipped to Analytica-Anchorage. As a result, the trip blank results included in this report are not an accurate representation of the field. The laboratory batch method blank QC sample analyzed with these samples was entirely free of contamination indicating that the laboratory equipment was not the source of this contamination.

Test Method: Inorganic Anions by Ion Chromatography - Juneau - Aqueous

HOLDING TIMES:

HOLD TIMES MISSED:

Sample SSM03WA02,J0303006-14D

Sampled: 3/1/2003 5:00:00 PM, Prepped: 3/6/2003

Regulatory hold time: 48 Hrs

Sample MS,J0303006-14D-MS

Sampled: 3/1/2003 5:00:00 PM, Prepped: 3/6/2003

Regulatory hold time: 48 Hrs

Sample MSD,J0303006-14D-MSD

Sampled: 3/1/2003 5:00:00 PM, Prepped: 3/6/2003

Regulatory hold time: 48 Hrs

SAMPLE PREPARATION ISSUES AND OBSERVATIONS:

INSTRUMENT PERFORMANCE CHECKS:

Instrument checks were within method criteria.****NOTE - ALTER IF THIS IS NOT TRUE****

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.****NOTE - ALTER IF THIS IS NOT TRUE****

CONTINUING CALIBRATIONS:

Continuing calibrations were within method criteria.

METHOD BLANK OUTLIERS:

There are no method blank outliers.

LCS OUTLIERS:

There are no LCS outliers.

Case Narrative

Analytica Alaska Southeast

Work Order: J0303006

(continued)

MS/MSD and DUP OUTLIERS:

There are no MS/MSD or DUP outliers.

Test Method: Inorganic Anions by Ion Chromatography - Nitrate/Nitrite - Aqueous

HOLDING TIMES:

Holding times were met for this Test

SAMPLE PREPARATION ISSUES AND OBSERVATIONS:

INSTRUMENT PERFORMANCE CHECKS:

Instrument checks were within method criteria.***NOTE - ALTER IF THIS IS NOT TRUE***

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.***NOTE - ALTER IF THIS IS NOT TRUE***

CONTINUING CALIBRATIONS:

Continuing calibrations were within method criteria.

METHOD BLANK OUTLIERS:

There are no method blank outliers.

LCS OUTLIERS:

There are no LCS outliers.

MS/MSD and DUP OUTLIERS:

There are no MS/MSD or DUP outliers.

Test Method: Methane by RSK 175 - Aqueous

This is a subcontracted test and has been represented to us as having met criteria.

Test Method: SW6020 - ICPMS - ICPMS Diss - Aqueous

HOLDING TIMES:

Holding times were met for this Test.

SAMPLE PREPARATION ISSUES AND OBSERVATIONS:

INSTRUMENT PERFORMANCE CHECKS:

Instrument checks were within method criteria.

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.

METHOD BLANK OUTLIERS:

There are no method blank outliers.

LCS OUTLIERS:

There are no LCS outliers.

Case Narrative

Analytica Alaska Southeast

Work Order: J0303006

(continued)

MS/MSD and DUP OUTLIERS:

Type	Client Sample	LabSample	Analyte	Recovery	LCL	UCL	Parent	Spike
MS	SSM03WA02	J0303006-14E	Manganese	36.1	75	125	1950	50.0
MS	SSM03WA02	J0303006-14E	Iron	-59.	75	125	22200	550

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
 Project: Skagway State Street Mystery
 Client: CH2M Hill of Alaska
 Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA01**

Matrix: Aqueous Collection Date: 2/28/2003 12:00:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303006-01B	Analysis Date:	3/8/2003 12:50:00AM
Prep Date:	3/7/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3030772.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030307002	Analyst Initials:	GD
Report Basis:	As Received	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	700.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Diesel Range Organics	n/a	0.27		mg/L	0.23	0.046		1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.069		mg/L	0.016	0.0032	0.071	96.2	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303006-01A	Analysis Date:	3/10/2003 11:33:00AM
Prep Date:	3/10/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3031007.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030310001	Analyst Initials:	STE
Report Basis:	As Received	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Benzene	71-43-2	ND		ug/L	1.0	0.15		1
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18		
Toluene	108-88-3	ND		ug/L	1.0	0.24		
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63		

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	86		ug/L	1.0	0.10	100	86.1	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	97.8	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA04**

Matrix: Aqueous Collection Date: 2/28/2003 12:30:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-02B Analysis Date: 3/8/2003 1:17:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030773.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002 Analyst Initials: GD
Report Basis: As Received Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 710.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	0.65		mg/L	0.23	0.045				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.070		mg/L	0.016	0.0032	0.070	99.0	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-02A Analysis Date: 3/10/2003 12:02:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031008.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	88		ug/L	1.0	0.10	100	87.9	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	98.9	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03WA05

Matrix: Aqueous Collection Date: 2/28/2003 12:50:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-03A Analysis Date: 3/10/2003 12:31:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031009.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001
Report Basis: As Received Analyst Initials: STE
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

Table with columns: Analyte, CASNo, Result, Flags, Units, PQL, MDL, Spike, % Recov, LCL, UCL, Rerun #. Rows include Benzene, Ethylbenzene, Toluene, Xylenes, Total, Bromofluorobenzene(PID), and Difluorobenzene(PID).

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA06**

Matrix: Aqueous

Collection Date: 2/28/2003 12:55:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-04B Analysis Date: 3/8/2003 1:44:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030774.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002 Analyst Initials: GD
Report Basis: As Received Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 860.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	0.084	J	mg/L	0.19	0.037				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.053		mg/L	0.013	0.0026	0.058	91.6	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-04A Analysis Date: 3/10/2003 1:00:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031010.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	85		ug/L	1.0	0.10	100	84.8	50	150	1
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	96.5	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA07**

Matrix: Aqueous

Collection Date: 2/28/2003 1:30:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-05A

Prep Date: 3/10/2003

Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX

Prep Method ID: 5030

Prep Batch Number: A030310001

Report Basis: As Received

Sample prep wt./vol: 5.00 ml

Analysis Date: 3/10/2003 1:29:00PM

Instrument: Natasha

File Name: N3031011.D

Dilution Factor: 1

Analyst Initials: STE

Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	1.4		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	89		ug/L	1.0	0.10	100	88.6	50	150	1
Difluorobenzene(PID)	540-36-3	50		ug/L	1.0	0.10	50	99.2	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859
Report Section: Client Sample Report

Client Sample Name: **SSM03WA08**

Matrix: Aqueous Collection Date: 3/1/2003 8:20:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-06B Analysis Date: 3/8/2003 2:11:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030775.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002 Analyst Initials: GD
Report Basis: As Received Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 830.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	1.2		mg/L	0.19	0.039				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	0.058		mg/L	0.014	0.0027	0.060	96.5	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-06A Analysis Date: 3/10/2003 1:58:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: GRO by ADEC AK101 & BTEX by 8021B File Name: N3031012.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL					Rerun #:
Benzene	71-43-2	1.1		ug/L	1.0	0.15					1
Ethylbenzene	100-41-4	8.5		ug/L	1.0	0.18					
Gasoline Range Organics	n/a	670		ug/L	50	3.0					
Toluene	108-88-3	0.54	J	ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	11		ug/L	3.0	0.63					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene	1072-85-1	100		ug/L	1.0	0.10	100	102	50	150	1
Bromofluorobenzene(PID)	1072-85-1	84		ug/L	1.0	0.10	100	83.9	50	150	
Difluorobenzene	540-36-3	52		ug/L	1.0	0.10	50	104	50	150	
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	97.7	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA09**

Matrix: Aqueous Collection Date: 3/1/2003 9:00:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-07B Analysis Date: 3/8/2003 2:38:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030776.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002
Report Basis: As Received Analyst Initials: GD
Sample prep wt./vol: 830.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	3.6		mg/L	0.19	0.039				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.061		mg/L	0.014	0.0027	0.060	101	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-07A Analysis Date: 3/10/2003 9:13:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: GRO by ADEC AK101 & BTEX by 8021B File Name: N3031027.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001
Report Basis: As Received Analyst Initials: STE
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	1.4		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	22		ug/L	1.0	0.18					
Gasoline Range Organics	n/a	680		ug/L	50	3.0					
Toluene	108-88-3	0.59	J	ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	130		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene	1072-85-1	89		ug/L	1.0	0.10	100	88.6	50	150	1
Bromofluorobenzene(PID)	1072-85-1	88		ug/L	1.0	0.10	100	88.1	50	150	
Difluorobenzene	540-36-3	48		ug/L	1.0	0.10	50	96.1	50	150	
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	97.6	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA10**

Matrix: Aqueous

Collection Date: 3/1/2003 10:00:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-08B

Prep Date: 3/7/2003

Analytical Method ID: ADEC AK102 - (DRO)

Prep Method ID: 3510

Prep Batch Number: A030307002

Report Basis: As Received

Sample prep wt./vol: 830.00 ml

Analysis Date: 3/8/2003 3:05:00AM

Instrument: Roo

File Name: R3030777.D

Dilution Factor: 1

Analyst Initials: GD

Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	2.0		mg/L	0.19	0.039				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.059		mg/L	0.014	0.0027	0.060	97.3	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-08A

Prep Date: 3/10/2003

Analytical Method ID: GRO by ADEC AK101 & BTEX by 8021B

Prep Method ID: 5030

Prep Batch Number: A030310001

Report Basis: As Received

Sample prep wt./vol: 5.00 ml

Analysis Date: 3/10/2003 3:53:00PM

Instrument: Natasha

File Name: N3031016.D

Dilution Factor: 1

Analyst Initials: STE

Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>					<u>Rerun #:</u>
Benzene	71-43-2	0.74	J	ug/L	1.0	0.15					1
Ethylbenzene	100-41-4	4.4		ug/L	1.0	0.18					
Gasoline Range Organics	n/a	640		ug/L	50	3.0					
Toluene	108-88-3	1.0		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	20		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene	1072-85-1	97		ug/L	1.0	0.10	100	96.9	50	150	1
Bromofluorobenzene(PID)	1072-85-1	84		ug/L	1.0	0.10	100	83.9	50	150	
Difluorobenzene	540-36-3	52		ug/L	1.0	0.10	50	105	50	150	
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	97.9	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859
Report Section: Client Sample Report
Client Sample Name: **SSM03WA11**

Matrix: Aqueous Collection Date: 3/1/2003 10:30:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-09B Analysis Date: 3/8/2003 4:26:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030780.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002 Analyst Initials: GD
Report Basis: As Received Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 830.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	0.26		mg/L	0.19	0.039				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	0.058		mg/L	0.014	0.0027	0.060	96.3	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-09A Analysis Date: 3/10/2003 4:22:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031017.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	85		ug/L	1.0	0.10	100	85.2	50	150	1
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	96.2	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA12**

Matrix: Aqueous Collection Date: 3/1/2003 1:15:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-10B Analysis Date: 3/8/2003 4:53:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030781.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002 Analyst Initials: GD
Report Basis: As Received Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 860.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	0.36		mg/L	0.19	0.037				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.057		mg/L	0.013	0.0026	0.058	98.0	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-10A Analysis Date: 3/10/2003 4:51:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031018.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	84		ug/L	1.0	0.10	100	84.2	50	150	1
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	96.0	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA13**

Matrix: Aqueous Collection Date: 3/1/2003 1:30:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-11B Analysis Date: 3/8/2003 5:20:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030782.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002 Analyst Initials: GD
Report Basis: As Received Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 870.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	24		mg/L	0.18	0.037				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.060		mg/L	0.013	0.0026	0.057	104	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-11A Analysis Date: 3/12/2003 1:10:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031208.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	1.4		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	24		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	87		ug/L	1.0	0.10	100	86.7	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	98.2	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA14**

Matrix: Aqueous Collection Date: 3/1/2003 2:10:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-12B Analysis Date: 3/8/2003 5:47:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030783.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002 Analyst Initials: GD
Report Basis: As Received Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 830.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	15		mg/L	0.19	0.039				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.050		mg/L	0.014	0.0027	0.060	83.6	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-12A Analysis Date: 3/12/2003 1:38:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: GRO by ADEC AK101 & BTEX by 8021B File Name: N3031209.D
Prep Method ID: 5030 Dilution Factor: 2
Prep Batch Number: A030310001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	1.7	J	ug/L	2.0	0.29				1	
Ethylbenzene	100-41-4	13		ug/L	2.0	0.37					
Gasoline Range Organics	n/a	2,500		ug/L	100	6.1					
Toluene	108-88-3	6.9		ug/L	2.0	0.47					
Xylenes, Total	1330-20-7	330		ug/L	6.0	1.3					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene	1072-85-1	190		ug/L	2.0	0.20	200	93.3	50	150	1
Bromofluorobenzene(PID)	1072-85-1	160		ug/L	2.0	0.20	200	82.0	50	150	
Difluorobenzene	540-36-3	100		ug/L	2.0	0.20	100	103	50	150	
Difluorobenzene(PID)	540-36-3	97		ug/L	2.0	0.20	100	96.7	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03WA15

Matrix: Aqueous Collection Date: 3/1/2003 3:00:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303006-13B	Analysis Date:	3/8/2003 6:14:00AM
Prep Date:	3/7/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3030784.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030307002	Analyst Initials:	GD
Report Basis:	As Received	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	830.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	2.5		mg/L	0.19	0.039				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.043		mg/L	0.014	0.0027	0.060	70.6	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303006-13A	Analysis Date:	3/10/2003 6:19:00PM
Prep Date:	3/10/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3031021.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030310001	Analyst Initials:	STE
Report Basis:	As Received	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	2.5		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	10.0		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	82		ug/L	1.0	0.10	100	82.4	50	150	1
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	95.8	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA02**

Matrix: Aqueous

Collection Date: 3/1/2003 5:00:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-14A
Prep Date: 3/10/2003
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX
Prep Method ID: 5030
Prep Batch Number: A030310001
Report Basis: As Received
Sample prep wt./vol: 5.00 ml

Analysis Date: 3/10/2003 6:48:00PM
Instrument: Natasha
File Name: N3031022.D
Dilution Factor: 5
Analyst Initials: STE
Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	5.0	0.74				1	
Ethylbenzene	100-41-4	59		ug/L	5.0	0.91					
Toluene	108-88-3	6.9		ug/L	5.0	1.2					
Xylenes, Total	1330-20-7	300		ug/L	15	3.2					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	440		ug/L	5.0	0.50	500	87.6	50	150	1
Difluorobenzene(PID)	540-36-3	250		ug/L	5.0	0.50	250	98.8	50	150	

Lab Sample Number: J0303006-14E
Prep Date: 3/18/2003
Analytical Method ID: SW6020 - ICPMS - ICPMS Diss
Prep Method ID: 3005_ICP
Prep Batch Number: J030318003
Report Basis: As Received
Sample prep wt./vol: 50.00 ml

Analysis Date: 3/18/2003 2:53:53PM
Instrument: Elan
File Name: export031803.c
Dilution Factor: 1
Analyst Initials: SA
Prep Extract Vol: 50.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>
Iron	7439-89-6	22,200		ug/L	50	4.9				2
Manganese	7439-96-5	1,950		ug/L	0.20	0.052				

Lab Sample Number: J0303006-14D
Prep Date: 3/10/2003
Analytical Method ID: 310.1 - Alkalinity, Titrimetric (pH 4.5) - CaCO3
Prep Method ID: 2320B
Prep Batch Number: J030312023
Report Basis: As Received
Sample prep wt./vol: 50.00 ml

Analysis Date: 3/10/2003 9:40:01AM
Instrument: Titrametric
File Name:
Dilution Factor: 1
Analyst Initials: SRM
Prep Extract Vol: 50.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>
Alkalinity, Total as CaCO3		101		mg/L CaCO3	1.0	0.34				1

Lab Sample Number: J0303006-14C
Prep Date: 3/6/2003
Analytical Method ID: Inorganic Anions by Ion Chromatography - Nitrate/Nitrite
Prep Method ID: 300.OP
Prep Batch Number: J030310007
Report Basis: As Received
Sample prep wt./vol: 5.00 ml

Analysis Date: 3/6/2003 3:39:36PM
Instrument: IC
File Name: NULL
Dilution Factor: 5
Analyst Initials: KDU
Prep Extract Vol: 5.00 ml

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA02**

Matrix: Aqueous Collection Date: 3/1/2003 5:00:00PM

Lab Sample Number: J0303006-14C Analysis Date: 3/6/2003 3:39:36PM
Prep Date: 3/6/2003 Instrument: IC
Analytical Method ID: Inorganic Anions by Ion Chromatography - Nitrate/Nitrite File Name: NULL
Prep Method ID: 300.0P Dilution Factor: 5
Prep Batch Number: J030310007
Report Basis: As Received Analyst Initials: KDU
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Total Nitrate & Nitrite as N		ND		mg/L	0.50	0.095	1

Lab Sample Number: J0303006-14D Analysis Date: 3/6/2003 3:39:36PM
Prep Date: 3/6/2003 Instrument: IC
Analytical Method ID: Inorganic Anions by Ion Chromatography - Juneau File Name: NULL
Prep Method ID: 300.0 Dilution Factor: 1
Prep Batch Number: J030310005
Report Basis: As Received Analyst Initials: KDU
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Sulfate		2.78		mg/L	0.10	0.035	1

The following test was conducted by: Laucks Testing Laboratories

Lab Sample Number: J0303006-14F Analysis Date: 3/11/2003 10:30:42AM
Prep Date: 3/11/2003 Instrument: Sub Contract
Analytical Method ID: Methane by RSK 175 File Name:
Prep Method ID: RSK175 Dilution Factor: 1
Prep Batch Number: J030321002
Report Basis: As Received Analyst Initials: Laucks
Sample prep wt./vol: 11.50 ml Prep Extract Vol: 11.50 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Ethane	74-84-0	ND		ug/L	1.7	0.60	1
Ethene	74-85-1	ND		ug/L	1.8	0.60	
Methane	74-82-8	440		ug/L	0.87	0.30	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03WA17

Matrix: Aqueous Collection Date: 3/1/2003 5:05:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-15B Analysis Date: 3/8/2003 6:41:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030785.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002
Report Basis: As Received Analyst Initials: GD
Sample prep wt./vol: 870.00 ml Prep Extract Vol: 1.00 ml

Table with columns: Analyte, CASNo, Result, Flags, Units, PQL, MDL, Rerun #. Rows include Diesel Range Organics and o-Terphenyl.

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-15A Analysis Date: 3/10/2003 7:17:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031023.D
Prep Method ID: 5030 Dilution Factor: 10
Prep Batch Number: A030310001
Report Basis: As Received Analyst Initials: STE
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

Table with columns: Analyte, CASNo, Result, Flags, Units, PQL, MDL, Spike, % Recov, LCL, UCL, Rerun #. Rows include Benzene, Ethylbenzene, Toluene, Xylenes, Total, Bromofluorobenzene(PID), and Difluorobenzene(PID).

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA18**

Matrix: Aqueous

Collection Date: 3/2/2003 11:00:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-16B Analysis Date: 3/8/2003 7:08:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030786.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002 Analyst Initials: GD
Report Basis: As Received Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 870.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	ND		mg/L	0.18	0.037				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.052		mg/L	0.013	0.0026	0.057	90.3	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-16A Analysis Date: 3/10/2003 7:46:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031024.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	84		ug/L	1.0	0.10	100	83.5	50	150	1
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	96.4	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859
Report Section: Client Sample Report

Client Sample Name: SSM03WA19

Matrix: Aqueous Collection Date: 3/2/2003 12:30:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-17B Analysis Date: 3/8/2003 7:35:00AM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030787.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002
Report Basis: As Received Analyst Initials: GD
Sample prep wt./vol: 870.00 ml Prep Extract Vol: 1.00 ml

Table with columns: Analyte, CASNo, Result, Flags, Units, POL, MDL, Rerun #. Row 1: Diesel Range Organics, n/a, 0.13, J, mg/L, 0.18, 0.037, 1. Row 2: Surrogate, CASNo, Result, Flags, Units, POL, MDL, Spike, % Recov, LCL, UCL, Rerun #. Row 1: o-Terphenyl, 84-15-1, 0.054, mg/L, 0.013, 0.0026, 0.057, 94.6, 50, 150, 1.

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-17A Analysis Date: 3/10/2003 8:15:00PM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031025.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001
Report Basis: As Received Analyst Initials: STE
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

Table with columns: Analyte, CASNo, Result, Flags, Units, POL, MDL, Rerun #. Row 1: Benzene, 71-43-2, ND, ug/L, 1.0, 0.15, 1. Row 2: Ethylbenzene, 100-41-4, ND, ug/L, 1.0, 0.18. Row 3: Toluene, 108-88-3, ND, ug/L, 1.0, 0.24. Row 4: Xylenes, Total, 1330-20-7, ND, ug/L, 3.0, 0.63. Row 5: Surrogate, CASNo, Result, Flags, Units, POL, MDL, Spike, % Recov, LCL, UCL, Rerun #. Row 1: Bromofluorobenzene(PID), 1072-85-1, 84, ug/L, 1.0, 0.10, 100, 84.4, 50, 150, 1. Row 2: Difluorobenzene(PID), 540-36-3, 49, ug/L, 1.0, 0.10, 50, 97.5, 50, 150.

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: SSM03WA03

Matrix: Aqueous Collection Date: 3/2/2003 3:30:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303006-18B	Analysis Date:	3/8/2003 8:02:00AM
Prep Date:	3/7/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3030788.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030307002	Analyst Initials:	GD
Report Basis:	As Received	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	830.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Diesel Range Organics	n/a	ND		mg/L	0.19	0.039		1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.053		mg/L	0.014	0.0027	0.060	88.5	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0303006-18A	Analysis Date:	3/10/2003 8:44:00PM
Prep Date:	3/10/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3031026.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030310001	Analyst Initials:	STE
Report Basis:	As Received	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Benzene	71-43-2	ND		ug/L	1.0	0.15		1
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18		
Toluene	108-88-3	ND		ug/L	1.0	0.24		
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63		

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	82		ug/L	1.0	0.10	100	81.5	50	150	1
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	96.5	50	150	

Lab Sample Number:	J0303006-18E	Analysis Date:	3/18/2003 3:06:19PM
Prep Date:	3/18/2003	Instrument:	Elan
Analytical Method ID:	SW6020 - ICPMS - ICPMS Diss	File Name:	export031803.c
Prep Method ID:	3005_ICP	Dilution Factor:	1
Prep Batch Number:	J030318003	Analyst Initials:	SA
Report Basis:	As Received	Prep Extract Vol:	50.00 ml
Sample prep wt./vol:	50.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Iron	7439-89-6	6,830		ug/L	50	4.9		2
Manganese	7439-96-5	2,020		ug/L	0.20	0.052		

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA03**

Matrix: Aqueous Collection Date: 3/2/2003 3:30:00PM

Lab Sample Number: J0303006-18D Analysis Date: 3/10/2003 9:40:01AM
Prep Date: 3/10/2003 Instrument: Titrametric
Analytical Method ID: 310.1 - Alkalinity, Titrimetric (pH 4.5) - CaCO3 File Name:
Prep Method ID: 2320B Dilution Factor: 1
Prep Batch Number: J030312023 Analyst Initials: SRM
Report Basis: As Received Prep Extract Vol: 50.00 ml
Sample prep wt./vol: 50.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Alkalinity, Total as CaCO3		110		mg/L CaCO	1.0	0.34	1

Lab Sample Number: J0303006-18D Analysis Date: 3/4/2003 3:24:50PM
Prep Date: 3/4/2003 Instrument: IC
Analytical Method ID: Inorganic Anions by Ion Chromatography - Juneau File Name: NULL
Prep Method ID: 300.0 Dilution Factor: 1
Prep Batch Number: J030305004 Analyst Initials: KDU
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Sulfate		7.44		mg/L	0.10	0.035	1

Lab Sample Number: J0303006-18D Analysis Date: 3/11/2003 6:16:04PM
Prep Date: 3/4/2003 Instrument: IC
Analytical Method ID: Inorganic Anions by Ion Chromatography - Juneau File Name:
Prep Method ID: 300.0 Dilution Factor: 1
Prep Batch Number: J030305004 Analyst Initials: KD
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Total Nitrate & Nitrite as N		ND		mg/L	0.50	0.048	2

The following test was conducted by: Laucks Testing Laboratories

Lab Sample Number: J0303006-18F Analysis Date: 3/11/2003 10:30:42AM
Prep Date: 3/11/2003 Instrument: Sub Contract
Analytical Method ID: Methane by RSK 175 File Name:
Prep Method ID: RSK175 Dilution Factor: 1
Prep Batch Number: J030321002 Analyst Initials: Laucks
Report Basis: As Received Prep Extract Vol: 11.50 ml
Sample prep wt./vol: 11.50 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Ethane	74-84-0	ND		ug/L	1.7	0.60	1
Ethene	74-85-1	ND		ug/L	1.8	0.60	
Methane	74-82-8	280		ug/L	0.87	0.30	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **trip blank**

Matrix: Aqueous Collection Date: 3/1/2003 8:20:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0303006-19A Analysis Date: 3/12/2003 11:46:00AM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031207.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	1.6		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	90		ug/L	1.0	0.10	100	89.8	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	98.8	50	150	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Method Blank Report

Client Sample Name: **MB**

Matrix: Aqueous Collection Date: 3/7/2003 12:00:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: A030307002-MB Analysis Date: 3/7/2003 6:01:00PM
Prep Date: 3/7/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3030757.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030307002
Report Basis: Dry Weight Basis Analyst Initials: GD
Sample prep wt./vol: 1,000.00ml Prep Extract Vol: 1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	ND		mg/L	0.16	0.032				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	0.044		mg/L	0.011	0.0023	0.050	88.6	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: A030310001-MB Analysis Date: 3/10/2003 10:07:00AM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3031004.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001
Report Basis: Dry Weight Basis Analyst Initials: STE
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL					Rerun #:
Benzene	71-43-2	ND		ug/L	1.0	0.15					1
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	83		ug/L	1.0	0.10	100	82.9	50	150	1
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	96.0	50	150	

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: A030310001-MB Analysis Date: 3/10/2003 10:07:00AM
Prep Date: 3/10/2003 Instrument: Natasha
Analytical Method ID: GRO by ADEC AK101 & BTEX by 8021B File Name: N3031004.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030310001
Report Basis: Dry Weight Basis Analyst Initials: STE
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL					Rerun #:
Benzene	71-43-2	ND		ug/L	1.0	0.15					1
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Gasoline Range Organics	n/a	6.1	J	ug/L	50	3.0					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Method Blank Report

Client Sample Name:

MB

Matrix: Aqueous

Collection Date: 3/10/2003 12:00:00AM

Lab Sample Number:	A030310001-MB	Analysis Date:	3/10/2003 10:07:00AM
Prep Date:	3/10/2003	Instrument:	Natasha
Analytical Method ID:	GRO by ADEC AK101 & BTEX by 8021B	File Name:	N3031004.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030310001	Analyst Initials:	STE
Report Basis:	Dry Weight Basis	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene	1072-85-1	94		ug/L	1.0	0.10	100	94.2	50	150	1
Bromofluorobenzene(PID)	1072-85-1	83		ug/L	1.0	0.10	100	82.9	50	150	
Difluorobenzene	540-36-3	52		ug/L	1.0	0.10	50	104	50	150	
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	96.0	50	150	

Lab Sample Number:	J030318003-MB	Analysis Date:	3/18/2003 5:11:27PM
Prep Date:	3/18/2003	Instrument:	Elan
Analytical Method ID:	SW6020 - ICPMS - ICPMS Diss	File Name:	export031803.c
Prep Method ID:	3005_ICP	Dilution Factor:	1
Prep Batch Number:	J030318003	Analyst Initials:	SA
Report Basis:	Dry Weight Basis	Prep Extract Vol:	50.00 ml
Sample prep wt./vol:	50.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Iron	7439-89-6	ND		ug/L	50	4.9	4
Manganese	7439-96-5	ND		ug/L	0.20	0.052	

Lab Sample Number:	J030312023-MB	Analysis Date:	3/10/2003 9:40:01AM
Prep Date:	3/10/2003	Instrument:	Titrametric
Analytical Method ID:	310.1 - Alkalinity, Titrimetric (pH 4.5) - CaCO3	File Name:	
Prep Method ID:	2320B	Dilution Factor:	1
Prep Batch Number:	J030312023	Analyst Initials:	SRM
Report Basis:	Dry Weight Basis	Prep Extract Vol:	50.00 ml
Sample prep wt./vol:	50.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Alkalinity, Total as CaCO3		ND		mg/L CaCO	1.0	0.34	1

Lab Sample Number:	J030310007-MB	Analysis Date:	3/6/2003 3:39:36PM
Prep Date:	3/6/2003	Instrument:	IC
Analytical Method ID:	Inorganic Anions by Ion Chromatography - Nitrate/Nitrite	File Name:	NULL
Prep Method ID:	300.OP	Dilution Factor:	1
Prep Batch Number:	J030310007	Analyst Initials:	KDU
Report Basis:	Dry Weight Basis	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Total Nitrate & Nitrite as N		ND		mg/L	0.10	0.019	1

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Method Blank Report

Client Sample Name:

MB

Matrix: Aqueous

Collection Date: 3/4/2003 12:00:00AM

Lab Sample Number: J030305004-MB
Prep Date: 3/4/2003
Analytical Method ID: Inorganic Anions by Ion Chromatography - Juneau
Prep Method ID: 300.0
Prep Batch Number: J030305004
Report Basis: Dry Weight Basis
Sample prep wt./vol: 5.00 ml

Analysis Date: 3/4/2003 12:10:24PM
Instrument: IC
File Name: NULL
Dilution Factor: 1
Analyst Initials: KDU
Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Sulfate		ND		mg/L	0.10	0.035	1

Lab Sample Number: J030310005-MB
Prep Date: 3/6/2003
Analytical Method ID: Inorganic Anions by Ion Chromatography - Juneau
Prep Method ID: 300.0
Prep Batch Number: J030310005
Report Basis: Dry Weight Basis
Sample prep wt./vol: 5.00 ml

Analysis Date: 3/6/2003 3:39:36PM
Instrument: IC
File Name: NULL
Dilution Factor: 1
Analyst Initials: KDU
Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Rerun #:</u>
Sulfate		ND		mg/L	0.10	0.035	1

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC Recovery Report

Work Order: J0303006

Prep Batch Number: J030305004

Base Sample	J0303006-18D				Anal. Method:	Inorganic Anions by Ion Chromatography - J						
QC Sample	J0303006-18D-MS				Sample Prep Date:	3/4/2003 12:00:00AM						
QC Duplicate:	J0303006-18D-MSD				Analysis Units:	mg/L						
Sample Analysis Date:	3/4/2003 3:24:50PM				Matrix:	Aqueous						
QC Sample Analysis Date:	3/4/2003 3:44:18PM				QC DUP Sample Analysis Date:	3/4/2003 4:03:47PM						
Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Sulfate	7.44	54.9	55.2	50.0	94.9	50.0	95.5	75	125	0.54		

Base Sample	J030305004-MB				Anal. Method:	Inorganic Anions by Ion Chromatography - J						
QC Sample	J030305004-LCS				Sample Prep Date:	3/4/2003 12:00:00AM						
QC Duplicate:	J030305004-LCSD				Analysis Units:	mg/L						
Sample Analysis Date:	3/4/2003 12:10:24PM				Matrix:	Aqueous						
QC Sample Analysis Date:	3/4/2003 12:29:50PM				QC DUP Sample Analysis Date:	3/4/2003 3:05:21PM						
Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Sulfate	ND	48.1	47.9	50.0	96.2	50.0	95.8	85	115	0.42		

Prep Batch Number: A030307002

Base Sample	A030307002-MB				Anal. Method:	ADEC AK102 - (DRO)						
QC Sample	A030307002-LCS				Sample Prep Date:	3/7/2003 12:00:00AM						
QC Duplicate:	A030307002-LCSD				Analysis Units:	mg/L						
Sample Analysis Date:	3/7/2003 6:01:00PM				Matrix:	Aqueous						
QC Sample Analysis Date:	3/7/2003 6:29:00PM				QC DUP Sample Analysis Date:	3/7/2003 6:56:00PM						
Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Diesel Range Organics	ND	1.94	1.95	2.00	97.0	2.00	97.5	60	120	0.51		

Surrogates:

o-Terphenyl	0.0443	0.0504	0.0485	0.0500	100.8	0.0500	97.0	60	120	3.84		
-------------	--------	--------	--------	--------	-------	--------	------	----	-----	------	--	--

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

QC Recovery Report

Work Order: J0303006

Prep Batch Number: A030310001

Base Sample	A030310001-MB	Anal. Method:	GRO by ADEC AK101 & BTEX by 8021B
QC Sample	A030310001-LCS	Sample Prep Date:	3/10/2003 12:00:00AM
QC Duplicate:	A030310001-LCSD	Analysis Units:	ug/L
Sample Analysis Date:	3/10/2003 10:07:00AM	Matrix:	Aqueous
QC Sample Analysis Date:	3/10/2003 10:36:00AM	QC DUP Sample Analysis Date:	3/10/2003 11:04:00AM

Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Benzene	ND	14.8	15.3	13.8	107.2	13.8	110.9	60	120	3.32		
Ethylbenzene	ND	21.3	22.1	20.3	104.9	20.3	108.9	60	120	3.69		
Gasoline Range Organics	ND	1,010	1,100	1,100	91.8	1,100	100.0	60	120	8.53		
Toluene	ND	71.5	73.0	84.5	84.6	84.5	86.4	60	120	2.08		
Xylenes, Total	ND	98.2	101	99.2	99.0	99.2	101.8	60	120	2.81		

Surrogates:

Bromofluorobenzene	94.2	98.2	100	100	98.2	100	100.0	60	120	1.82		
Bromofluorobenzene(PID)	82.9	95.8	97.4	100	95.8	100	97.4	60	120	1.66		
Difluorobenzene	52.1	48.9	50.0	50.0	97.8	50.0	100.0	60	120	2.22		
Difluorobenzene(PID)	48.0	53.8	55.2	50.0	107.6	50.0	110.4	60	120	2.57		

Base Sample	A030310001-MB	Anal. Method:	Aromatic VOCs by GC/FID via method 8021B
QC Sample	A030310001-LCS	Sample Prep Date:	3/10/2003 12:00:00AM
QC Duplicate:	A030310001-LCSD	Analysis Units:	ug/L
Sample Analysis Date:	3/10/2003 10:07:00AM	Matrix:	Aqueous
QC Sample Analysis Date:	3/10/2003 10:36:00AM	QC DUP Sample Analysis Date:	3/10/2003 11:04:00AM

Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Benzene	ND	14.8	15.3	13.8	107.2	13.8	110.9	60	120	3.32		
Ethylbenzene	ND	21.3	22.1	20.3	104.9	20.3	108.9	60	120	3.69		
Toluene	ND	71.5	73.0	84.5	84.6	84.5	86.4	60	120	2.08		
Xylenes, Total	ND	98.2	101	99.2	99.0	99.2	101.8	60	120	2.81		

Surrogates:

Bromofluorobenzene(PID)	82.9	95.8	97.4	100	95.8	100	97.4	60	120	1.66		
-------------------------	------	------	------	-----	------	-----	------	----	-----	------	--	--

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
 Project: Skagway State Street Mystery
 Client: CH2M Hill of Alaska
 Client Project Number: 178859

QC Recovery Report

Work Order: J0303006

Prep Batch Number: A030310001

Base Sample	A030310001-MB				Anal. Method:	Aromatic VOCs by GC/FID via method 8021B						
QC Sample	A030310001-LCS				Sample Prep Date:	3/10/2003 12:00:00AM						
QC Duplicate:	A030310001-LCSD				Analysis Units:	ug/L						
Sample Analysis Date:	3/10/2003 10:07:00AM				Matrix:	Aqueous						
QC Sample Analysis Date:	3/10/2003 10:36:00AM				QC DUP Sample Analysis Date:	3/10/2003 11:04:00AM						
Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Difluorobenzene(PID)	48.0	53.8	55.2	50.0	107.6	50.0	110.4	60	120	2.57		

Prep Batch Number: J030310005

Base Sample	J0303006-14D				Anal. Method:	Inorganic Anions by Ion Chromatography - J						
QC Sample	J0303006-14D-MS				Sample Prep Date:	3/6/2003 12:00:00AM						
QC Duplicate:	J0303006-14D-MSD				Analysis Units:	mg/L						
Sample Analysis Date:	3/6/2003 3:39:36PM				Matrix:	Aqueous						
QC Sample Analysis Date:	3/6/2003 3:39:36PM				QC DUP Sample Analysis Date:	3/6/2003 3:39:36PM						
Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Sulfate	2.78	49.8	49.8	50.0	94.0	50.0	94.0	75	125	0.00		

Base Sample	J030310005-MB				Anal. Method:	Inorganic Anions by Ion Chromatography - J						
QC Sample	J030310005-LCS				Sample Prep Date:	3/6/2003 12:00:00AM						
QC Duplicate:	J030310005-LCSD				Analysis Units:	mg/L						
Sample Analysis Date:	3/6/2003 3:39:36PM				Matrix:	Aqueous						
QC Sample Analysis Date:	3/6/2003 3:39:36PM				QC DUP Sample Analysis Date:	3/6/2003 3:39:36PM						
Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Sulfate	ND	48.3	48.3	50.0	96.6	50.0	96.6	85	115	0.00		

Prep Batch Number: J030310007

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
 Project: Skagway State Street Mystery
 Client: CH2M Hill of Alaska
 Client Project Number: 178859

QC Recovery Report

Work Order: J0303006

Prep Batch Number: J030310007

Base Sample	J030310007-MB	Anal. Method:	Inorganic Anions by Ion Chromatography - N
QC Sample	J030310007-LCS	Sample Prep Date:	3/6/2003 12:00:00AM
QC Duplicate:	J030310007-LCSD	Analysis Units:	mg/L
Sample Analysis Date:	3/6/2003 3:39:36PM	Matrix:	Aqueous
QC Sample Analysis Date:	3/6/2003 3:39:36PM	QC DUP Sample Analysis Date:	3/6/2003 3:39:36PM

Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Total Nitrate & Nitrite as N	ND	1.92	1.90	2.00	96.0	2.00	95.0	85	115	1.05		

Prep Batch Number: J030312023

Base Sample	J030312023-MB	Anal. Method:	310.1 - Alkalinity, Titrimetric (pH 4.5) - CaCO
QC Sample	J030312023-LCS	Sample Prep Date:	3/10/2003 12:00:00AM
QC Duplicate:	J030312023-LCSD	Analysis Units:	mg/L CaCO3
Sample Analysis Date:	3/10/2003 9:40:01AM	Matrix:	Aqueous
QC Sample Analysis Date:	3/10/2003 9:40:01AM	QC DUP Sample Analysis Date:	3/10/2003 9:40:01AM

Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Alkalinity, Total as CaCO3	ND	60.8	62.8	60.0	101.3	60.0	104.7	85	115	3.24		

Prep Batch Number: J030318003

Base Sample	J0303006-18E	Anal. Method:	SW6020 - ICPMS - ICPMS Diss
QC Sample	J0303006-18E-DUP	Sample Prep Date:	3/18/2003 12:00:00AM
QC Duplicate:		Analysis Units:	ug/L
Sample Analysis Date:	3/18/2003 3:06:19PM	Matrix:	Aqueous
QC Sample Analysis Date:	3/18/2003 3:09:58PM	QC DUP Sample Analysis Date:	3/18/2003 3:09:58PM

Analyte	Samp. Result	Dup Res	DUPRPD	DUPUCL	DUPFI
Iron	6,830	7,070	-3.5	20	
Manganese	2,020	2,080	-3.0	20	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

QC Recovery Report

Work Order: J0303006

Prep Batch Number: J030318003

Base Sample	J0303006-14E			Anal. Method:	SW6020 - ICPMS - ICPMS Diss		
QC Sample	J0303006-14E-MS			Sample Prep Date:	3/18/2003 12:00:00AM		
Sample Analysis Date:	3/18/2003 2:53:53PM			Analysis Units:	ug/L		
QC Sample Analysis Date:	3/18/2003 2:58:57PM			Matrix:	Aqueous		
QC DUP Sample Analysis Date:				QC DUP Sample Analysis Date:			
Analyte	Samp. Result	Spike Res.	Spike Conc	Recov	LCL	UCL	Rec Fl
Iron	22,200	21,800	550		75	125	NOTE 2 LOW/
Manganese	1,950	1,970	50.0		75	125	NOTE 2 LOW/

Base Sample	J030318003-MB			Anal. Method:	SW6020 - ICPMS - ICPMS Diss		
QC Sample	J030318003-LCS			Sample Prep Date:	3/18/2003 12:00:00AM		
Sample Analysis Date:	3/18/2003 5:11:27PM			Analysis Units:	ug/L		
QC Sample Analysis Date:	3/18/2003 2:42:49PM			Matrix:	Aqueous		
QC DUP Sample Analysis Date:				QC DUP Sample Analysis Date:			
Analyte	Samp. Result	Spike Res.	Spike Conc	Recov	LCL	UCL	Rec Fl
Iron	ND	589	550	107.1	80	120	
Manganese	ND	53.8	50.0	107.6	80	120	

FOOTNOTES TO QC REPORT

Note 1: Results are shown to three significant figures to avoid rounding errors in calculations.

Note 2: If the sample concentration is greater than 4 times the spike level, a recovery is not calculated, and the result should be used as a replicate. In such cases the spike is not as high as expected random measurement variability of the sample result itself.

Note 3: For sample duplicates, if the result is less than the PQL, the duplicate RPD is not applicable and is shown as 0. If the sample and duplicate results are not five times the PQL or greater, then the RPD is not expected to fall within the window shown and the comparison should be made on the basis of the absolute difference. Analytica uses the criterion that the absolute difference should be less than the PQL for water or less than 2XPQL for other matrices.

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 15,361 Lab Project Number: J0303006

Prep Date: 3/4/2003

Lab Method Blank Id: J030305004-MB
Prep Batch ID: J030305004
Method: Inorganic Anions by Ion Chromatography - Juneau

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
J0303006-18D	SSM03WA03		3/11/2003 6:16:04PM
J0303006-18D	SSM03WA03	NULL	3/4/2003 3:24:50PM
J030305004-LCS	LCS	NULL	3/4/2003 12:29:50PM
J030305004-LCSD	LCSD	NULL	3/4/2003 3:05:21PM
J0303006-18D-MS	MS	NULL	3/4/2003 3:44:18PM
J0303006-18D-MSD	MSD	NULL	3/4/2003 4:03:47PM

Prep Date: 3/7/2003

Lab Method Blank Id: A030307002-MB
Prep Batch ID: A030307002
Method: ADEC AK102 - (DRO)

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A030307002-LCS	LCS	R3030758.D	3/7/2003 6:29:00PM
A030307002-LCSD	LCSD	R3030759.D	3/7/2003 6:56:00PM
A0303001-03C-MS	MS	R3030760.D	3/7/2003 7:24:00PM
A0303001-03C-MSD	MSD	R3030761.D	3/7/2003 7:51:00PM
A0303001-03C	Batch QC	R3030770.D	3/7/2003 11:55:00PM
J0303006-01B	SSM03WA01	R3030772.D	3/8/2003 12:50:00AM
J0303006-02B	SSM03WA04	R3030773.D	3/8/2003 1:17:00AM
J0303006-04B	SSM03WA06	R3030774.D	3/8/2003 1:44:00AM
J0303006-06B	SSM03WA08	R3030775.D	3/8/2003 2:11:00AM
J0303006-07B	SSM03WA09	R3030776.D	3/8/2003 2:38:00AM
J0303006-08B	SSM03WA10	R3030777.D	3/8/2003 3:05:00AM
J0303006-09B	SSM03WA11	R3030780.D	3/8/2003 4:26:00AM
J0303006-10B	SSM03WA12	R3030781.D	3/8/2003 4:53:00AM
J0303006-11B	SSM03WA13	R3030782.D	3/8/2003 5:20:00AM
J0303006-12B	SSM03WA14	R3030783.D	3/8/2003 5:47:00AM
J0303006-13B	SSM03WA15	R3030784.D	3/8/2003 6:14:00AM
J0303006-15B	SSM03WA17	R3030785.D	3/8/2003 6:41:00AM
J0303006-16B	SSM03WA18	R3030786.D	3/8/2003 7:08:00AM
J0303006-17B	SSM03WA19	R3030787.D	3/8/2003 7:35:00AM
J0303006-18B	SSM03WA03	R3030788.D	3/8/2003 8:02:00AM

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 15,361 Lab Project Number: J0303006

Prep Date: 3/10/2003

Lab Method Blank Id: A030310001-MB
Prep Batch ID: A030310001
Method: GRO by ADEC AK101 & BTEX by 8021B

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A030310001-LCS	LCS	N3031005.D	3/10/2003 10:36:00AM
A030310001-LCS	LCS	N3031005.D	3/10/2003 10:36:00AM
A030310001-LCSD	LCSD	N3031006.D	3/10/2003 11:04:00AM
A030310001-LCSD	LCSD	N3031006.D	3/10/2003 11:04:00AM
J0303006-01A	SSM03WA01	N3031007.D	3/10/2003 11:33:00AM
J0303006-02A	SSM03WA04	N3031008.D	3/10/2003 12:02:00PM
J0303006-03A	SSM03WA05	N3031009.D	3/10/2003 12:31:00PM
J0303006-04A	SSM03WA06	N3031010.D	3/10/2003 1:00:00PM
J0303006-05A	SSM03WA07	N3031011.D	3/10/2003 1:29:00PM
J0303006-06A	SSM03WA08	N3031012.D	3/10/2003 1:58:00PM
J0303006-08A	SSM03WA10	N3031016.D	3/10/2003 3:53:00PM
J0303006-09A	SSM03WA11	N3031017.D	3/10/2003 4:22:00PM
J0303006-10A	SSM03WA12	N3031018.D	3/10/2003 4:51:00PM
J0303006-13A	SSM03WA15	N3031021.D	3/10/2003 6:19:00PM
J0303006-14A	SSM03WA02	N3031022.D	3/10/2003 6:48:00PM
J0303006-15A	SSM03WA17	N3031023.D	3/10/2003 7:17:00PM
J0303006-16A	SSM03WA18	N3031024.D	3/10/2003 7:46:00PM
J0303006-17A	SSM03WA19	N3031025.D	3/10/2003 8:15:00PM
J0303006-18A	SSM03WA03	N3031026.D	3/10/2003 8:44:00PM
J0303006-07A	SSM03WA09	N3031027.D	3/10/2003 9:13:00PM
J0303006-19A	trip blank	N3031207.D	3/12/2003 11:46:00AM
J0303006-11A	SSM03WA13	N3031208.D	3/12/2003 1:10:00PM
J0303006-12A	SSM03WA14	N3031209.D	3/12/2003 1:38:00PM

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 15,361 Lab Project Number: J0303006

Prep Date: 3/6/2003

Lab Method Blank Id: J030310005-MB
Prep Batch ID: J030310005
Method: Inorganic Anions by Ion Chromatography - Juneau

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
J0303006-14D	SSM03WA02	NULL	3/6/2003 3:39:36PM
J0303026-01A	Batch QC	NULL	3/6/2003 3:39:36PM
J030310005-LCS	LCS	NULL	3/6/2003 3:39:36PM
J030310005-LCSD	LCSD	NULL	3/6/2003 3:39:36PM
J0303006-14D-MS	MS	NULL	3/6/2003 3:39:36PM
J0303026-01A-MS	MS	NULL	3/6/2003 3:39:36PM
J0303006-14D-MSD	MSD	NULL	3/6/2003 3:39:36PM

Prep Date: 3/6/2003

Lab Method Blank Id: J030310007-MB
Prep Batch ID: J030310007
Method: Inorganic Anions by Ion Chromatography - Nitrate/Nitrite

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
J0303006-14C	SSM03WA02	NULL	3/6/2003 3:39:36PM
J030310007-LCS	LCS	NULL	3/6/2003 3:39:36PM
J030310007-LCSD	LCSD	NULL	3/6/2003 3:39:36PM

Prep Date: 3/10/2003

Lab Method Blank Id: J030312023-MB
Prep Batch ID: J030312023
Method: 310.1 - Alkalinity, Titrimetric (pH 4.5) - CaCO3

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
J0302151-02A	Batch QC		3/10/2003 9:40:01AM
J0302152-01A	Batch QC		3/10/2003 9:40:01AM
J0303006-14D	SSM03WA02		3/10/2003 9:40:01AM
J0303006-18D	SSM03WA03		3/10/2003 9:40:01AM
J030312023-LCS	LCS		3/10/2003 9:40:01AM
J030312023-LCSD	LCSD		3/10/2003 9:40:01AM
J0302151-02A-DUP	DUP		3/10/2003 9:40:01AM
J0302152-01A-MS	MS		3/10/2003 9:40:01AM
J0302152-01A-MSD	MSD		3/10/2003 9:40:01AM

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 15,361 Lab Project Number: J0303006

Prep Date: 3/18/2003

Lab Method Blank Id: J030318003-MB
Prep Batch ID: J030318003
Method: SW6020 - ICPMS - ICPMS Diss

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
J0303006-14E	SSM03WA02	export031803.csv	3/18/2003 2:53:53PM
J0303006-18E	SSM03WA03	export031803.csv	3/18/2003 3:06:19PM
J030318003-LCS	LCS	export031803.csv	3/18/2003 2:42:49PM
J0303006-18E-DUP	DUP	export031803.csv	3/18/2003 3:09:58PM
J0303006-14E-MS	MS	export031803.csv	3/18/2003 2:58:57PM

DATA FLAGS AND DEFINITIONS

The PQL is the Method Quantitation Limit as defined by USACE.

Reporting Limit: Limit below which results are shown as "ND". This may be the PQL, MDL, or a value between. See the report conventions below.

Result Field:

- ND = Not Detected at or above the Reporting Limit
- NA = Analyte not applicable (see Case Narrative for discussion)

Qualifier Fields:

- LOW = Recovery is below Lower Control Limit
- HIGH = Recovery, RPD, or other parameter is above Upper Control Limit
- E = Reported concentration is above the instrument calibration upper range

Organic Analysis Flags:

- B = Analyte was detected in the laboratory method blank
- J = Analyte was detected above MDL or Reporting Limit but below the Quant Limit (PQL)

Inorganic Analysis Flags:

- J = Analyte was detected above the Reporting Limit but below the Quant Limit (PQL)
- W = Post digestion spike did not meet criteria
- S = Reported value determined by the Method of Standard Additions (MSA)

Other Flags may be applied. See Case Narrative for Description

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0303006

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

REPORTING CONVENTIONS FOR THIS REPORT

<u>TestPkgName</u>	<u>Basis</u>	<u># Sig Figs</u>	<u>Reporting Limit</u>
300.0/300.0 (Aqueous) - Juneau	As Received	3	Report to PQL
300.0/300.0 (Aqueous) - Nitrate/Nitrite	As Received	3	Report to PQL
310.1/310.1 (Aqueous) - CaCO3	As Received	3	Report to PQL
6020/3005 (Aqueous) - ICPMS Diss	As Received	3	Report to PQL
8021/5030 (Aqueous) - BTEX	As Received	2	Report to PQL
AK101GRO/8021BTEX/5030 (Aqueous)	As Received	2	Report to PQL
AK102/3510C (Aqueous) - (DRO)	As Received	2	Report to PQL
RSK175/RSK175 (Aqueous)	As Received	3	Report to PQL

Request for Analytical Services

Abbreviated Provisions of Sale

(A complete copy of Analytica's General Provision of Sale can be provided upon request.)

Payment. Prepayment is normally required unless a credit line has been approved in advance. Client agrees to provide Analytica a completed business application, within ten (10) business days of request, but no later than five (5) days prior to work being received, along with any other requested information, in order to establish an approved credit line. For Clients with approved credit, Analytica will submit invoices upon completion of the scheduled work. Invoices(s) are due and payable upon receipt. Balances remaining unpaid 30 days after invoice date shall accrue interest at 1.5% per month (18% per annum). Analytica shall receive payments for the Services in accordance with the amount(s) listed in the Quotation provided, when applicable. Client shall be required to pay Analytica's invoice, regardless of reimbursement from their client, and the final billing will be based upon the actual work performed, pursuant to the samples and documents submitted at the time of receipt. If Analytica engages legal counsel to enforce its rights of payment or any other rights under the parties' Agreement, Client will be liable for all costs incurred by Analytica, including reasonable attorney fees.

Changes and Additional Compensation. No changes to this agreement and no changes to the scope of any work will be allowed unless an authorized representative or officer of Analytica specifically agrees to the changes in writing. Client agrees to provide written notice of any requested changes in the scope of work and to reasonably compensate Analytica for any work completed prior to the change request. This written notice shall be provided by a representative of the client that has the authority to approve both changes to the scope of work and the associated charges that may be incurred. Names of such representatives should be made available at the time the order is formalized. Changes, such as substantial differences in sample quantities, may impact costs and turnaround time commitments previously made by Analytica, and may result in additional fees. Client's failure to provide written notice as required in this paragraph shall be a waiver of Client's right to dispute any work performed.

Sample Kits. Bottles will be supplied free of charge as long as samples are received by Analytica for billable analyses. Analytica will provide sample kits, such as sample containers, labels, Chain of Custody forms, custody seals, etc., shipped to one location via regular ground transportation methods upon request. Client agrees to allow 5-7 working days (from the date of Client's request) for Analytica to ship sample kits. Rush delivery charges, including but not limited to, expedited freight charges or administrative fees may be charged by Analytica.

Holding Times. Analytica will initiate sample preparation and/or analysis within the regulated holding time provided samples are received within forty- eight hours of sampling, or with not less than ? the prescribed holding time remaining, whichever is less. If samples are received outside these parameters, Analytica will make a reasonable effort to meet the holding time. However, expedited turnaround surcharges will be applied to cover additional cost and capacity utilization. Client agrees to indemnify and hold harmless Analytica from any and all claims, including but not limited to, expenses, fines, fees, penalties, resampling costs, etc., resulting from missing a regulated holding time if Client has provided samples outside the stated parameters. Client also agrees to provide a minimum twenty-four (24) hours advance notification to Analytica of sample arrival requiring expedited processing.

Normal Hours of Operation and Sample Receipt. Analytica maintains normal business hours of 8a.m. to 5p.m., Monday through Friday. In observance of recognized holidays, Analytica is closed for business on the following days: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, the day after Thanksgiving and Christmas Day and as required by any governmental agency having jurisdiction. Client agrees to contact Analytica in advance to schedule any sample acceptance and/or analysis during days outside of normal business hours. Expedited turnaround surcharges may be applied. Samples received after 2 p.m. on normal business days, may not be formally accepted until the next business day. Normal business days are used for turnaround time calculations. Weekends, holidays, and after-hours may require expedited turnaround charges. Samples specifically requested or required by the Client to be analyzed or received outside of Analytica's normal business hours may be subject to an additional fee of \$300.00 plus any applicable surcharges. Client agrees to indemnify and hold harmless Analytica from any and all claims, including but not limited to, expenses, fines, fees, penalties, resampling costs, etc., resulting from missing a regulated holding time if Client has provided samples outside the stated parameters.

Non-Standard and Analytical Complications. In order to achieve the lowest possible reporting limits, cleanup procedures may be required when running Methods 8270, 8081, 8082, and 1664. These cleanup procedures may include Flurosil, Silica Gel, Alumina, Acid/Base, Centrifuge, or GPC and are billed at \$50.00 per procedure. Analytica will notify Client of any analytical complexities requiring cleanups, multiple re-runs or column degradation due to complicated or extremely contaminated samples or matrices. Additional charges may apply and will be discussed at the time of notification. Non-authorization of cleanup procedures by the client will result in the use of a high dilution factor and an elevation in reporting limits. Multi-phased samples will be processed and charged as separate samples.

Trip Blanks. Analytical methods requiring Trip Blank or Temperature Blank sample containers will be supplied by Analytica unless Client specifically requests otherwise. These samples will be received, analyzed and billed as an additional sample, unless other agreements have been made in writing.

Sample Disposal. Analytica's policy is to return residual Client samples to the Client within thirty (30) days after completion of the Services, unless agreed to otherwise in writing. Upon request, Analytica may dispose of Client samples and shall act in a prudent manner in selecting and arranging for the transportation, handling, storage or disposal of hazardous substances or suspected hazardous substances. Analytica will only use contractors considered lawful professionals in the disposal of hazardous substances or suspected hazardous substances. Disposal of Client samples by Analytica may incur a charge of \$10 per sample.

Minimum Orders. Analytica retains the right to impose a minimum order charge of Sixty-Five Dollars (\$65.00) on all deliveries, including but not limited to analytical reports, electronic deliveries, supplies, etc.

Turnaround Times. Analytica's standard turnaround time (TAT) is ten normal business days. Expedited TAT surcharges are applied as follows: 2 Business Days – plus 100% of quoted analysis cost; 3 Business Days – plus 75% of quoted analysis cost; 5 Business Days – plus 50% of quoted analysis cost; 8 Business Days – plus 25% of quoted analysis cost. Samples submitted for expedited analyses or TAT will be reported after the initial run. If samples require re-runs due to QC failure, high contamination, or difficult matrices, these results will be reported at a later time. Every attempt will be made to expedite and report these required reruns as needed. To avoid expedited TAT surcharges, samples with holding times of less than 72 hours must be received by the lab no later than 1 pm on the day of sampling.

Matrix Spike/Matrix Spike Duplicates. All client specified Matrix Spike (MS) and Matrix Spike Duplicate (MSD) samples will be billed at the quoted method unit rate.

Request for Analytical Services

Abbreviated Provisions of Sale

(A complete copy of Analytica's General Provision of Sale can be provided upon request.)

Payment. Prepayment is normally required unless a credit line has been approved in advance. Client agrees to provide Analytica a completed business application, within ten (10) business days of request, but no later than five (5) days prior to work being received, along with any other requested information, in order to establish an approved credit line. For Clients with approved credit, Analytica will submit invoices upon completion of the scheduled work. Invoices(s) are due and payable upon receipt. Balances remaining unpaid 30 days after invoice date shall accrue interest at 1.5% per month (18% per annum). Analytica shall receive payments for the Services in accordance with the amount(s) listed in the Quotation provided, when applicable. Client shall be required to pay Analytica's invoice, regardless of reimbursement from their client, and the final billing will be based upon the actual work performed, pursuant to the samples and documents submitted at the time of receipt. If Analytica engages legal counsel to enforce its rights of payment or any other rights under the parties' Agreement, Client will be liable for all costs incurred by Analytica, including reasonable attorney fees.

Changes and Additional Compensation. No changes to this agreement and no changes to the scope of any work will be allowed unless an authorized representative or officer of Analytica specifically agrees to the changes in writing. Client agrees to provide written notice of any requested changes in the scope of work and to reasonably compensate Analytica for any work completed prior to the change request. This written notice shall be provided by a representative of the client that has the authority to approve both changes to the scope of work and the associated charges that may be incurred. Names of such representatives should be made available at the time the order is formalized. Changes, such as substantial differences in sample quantities, may impact costs and turnaround time commitments previously made by Analytica, and may result in additional fees. Client's failure to provide written notice as required in this paragraph shall be a waiver of Client's right to dispute any work performed.

Sample Kits. Bottles will be supplied free of charge as long as samples are received by Analytica for billable analyses. Analytica will provide sample kits, such as sample containers, labels, Chain of Custody forms, custody seals, etc., shipped to one location via regular ground transportation methods upon request. Client agrees to allow 5-7 working days (from the date of Client's request) for Analytica to ship sample kits. Rush delivery charges, including but not limited to, expedited freight charges or administrative fees may be charged by Analytica.

Holding Times. Analytica will initiate sample preparation and/or analysis within the regulated holding time provided samples are received within forty-eight hours of sampling, or with not less than 7 the prescribed holding time remaining, whichever is less. If samples are received outside these parameters, Analytica will make a reasonable effort to meet the holding time. However, expedited turnaround surcharges will be applied to cover additional cost and capacity utilization. Client agrees to indemnify and hold harmless Analytica from any and all claims, including but not limited to, expenses, fines, fees, penalties, resampling costs, etc., resulting from missing a regulated holding time if Client has provided samples outside the stated parameters. Client also agrees to provide a minimum twenty-four (24) hours advance notification to Analytica of sample arrival requiring expedited processing.

Normal Hours of Operation and Sample Receipt. Analytica maintains normal business hours of 8a.m. to 5p.m., Monday through Friday. In observance of recognized holidays, Analytica is closed for business on the following days: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, the day after Thanksgiving and Christmas Day and as required by any governmental agency having jurisdiction. Client agrees to contact Analytica in advance to schedule any sample acceptance and/or analysis during days outside of normal business hours. Expedited turnaround surcharges may be applied. Samples received after 2 p.m. on normal business days, may not be formally accepted until the next business day. Normal business days are used for turnaround time calculations. Weekends, holidays, and after-hours may require expedited turnaround charges. Samples specifically requested or required by the Client to be analyzed or received outside of Analytica's normal business hours may be subject to an additional fee of \$300.00 plus any applicable surcharges. Client agrees to indemnify and hold harmless Analytica from any and all claims, including but not limited to, expenses, fines, fees, penalties, resampling costs, etc., resulting from missing a regulated holding time if Client has provided samples outside the stated parameters.

Non-Standard and Analytical Complications. In order to achieve the lowest possible reporting limits, cleanup procedures may be required when running Methods 8270, 8081, 8082, and 1664. These cleanup procedures may include Fluorosil, Silica Gel, Alumina, Acid/Base, Centrifuge, or GPC and are billed at \$50.00 per procedure. Analytica will notify Client of any analytical complexities requiring cleanups, multiple re-runs or column degradation due to complicated or extremely contaminated samples or matrices. Additional charges may apply and will be discussed at the time of notification. Non-authorization of cleanup procedures by the client will result in the use of a high dilution factor and an elevation in reporting limits. Multi-phased samples will be processed and charged as separate samples.

Trip Blanks. Analytical methods requiring Trip Blank or Temperature Blank sample containers will be supplied by Analytica unless Client specifically requests otherwise. These samples will be received, analyzed and billed as an additional sample, unless other agreements have been made in writing.

Sample Disposal. Analytica's policy is to return residual Client samples to the Client within thirty (30) days after completion of the Services, unless agreed to otherwise in writing. Upon request, Analytica may dispose of Client samples and shall act in a prudent manner in selecting and arranging for the transportation, handling, storage or disposal of hazardous substances or suspected hazardous substances. Analytica will only use contractors considered lawful professionals in the disposal of hazardous substances or suspected hazardous substances. Disposal of Client samples by Analytica may incur a charge of \$10 per sample.

Minimum Orders. Analytica retains the right to impose a minimum order charge of Sixty-Five Dollars (\$65.00) on all deliveries, including but not limited to analytical reports, electronic deliveries, supplies, etc.

Turnaround Times. Analytica's standard turnaround time (TAT) is ten normal business days. Expedited TAT surcharges are applied as follows: 2 Business Days – plus 100% of quoted analysis cost; 3 Business Days – plus 75% of quoted analysis cost; 5 Business Days – plus 50% of quoted analysis cost; 8 Business Days – plus 25% of quoted analysis cost. Samples submitted for expedited analyses or TAT will be reported after the initial run. If samples require re-runs due to QC failure, high contamination, or difficult matrices, these results will be reported at a later time. Every attempt will be made to expedite and report these required reruns as needed. To avoid expedited TAT surcharges, samples with holding times of less than 72 hours must be received by the lab no later than 1 pm on the day of sampling.

Matrix Spike/Matrix Spike Duplicates. All client specified Matrix Spike (MS) and Matrix Spike Duplicate (MSD) samples will be billed at the quoted method unit rate.



Cooler Receipt Form

Client: CH2M Hill of Alaska
Project: Skagway State Street Mystery

Client Code: 006120

Order #: J0303006

Cooler ID: 1

A. Preliminary Examination Phase:

Date cooler opened: 3/4/2003
Cooler opened by: KS

Signature: KS

- 1. Was airbill Attached? Yes Airbill #: Wings #7074893 Carrier Name: Other
- 2. Custody Seals? Yes How many? 3 Location: on coolers Seal Name: JB
- 3. Seals intact? Yes
- 4. Screened for radiation? No
- 5. COC Attached? Yes Properly Completed? Yes Signed by AEL employee? Yes
- 6. Project Identification from custody paper: State St. Mystery
- 7. Preservative: BlueGel Temperature: 1.6

Designated person initial here to acknowledge receipt:

Kerwin Schneider Date: 3/4/03

COMMENTS: samples arrived in three coolers, temps. 2.7, 1.6, 3.0
SSM03WA02 out of hold time for nitrate/nitrite, so ran preserved fraction.
trip blank was broken upon arrival in Skagway; a new trip blank will be sent to Anchorage.

B. Log-In Phase:

Samples Log-in Date: 3/4/2003 Log-in By: KS

Signature: KS

- 1. Packing Type: Other
- 2. Were samples in separate bags? No
- 3. Were containers intact? Yes Labels agree with COC? Yes
- 4. Number of bottles received: 71 Number of samples received: 19
- 5. Correct containers used? Yes Correct preservatives added? Yes
- 6. Sufficient sample volume? Yes
- 7. Bubbles in VOA samples? No
- 8. Was Project manager called and status discussed? No
- 9. Was anyone called? No Who was called? _____ By whom? _____ Date: _____

COMMENTS:



Analytica Alaska Southeast
5438 Shaune Drive
Juneau, AK 99801
(907) 780-6668
Fax (907) 780-6670

4/16/2003

CH2M Hill of Alaska
301 W. Northern Lights Blvd.
Suite 601
Anchorage, AK 99503
Attn: Win Westervelt

Work Order #: J0304021
Date: 4/16/2003
Work ID: Skagway State Street Mystery
Date Received: 4/3/2003

Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
J0304021-01	SSM03WA21	J0304021-02	SSM03WA22
J0304021-03	SSM03WA23	J0304021-04	SSM03WA24
J0304021-05	SSM03WA25	J0304021-06	Trip Blank

Enclosed are the analytical results for the submitted sample(s). Please review the CASE NARRATIVE for a discussion of any data and/or quality control issues. Listings of data qualifiers, analytical codes, key dates, and QC relationships are provided at the end of the report.

Sincerely,



Kimberly Unger
Project Manager

"The Science of Analysis, The Art of Service"

Case Narrative

Analytica Alaska Southeast

Work Order: J0304021

Samples were prepared and analyzed by EPA or equivalent methods in the following references:

Test Methods for Evaluating Solid Waste, USEPA SW-846, Third Ed., Rev.4, December 1996.

ADEC Method AK102 For the Determination of Diesel Range Organics.

SAMPLE RECEIPT:

There were 6 samples of Skagway State Street Mystery project initially received at Analytica-Juneau on 4/3/2003. Samples were received at a temperature of 0.4°C in one cooler in good condition and in order per chain of custody.

All samples were subsequently transferred to Analytica-Anchorage (ADEC Laboratory Approval Number: UST-014) where they were received on 4/8/2003 in one cooler at temperature of 4.2°C in good condition and in order per chain of custody.

REVIEW FOR COMPLIANCE WITH ANALYTICA QA PLAN

A summary of our review is shown below, organized by test:

Test Method: ADEC AK102 - (DRO) - Solid

HOLDING TIMES:

Holding times were met for this Test.

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.

CONTINUING CALIBRATIONS:

Continuing calibrations were within method criteria.

SURROGATE RECOVERIES:

There were no surrogate recovery outliers.

METHOD BLANK OUTLIERS:

There were no MB outliers, batch MB sample had no detected DRO above PQL.

LCS/LCSD OUTLIERS:

There are no LCS/LCSD outliers.

MS/MSD OUTLIERS:

No samples of this delivery were requested for MS/MSD preparation.

Test Method: Aromatic VOCs by GC/FID via method 8021B - BTEX

HOLDING TIMES:

Holding times were met for this Test.

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.

CONTINUING CALIBRATIONS:

Continuing calibrations were within method criteria.

Case Narrative

Analytica Alaska Southeast

Work Order: J0304021

(continued)

SURROGATE RECOVERIES:

There were no surrogate recovery outliers.

METHOD BLANK OUTLIERS:

There were no MB outliers, batch MB sample had no detected BTEX above PQL.

LCS/LCSD OUTLIERS:

There are no LCS/LCSD outliers.

MS/MSD OUTLIERS:

No samples of this delivery were requested for MS/MSD preparation.

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0304021

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA21 MW-02**

Matrix: Aqueous

Collection Date: 4/2/2003 10:05:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0304021-01A Analysis Date: 4/15/2003 3:52:00AM
Prep Date: 4/14/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3041476.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030414004
Report Basis: As Received Analyst Initials: GD
Sample prep wt./vol: 980.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	ND		mg/L	0.10	0.020				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.045		mg/L	0.011	0.0023	0.051	88.9	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0304021-01B Analysis Date: 4/11/2003 10:35:00AM
Prep Date: 4/11/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3041107.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030411001
Report Basis: As Received Analyst Initials: STE
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	97		ug/L	1.0	0.10	100	97.3	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	97.3	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0304021
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA22 MW-03**

Matrix: Aqueous Collection Date: 4/2/2003 11:50:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0304021-02A Analysis Date: 4/15/2003 4:19:00AM
Prep Date: 4/14/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3041477.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030414004 Analyst Initials: GD
Report Basis: As Received Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 980.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:	
Diesel Range Organics	n/a	0.11		mg/L	0.10	0.020				1	
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	0.046		mg/L	0.011	0.0023	0.051	90.3	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0304021-02B Analysis Date: 4/11/2003 11:04:00AM
Prep Date: 4/11/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3041108.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030411001 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL					Rerun #:
Benzene	71-43-2	ND		ug/L	1.0	0.15					1
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	93		ug/L	1.0	0.10	100	92.9	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	97.1	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0304021

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA23 MW-04**

Matrix: Aqueous

Collection Date: 4/2/2003 1:40:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0304021-03A Analysis Date: 4/15/2003 4:46:00AM
Prep Date: 4/14/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3041478.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030414004
Report Basis: As Received Analyst Initials: GD
Sample prep wt./vol: 980.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	ND		mg/L	0.10	0.020				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.044		mg/L	0.011	0.0023	0.051	85.9	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0304021-03B Analysis Date: 4/11/2003 11:33:00AM
Prep Date: 4/11/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3041109.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030411001
Report Basis: As Received Analyst Initials: STE
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	91		ug/L	1.0	0.10	100	91.3	50	150	1
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	96.2	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0304021
 Project: Skagway State Street Mystery
 Client: CH2M Hill of Alaska
 Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA24 - MW-01**

Matrix: Aqueous Collection Date: 4/2/2003 3:05:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0304021-04A	Analysis Date:	4/15/2003 5:13:00AM
Prep Date:	4/14/2003	Instrument:	Roo
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	R3041479.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030414004	Analyst Initials:	GD
Report Basis:	As Received	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	980.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Diesel Range Organics	n/a	0.92		mg/L	0.10	0.020		1

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.045		mg/L	0.011	0.0023	0.051	88.5	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0304021-04B	Analysis Date:	4/11/2003 12:03:00PM
Prep Date:	4/11/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3041110.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030411001	Analyst Initials:	STE
Report Basis:	As Received	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>Rerun #:</u>
Benzene	71-43-2	1.0		ug/L	1.0	0.15		1
Ethylbenzene	100-41-4	17		ug/L	1.0	0.18		
Toluene	108-88-3	1.1		ug/L	1.0	0.24		
Xylenes, Total	1330-20-7	57		ug/L	3.0	0.63		

<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	84		ug/L	1.0	0.10	100	83.7	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	97.3	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0304021
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA25**

Matrix: Aqueous Collection Date: 4/2/2003 3:10:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0304021-05A Analysis Date: 4/15/2003 5:40:00AM
Prep Date: 4/14/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3041480.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030414004
Report Basis: As Received Analyst Initials: GD
Sample prep wt./vol: 980.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	0.95		mg/L	0.10	0.020				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.046		mg/L	0.011	0.0023	0.051	91.0	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0304021-05B Analysis Date: 4/11/2003 12:32:00PM
Prep Date: 4/11/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3041111.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030411001
Report Basis: As Received Analyst Initials: STE
Sample prep wt./vol: 5.00 ml Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	17		ug/L	1.0	0.18					
Toluene	108-88-3	1.0		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	57		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	86		ug/L	1.0	0.10	100	86.0	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	98.3	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0304021

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **Trip Blank**

Matrix: Aqueous

Collection Date: 4/2/2003 10:05:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0304021-06A

Analysis Date: 4/11/2003 1:02:00PM

Prep Date: 4/11/2003

Instrument: Natasha

Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX

File Name: N3041112.D

Prep Method ID: 5030

Dilution Factor: 1

Prep Batch Number: A030411001

Report Basis: As Received

Analyst Initials: STE

Sample prep wt./vol: 5.00 ml

Prep Extract Vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	92		ug/L	1.0	0.10	100	91.8	50	150	1
Difluorobenzene(PID)	540-36-3	48		ug/L	1.0	0.10	50	95.7	50	150	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0304021

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Method Blank Report

Client Sample Name:

MB

Matrix: Aqueous

Collection Date: 4/14/2003 12:00:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: A030414004-MB Analysis Date: 4/14/2003 6:50:00PM
Prep Date: 4/14/2003 Instrument: Roo
Analytical Method ID: ADEC AK102 - (DRO) File Name: R3041456.D
Prep Method ID: 3510 Dilution Factor: 1
Prep Batch Number: A030414004 Analyst Initials: GD
Report Basis: Dry Weight Basis Prep Extract Vol: 1.00 ml
Sample prep wt./vol: 1,000.00ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL				Rerun #:
Diesel Range Organics	n/a	ND		mg/L	0.10	0.020				1

Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
o-Terphenyl	84-15-1	0.039		mg/L	0.0050	0.00064	0.050	78.7	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: A030411001-MB Analysis Date: 4/11/2003 9:08:00AM
Prep Date: 4/11/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3041104.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030411001 Analyst Initials: STE
Report Basis: Dry Weight Basis Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL					Rerun #:
Benzene	71-43-2	ND		ug/L	1.0	0.15					1
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					

Surrogate	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL	Rerun #:
Bromofluorobenzene(PID)	1072-85-1	97		ug/L	1.0	0.10	100	96.8	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	97.7	50	150	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0304021
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC Recovery Report

Work Order: J0304021

Prep Batch Number: A030411001

Base Sample: A030411001-MB Anal. Method: Aromatic VOCs by GC/FID via method 8021B
QC Sample: A030411001-LCS Sample Prep Date: 4/11/2003 12:00:00AM
QC Duplicate: A030411001-LCSD Analysis Units: ug/L
Sample Analysis Date: 4/11/2003 9:08:00AM Matrix: Aqueous
QC Sample Analysis Date: 4/11/2003 9:37:00AM QC DUP Sample Analysis Date: 4/11/2003 10:06:00AM

Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Benzene	ND	52.1	47.8	50.0	104.2	50.0	95.6	60	120	8.61		
Ethylbenzene	ND	52.5	48.2	50.0	105.0	50.0	96.4	60	120	8.54		
Toluene	ND	50.9	46.9	50.0	101.8	50.0	93.8	60	120	8.18		
Xylenes, Total	ND	148	135	150	98.7	150	90.0	60	120	9.19		

Surrogates:

Bromofluorobenzene(PID)	96.8	94.2	85.8	100	94.2	100	85.8	60	120	9.33		
Difluorobenzene(PID)	48.8	51.0	49.7	50.0	102.0	50.0	99.4	60	120	2.58		

Prep Batch Number: A030414004

Base Sample: A030414004-MB Anal. Method: ADEC AK102 - (DRO)
QC Sample: A030414004-LCS Sample Prep Date: 4/14/2003 12:00:00AM
QC Duplicate: A030414004-LCSD Analysis Units: mg/L
Sample Analysis Date: 4/14/2003 6:50:00PM Matrix: Aqueous
QC Sample Analysis Date: 4/14/2003 7:18:00PM QC DUP Sample Analysis Date: 4/14/2003 7:44:00PM

Analyte	Samp. Result	Spike Res.	Sp Dup Res	Spike Conc	Recov	SpikeDup Conc	SPDUP.R EC	LCL	UCL	RPD	RPD FI	Rec FI
Diesel Range Organics	ND	1.86	1.88	2.00	93.0	2.00	94.0	60	120	1.07		

Surrogates:

o-Terphenyl	0.0394	0.0454	0.0458	0.0500	90.8	0.0500	91.6	60	120	0.88		
-------------	--------	--------	--------	--------	------	--------	------	----	-----	------	--	--

FOOTNOTES TO QC REPORT

Note 1: Results are shown to three significant figures to avoid rounding errors in calculations.

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0304021

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Note 2: If the sample concentration is greater than 4 times the spike level, a recovery is not calculated, and the result should be used as a replicate. In such cases the spike is not as high as expected random measurement variability of the sample result itself.

Note 3: For sample duplicates, if the result is less than the PQL, the duplicate RPD is not applicable and is shown as 0. If the sample and duplicate results are not five times the PQL or greater, then the RPD is not expected to fall within the window shown and the comparison should be made on the basis of the absolute difference. Analytica uses the criterion that the absolute difference should be less than the PQL for water or less than 2XPQL for other matrices.

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 15,916 **Lab Project Number:** J0304021

Prep Date: 4/11/2003

Lab Method Blank Id: A030411001-MB

Prep Batch ID: A030411001

Method: Aromatic VOCs by GC/FID via method 8021B - BTEX

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A030411001-LCS	LCS	N3041105.D	4/11/2003 9:37:00AM
A030411001-LCSD	LCSD	N3041106.D	4/11/2003 10:06:00AM
J0304021-01B	SSM03WA21	N3041107.D	4/11/2003 10:35:00AM
J0304021-02B	SSM03WA22	N3041108.D	4/11/2003 11:04:00AM
J0304021-03B	SSM03WA23	N3041109.D	4/11/2003 11:33:00AM
J0304021-04B	SSM03WA24	N3041110.D	4/11/2003 12:03:00PM
J0304021-05B	SSM03WA25	N3041111.D	4/11/2003 12:32:00PM
J0304021-06A	Trip Blank	N3041112.D	4/11/2003 1:02:00PM

Prep Date: 4/14/2003

Lab Method Blank Id: A030414004-MB

Prep Batch ID: A030414004

Method: ADEC AK102 - (DRO)

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A030414004-LCS	LCS	R3041457.D	4/14/2003 7:18:00PM
A030414004-LCSD	LCSD	R3041458.D	4/14/2003 7:44:00PM
J0304021-01A	SSM03WA21	R3041476.D	4/15/2003 3:52:00AM
J0304021-02A	SSM03WA22	R3041477.D	4/15/2003 4:19:00AM
J0304021-03A	SSM03WA23	R3041478.D	4/15/2003 4:46:00AM
J0304021-04A	SSM03WA24	R3041479.D	4/15/2003 5:13:00AM
J0304021-05A	SSM03WA25	R3041480.D	4/15/2003 5:40:00AM

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0304021

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

DATA FLAGS AND DEFINITIONS

The PQL is the Method Quantitation Limit as defined by USACE.

Reporting Limit: Limit below which results are shown as "ND". This may be the PQL, MDL, or a value between. See the report conventions below.

Result Field:

ND = Not Detected at or above the Reporting Limit

NA = Analyte not applicable (see Case Narrative for discussion)

Qualifier Fields:

LOW = Recovery is below Lower Control Limit

HIGH = Recovery, RPD, or other parameter is above Upper Control Limit

E = Reported concentration is above the instrument calibration upper range

Organic Analysis Flags:

B = Analyte was detected in the laboratory method blank

J = Analyte was detected above MDL or Reporting Limit but below the Quant Limit (PQL)

Inorganic Analysis Flags:

J = Analyte was detected above the Reporting Limit but below the Quant Limit (PQL)

W = Post digestion spike did not meet criteria

S = Reported value determined by the Method of Standard Additions (MSA)

Other Flags may be applied. See Case Narrative for Description

REPORTING CONVENTIONS FOR THIS REPORT

<u>TestPkgName</u>	<u>Basis</u>	<u># Sig Figs</u>	<u>Reporting Limit</u>
8021/5030 (Aqueous) - BTEX	As Received	2	Report to PQL
AK102/3510C (Aqueous) - (DRO)	As Received	2	Report to PQL



Cooler Receipt Form

Client: CH2M Hill of Alaska
Project: Skagway State Street Mystery

Client Code: 006120

Order #: J0304021

Cooler ID: 1

A. Preliminary Examination Phase:

Date cooler opened: 4/3/2003
Cooler opened by: KS

Signature: KS

- 1. Was airbill Attached? Yes Airbill #: Wings #7074935 Carrier Name: DHL
- 2. Custody Seals? Yes How many? 1 Location: on cooler Seal Name: JB
- 3. Seals intact? Yes
- 4. Screened for radiation? No
- 5. COC Attached? Yes Properly Completed? Yes Signed by AEL employee? Yes
- 6. Project Identification from custody paper: Skagway State Street Mystery
- 7. Preservative: BlueGel Temperature: 0.4

Designated person initial here to acknowledge receipt:

Kerwin Schraed Date: 4/4/03

COMMENTS:

B. Log-In Phase:

Samples Log-in Date: 4/4/2003

Log-in By: KS

Signature: KS

- 1. Packing Type: Other
- 2. Were samples in separate bags? No
- 3. Were containers intact? Yes Labels agree with COC? Yes
- 4. Number of bottles received: 22 Number of samples received: 6
- 5. Correct containers used? Yes Correct preservatives added? Yes
- 6. Sufficient sample volume? Yes
- 7. Bubbles in VOA samples? No
- 8. Was Project manager called and status discussed? No
- 9. Was anyone called? Yes Who was called? _____ By whom? _____ Date: _____

COMMENTS: Jeremy Blei was called (as he requested) when samples arrived to AAI SE to inform him that all sample containers were in good condition



Analytica Alaska Southeast
5438 Shaune Drive
Juneau, AK 99801
(907) 780-6668
Fax (907) 780-6670

7/23/2003

CH2M Hill of Alaska
301 W. Northern Lights Blvd.
Suite 601
Anchorage, AK 99503
Attn: Jeremy Blei

Work Order #: J0306253
Date: 7/23/2003
Work ID: Skagway State Street Mystery
Date Received: 6/27/2003

Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
J0306253-01	SSM03WA26	J0306253-02	SSM03WA27
J0306253-03	SSM03WA28	J0306253-04	SSM03WA29
J0306253-05	SSM03WA30	J0306253-06	trip blank

Enclosed are the analytical results for the submitted sample(s). Please review the CASE NARRATIVE for a discussion of any data and/or quality control issues. Listings of data qualifiers, analytical codes, key dates, and QC relationships are provided at the end of the report.

Sincerely,

Jason Gray
Project Manager

"The Science of Analysis, The Art of Service"

Case Narrative

Analytica Alaska Southeast

Work Order: J0306253

Samples were prepared and analyzed by EPA or equivalent methods in the following references:

Test Methods for Evaluating Solid Waste, USEPA SW-846, Third Ed., Rev.4, December 1996.

ADEC Method AK102 For the Determination of Diesel Range Organics.

SAMPLE RECEIPT:

There were 6 samples of Skagway State Street Mystery project initially received at Analytica-Juneau on 6/27/2003. Samples were received at a temperature of 2.5°C in one cooler in good condition and in order per chain of custody.

All samples were subsequently transferred to Analytica-Anchorage (ADEC Laboratory Approval Number: UST-014) where they were received on 7/1/2003 in one cooler at temperature of 5.7°C in good condition and in order per chain of custody.

REVIEW FOR COMPLIANCE WITH ANALYTICA QA PLAN

A summary of our review is shown below, organized by test:

Test Method: ADEC AK102 - (DRO) - Solid

HOLDING TIMES:

Holding times were met for this Test.

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.

CONTINUING CALIBRATIONS:

Continuing calibrations were within method criteria.

SURROGATE RECOVERIES:

There were no surrogate recovery outliers.

METHOD BLANK OUTLIERS:

There were no MB outliers, batch MB sample had no detected DRO above PQL.

LCS/LCSD OUTLIERS:

There are no LCS/LCSD outliers.

MS/MSD OUTLIERS:

No samples of this delivery were requested for MS/MSD preparation.

Test Method: Aromatic VOCs by GC/FID via method 8021B - BTEX

HOLDING TIMES:

Holding times were met for this Test.

INITIAL CALIBRATIONS:

Initial calibrations were within method criteria.

CONTINUING CALIBRATIONS:

Continuing calibrations were within method criteria.

Case Narrative

Analytica Alaska Southeast

Work Order: J0306253

(continued)

SURROGATE RECOVERIES:

There were no surrogate recovery outliers.

METHOD BLANK OUTLIERS:

There were no MB outliers, batch MB sample had no detected BTEX above PQL.

LCS/LCSD OUTLIERS:

There are no LCS/LCSD outliers.

MS/MSD OUTLIERS:

No samples of this delivery were requested for MS/MSD preparation.

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA26**

Matrix: Aqueous

Collection Date: 6/26/2003 4:40:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-01B	Analysis Date:	7/15/2003 12:09:00AM
Prep Date:	7/8/2003	Instrument:	Woof
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	W3071470.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030708001	Analyst Initials:	GD
Report Basis:	As Received	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	780.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	1.3		mg/L	0.13	0.026				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.058		mg/L	0.0064	0.00082	0.064	91.3	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-01A	Analysis Date:	7/3/2003 1:16:00PM
Prep Date:	7/3/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3070313.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030703002	Analyst Initials:	STE
Report Basis:	As Received	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	28		ug/L	1.0	0.18					
Toluene	108-88-3	1.1		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	140		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	93		ug/L	1.0	0.10	100	93.3	50	150	1
Difluorobenzene(PID)	540-36-3	51		ug/L	1.0	0.10	50	102	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA27**

Matrix: Aqueous

Collection Date: 6/26/2003 4:45:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-02B	Analysis Date:	7/15/2003 12:38:00AM
Prep Date:	7/8/2003	Instrument:	Woof
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	W3071471.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030708001	Analyst Initials:	GD
Report Basis:	As Received	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	860.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	1.5		mg/L	0.12	0.023				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.053		mg/L	0.0058	0.00074	0.058	92.0	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-02A	Analysis Date:	7/3/2003 2:43:00PM
Prep Date:	7/3/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3070316.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030703002	Analyst Initials:	STE
Report Basis:	As Received	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	31		ug/L	1.0	0.18					
Toluene	108-88-3	1.1		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	150		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	87		ug/L	1.0	0.10	100	86.8	50	150	1
Difluorobenzene(PID)	540-36-3	50		ug/L	1.0	0.10	50	100	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **SSM03WA28**

Matrix: Aqueous

Collection Date: 6/27/2003 11:05:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-03B	Analysis Date:	7/15/2003 1:06:00AM
Prep Date:	7/8/2003	Instrument:	Woof
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	W3071472.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030708001	Analyst Initials:	GD
Report Basis:	As Received	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	780.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	ND		mg/L	0.13	0.026				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.038		mg/L	0.0064	0.00082	0.064	59.3	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-03A	Analysis Date:	7/3/2003 3:18:00PM
Prep Date:	7/3/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3070317.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030703002	Analyst Initials:	STE
Report Basis:	As Received	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	99		ug/L	1.0	0.10	100	98.6	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	98.6	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name:

SSM03WA29

Matrix: Aqueous

Collection Date: 6/27/2003 12:00:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-04B	Analysis Date:	7/15/2003 1:35:00AM
Prep Date:	7/8/2003	Instrument:	Woof
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	W3071473.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030708001	Analyst Initials:	GD
Report Basis:	As Received	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	780.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	ND		mg/L	0.13	0.026				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.048		mg/L	0.0064	0.00082	0.064	74.6	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-04A	Analysis Date:	7/3/2003 3:48:00PM
Prep Date:	7/3/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3070318.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030703002	Analyst Initials:	STE
Report Basis:	As Received	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	100		ug/L	1.0	0.10	100	101	50	150	1
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	98.7	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name:

SSM03WA30

Matrix: Aqueous

Collection Date: 6/27/2003 12:40:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-05B	Analysis Date:	7/15/2003 2:04:00AM
Prep Date:	7/8/2003	Instrument:	Woof
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	W3071474.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030708001	Analyst Initials:	GD
Report Basis:	As Received	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	780.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	ND		mg/L	0.13	0.026				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.055		mg/L	0.0064	0.00082	0.064	85.1	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	J0306253-05A	Analysis Date:	7/3/2003 4:17:00PM
Prep Date:	7/3/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3070319.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030703002	Analyst Initials:	STE
Report Basis:	As Received	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	100		ug/L	1.0	0.10	100	104	50	150	1
Difluorobenzene(PID)	540-36-3	51		ug/L	1.0	0.10	50	103	50	150	

Detailed Analytical Report

Analytica Alaska Southeast

Workorder (SDG): J0306253
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Report Section: Client Sample Report

Client Sample Name: **trip blank**

Matrix: Aqueous Collection Date: 6/26/2003 4:40:00PM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number: J0306253-06A Analysis Date: 7/3/2003 4:46:00PM
Prep Date: 7/3/2003 Instrument: Natasha
Analytical Method ID: Aromatic VOCs by GC/FID via method 8021B - BTEX File Name: N3070320.D
Prep Method ID: 5030 Dilution Factor: 1
Prep Batch Number: A030703002 Analyst Initials: STE
Report Basis: As Received Prep Extract Vol: 5.00 ml
Sample prep wt./vol: 5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	110		ug/L	1.0	0.10	100	106	50	150	1
Difluorobenzene(PID)	540-36-3	51		ug/L	1.0	0.10	50	102	50	150	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Report Section: Method Blank Report

Client Sample Name:

MB

Matrix: Aqueous

Collection Date: 7/8/2003 12:00:00AM

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	A030708001-MB	Analysis Date:	7/14/2003 7:48:00PM
Prep Date:	7/8/2003	Instrument:	Woof
Analytical Method ID:	ADEC AK102 - (DRO)	File Name:	W3071461.D
Prep Method ID:	3510	Dilution Factor:	1
Prep Batch Number:	A030708001	Analyst Initials:	GD
Report Basis:	Dry Weight Basis	Prep Extract Vol:	1.00 ml
Sample prep wt./vol:	1,000.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Diesel Range Organics	n/a	ND		mg/L	0.10	0.020				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
o-Terphenyl	84-15-1	0.047		mg/L	0.0050	0.00064	0.050	93.3	50	150	1

The following test was conducted by: Analytica - Anchorage

Lab Sample Number:	A030703002-MB	Analysis Date:	7/3/2003 8:56:00AM
Prep Date:	7/3/2003	Instrument:	Natasha
Analytical Method ID:	Aromatic VOCs by GC/FID via method 8021B - BTEX	File Name:	N3070304.D
Prep Method ID:	5030	Dilution Factor:	1
Prep Batch Number:	A030703002	Analyst Initials:	STE
Report Basis:	Dry Weight Basis	Prep Extract Vol:	5.00 ml
Sample prep wt./vol:	5.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>Rerun #:</u>	
Benzene	71-43-2	ND		ug/L	1.0	0.15				1	
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.18					
Toluene	108-88-3	ND		ug/L	1.0	0.24					
Xylenes, Total	1330-20-7	ND		ug/L	3.0	0.63					
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>Rerun #:</u>
Bromofluorobenzene(PID)	1072-85-1	100		ug/L	1.0	0.10	100	99.8	50	150	1
Difluorobenzene(PID)	540-36-3	50		ug/L	1.0	0.10	50	99.9	50	150	

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0306253
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

Tests Run at: Analytica Environmental Laboratories - Anchorage, Alaska
Workorder (SDG): J0306253
Project: Skagway State Street Mystery
Project Number:
Prep Batch: A030708001

QUALITY CONTROL REPORT

LCS/LCSD REPORT

Analysis: ADEC AK102 - (DRO) MB: A030708001-MB
Prep Date: 7/8/2003
MB Anal. Date: 7/14/2003 7:48:00PM Units: mg/L
LCS Anal. Date: 7/14/2003 8:17:00PM LCSD Anal. Date: 7/14/2003 8:46:00PM Matrix: Aqueous

Analyte Name	SampResult	LCSRes.	SDRes.	SPLev	SPDLev	Recov.	SD Recov	RPD	Recov Lim	RPDLim	Flag
Diesel Range Organics	ND	1.85	2.01	2.00	2.00	92.5	100.5	8.3	60 - 120	20	

FOOTNOTES TO QC REPORT

Note 1: Results are shown to three significant figures to avoid rounding errors in calculations.

Note 2: If the sample concentration is greater than 4 times the spike level, a recovery is not meaningful, and the result should be used as a replicate. In such cases the spike is not as high as expected random measurement variability of the sample result itself.

Note 3: For sample duplicates, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample and duplicate results are not five times the PQL or greater, then the RPD is not expected to fall within the window shown and the comparison should be made on the basis of the absolute difference. Analytica uses the criterion that the absolute difference should be less than the PQL for water or less than 2XPQL for other matrices.

Note 4: For serial dilutions, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample result is not 50 times the MDL or greater, then the fact that the RPD does not meet the 10% criterion has little significance. Otherwise it indicates that a matrix bias may exist at the analytical step.

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Tests Run at: Analytica Environmental Laboratories - Anchorage, Alaska

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Project Number:

Prep Batch: A030703002

QUALITY CONTROL REPORT

LCS/LCSD REPORT

Analysis: Aromatic VOCs by GC/FID via method 8021B - BTEX MB: A030703002-MB

Prep Date: 7/3/2003

MB Anal. Date: 7/3/2003 8:56:00AM

Units: ug/L

LCS Anal. Date: 7/3/2003 9:25:00AM LCSD Anal. Date: 7/3/2003 9:53:00AM Matrix: Aqueous

Analyte Name	SampResult	LCSRes.	SDRes.	SPLev	SPDLev	Recov.	SD Recov	RPD	Recov Lim	RPDLim	Flag
Benzene	ND	53.6	51.4	50.0	50.0	107.2	102.8	4.2	60 - 120	20	
Toluene	ND	53.0	51.5	50.0	50.0	106.0	103.0	2.9	60 - 120	20	
Ethylbenzene	ND	56.6	54.6	50.0	50.0	113.2	109.2	3.6	60 - 120	20	
Xylenes, Total	ND	154	157	150	150	102.7	104.7	1.9	60 - 120	20	

FOOTNOTES TO QC REPORT

Note 1: Results are shown to three significant figures to avoid rounding errors in calculations.

Note 2: If the sample concentration is greater than 4 times the spike level, a recovery is not meaningful, and the result should be used as a replicate. In such cases the spike is not as high as expected random measurement variability of the sample result itself.

Note 3: For sample duplicates, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample and duplicate results are not five times the PQL or greater, then the RPD is not expected to fall within the window shown and the comparison should be made on the basis of the absolute difference. Analytica uses the criterion that the absolute difference should be less than the PQL for water or less than 2XPQL for other matrices.

Note 4: For serial dilutions, if the result is less than the PQL, the duplicate RPD is not applicable. If the sample result is not 50 times the MDL or greater, then the fact that the RPD does not meet the 10% criterion has little significance. Otherwise it indicates that a matrix bias may exist at the analytical step.

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0306253
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

SURROGATE RECOVERY SUMMARY REPORT

Test Method:		ADEC AK102 - (DRO)				
Lab Sample #:	J0306253-01B	Dilution:	1			
Analysis Date:	7/15/2003 12:09:00AM	Client Sample:	<u>SSM03WA26</u>			
Batch Number:	A030708001	Data File:	W3071470.D			
<u>AnalyteName</u>		<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl		91	50	150		Complete
Lab Sample #:	J0306253-02B	Dilution:	1			
Analysis Date:	7/15/2003 12:38:00AM	Client Sample:	<u>SSM03WA27</u>			
Batch Number:	A030708001	Data File:	W3071471.D			
<u>AnalyteName</u>		<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl		92	50	150		Complete
Lab Sample #:	J0306253-03B	Dilution:	1			
Analysis Date:	7/15/2003 1:06:00AM	Client Sample:	<u>SSM03WA28</u>			
Batch Number:	A030708001	Data File:	W3071472.D			
<u>AnalyteName</u>		<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl		59	50	150		Complete
Lab Sample #:	J0306253-04B	Dilution:	1			
Analysis Date:	7/15/2003 1:35:00AM	Client Sample:	<u>SSM03WA29</u>			
Batch Number:	A030708001	Data File:	W3071473.D			
<u>AnalyteName</u>		<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl		75	50	150		Complete
Lab Sample #:	J0306253-05B	Dilution:	1			
Analysis Date:	7/15/2003 2:04:00AM	Client Sample:	<u>SSM03WA30</u>			
Batch Number:	A030708001	Data File:	W3071474.D			
<u>AnalyteName</u>		<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl		85	50	150		Complete
Lab Sample #:	A030708001-MB	Dilution:	1			
Analysis Date:	7/14/2003 7:48:00PM	Client Sample:	<u>MB</u>			
Batch Number:	A030708001	Data File:	W3071461.D			
<u>AnalyteName</u>		<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl		93	60	120		Complete
Lab Sample #:	A030708001-LCS	Dilution:	1			
Analysis Date:	7/14/2003 8:17:00PM	Client Sample:	<u>LCS</u>			
Batch Number:	A030708001	Data File:	W3071462.D			
<u>AnalyteName</u>		<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl		94	60	120		Complete
Lab Sample #:	A030708001-LCSD	Dilution:	1			
Analysis Date:	7/14/2003 8:46:00PM	Client Sample:	<u>LCSD</u>			
Batch Number:	A030708001	Data File:	W3071463.D			
<u>AnalyteName</u>		<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
o-Terphenyl		100	60	120		Complete

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Test Method: Aromatic VOCs by GC/FID via method 8021B - BTEX

Lab Sample #: J0306253-01A Dilution: 1
 Analysis Date: 7/3/2003 1:16:00PM Client Sample: SSM03WA26
 Batch Number: A030703002 Data File: N3070313.D

<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
Bromofluorobenzene(PID)	93	50	150		Complete
Difluorobenzene(PID)	102	50	150		Complete

Lab Sample #: J0306253-02A Dilution: 1
 Analysis Date: 7/3/2003 2:43:00PM Client Sample: SSM03WA27
 Batch Number: A030703002 Data File: N3070316.D

<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
Bromofluorobenzene(PID)	87	50	150		Complete
Difluorobenzene(PID)	100	50	150		Complete

Lab Sample #: J0306253-03A Dilution: 1
 Analysis Date: 7/3/2003 3:18:00PM Client Sample: SSM03WA28
 Batch Number: A030703002 Data File: N3070317.D

<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
Bromofluorobenzene(PID)	99	50	150		Complete
Difluorobenzene(PID)	99	50	150		Complete

Lab Sample #: J0306253-04A Dilution: 1
 Analysis Date: 7/3/2003 3:48:00PM Client Sample: SSM03WA29
 Batch Number: A030703002 Data File: N3070318.D

<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
Bromofluorobenzene(PID)	101	50	150		Complete
Difluorobenzene(PID)	99	50	150		Complete

Lab Sample #: J0306253-05A Dilution: 1
 Analysis Date: 7/3/2003 4:17:00PM Client Sample: SSM03WA30
 Batch Number: A030703002 Data File: N3070319.D

<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
Bromofluorobenzene(PID)	104	50	150		Complete
Difluorobenzene(PID)	103	50	150		Complete

Lab Sample #: J0306253-06A Dilution: 1
 Analysis Date: 7/3/2003 4:46:00PM Client Sample: trip blank
 Batch Number: A030703002 Data File: N3070320.D

<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
Bromofluorobenzene(PID)	106	50	150		Complete
Difluorobenzene(PID)	102	50	150		Complete

Lab Sample #: A030703002-MB Dilution: 1
 Analysis Date: 7/3/2003 8:56:00AM Client Sample: MB
 Batch Number: A030703002 Data File: N3070304.D

<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
Bromofluorobenzene(PID)	100	60	120		Complete
Difluorobenzene(PID)	100	60	120		Complete

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

Client: CH2M Hill of Alaska

Client Project Number: 178859

Test Method: Aromatic VOCs by GC/FID via method 8021B - BTEX

Lab Sample #: A030703002-LCS Dilution: 1
Analysis Date: 7/3/2003 9:25:00AM Client Sample: LCS
Batch Number: A030703002 Data File: N3070305.D

<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
Bromofluorobenzene(PID)	96	60	120		Complete
Difluorobenzene(PID)	106	60	120		Complete

Lab Sample #: A030703002-LCSD Dilution: 1
Analysis Date: 7/3/2003 9:53:00AM Client Sample: LCSD
Batch Number: A030703002 Data File: N3070306.D

<u>AnalyteName</u>	<u>SSRecov</u>	<u>LCL</u>	<u>UCL</u>	<u>SSFlag</u>	<u>Result Status</u>
Bromofluorobenzene(PID)	93	60	120		Complete
Difluorobenzene(PID)	103	60	120		Complete

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0306253
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 17,807 Lab Project Number: J0306253

Prep Date: 7/3/2003

Lab Method Blank Id: A030703002-MB
Prep Batch ID: A030703002
Method: Aromatic VOCs by GC/FID via method 8021B - BTEX

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A030703002-LCS	LCS	N3070305.D	7/3/2003 9:25:00AM
A030703002-LCSD	LCSD	N3070306.D	7/3/2003 9:53:00AM
J0306253-01A	SSM03WA26	N3070313.D	7/3/2003 1:16:00PM
J0306253-02A	SSM03WA27	N3070316.D	7/3/2003 2:43:00PM
J0306253-03A	SSM03WA28	N3070317.D	7/3/2003 3:18:00PM
J0306253-04A	SSM03WA29	N3070318.D	7/3/2003 3:48:00PM
J0306253-05A	SSM03WA30	N3070319.D	7/3/2003 4:17:00PM
J0306253-06A	trip blank	N3070320.D	7/3/2003 4:46:00PM

Prep Date: 7/8/2003

Lab Method Blank Id: A030708001-MB
Prep Batch ID: A030708001
Method: ADEC AK102 - (DRO)

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A030708001-LCS	LCS	W3071462.D	7/14/2003 8:17:00PM
A030708001-LCSD	LCSD	W3071463.D	7/14/2003 8:46:00PM
J0306253-01B	SSM03WA26	W3071470.D	7/15/2003 12:09:00AM
J0306253-02B	SSM03WA27	W3071471.D	7/15/2003 12:38:00AM
J0306253-03B	SSM03WA28	W3071472.D	7/15/2003 1:06:00AM
J0306253-04B	SSM03WA29	W3071473.D	7/15/2003 1:35:00AM
J0306253-05B	SSM03WA30	W3071474.D	7/15/2003 2:04:00AM

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0306253
Project: Skagway State Street Mystery
Client: CH2M Hill of Alaska
Client Project Number: 178859

DATA FLAGS AND DEFINITIONS

The PQL is the Method Quantitation Limit as defined by USACE.

Reporting Limit: Limit below which results are shown as "ND". This may be the PQL, MDL, or a value between. See the report conventions below.

Result Field:

ND = Not Detected at or above the Reporting Limit
NA = Analyte not applicable (see Case Narrative for discussion)

Qualifier Fields:

LOW = Recovery is below Lower Control Limit
HIGH = Recovery, RPD, or other parameter is above Upper Control Limit
E = Reported concentration is above the instrument calibration upper range

Organic Analysis Flags:

B = Analyte was detected in the laboratory method blank
J = Analyte was detected above MDL or Reporting Limit but below the Quant Limit (PQL)

Inorganic Analysis Flags:

J = Analyte was detected above the Reporting Limit but below the Quant Limit (PQL)
W = Post digestion spike did not meet criteria
S = Reported value determined by the Method of Standard Additions (MSA)

Other Flags may be applied. See Case Narrative for Description

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): J0306253

Project: Skagway State Street Mystery

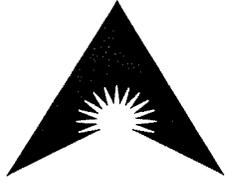
Client: CH2M Hill of Alaska

Client Project Number: 178859

REPORTING CONVENTIONS FOR THIS REPORT

J0306253

<u>TestPkgName</u>	<u>Basis</u>	<u># Sig Figs</u>	<u>Reporting Limit</u>
8021/5030 (Aqueous) - BTEX	As Received	2	Report to PQL
AK102/3510C (Aqueous) - (DRO)	As Received	2	Report to PQL



**ANALYTICA
ALASKA Inc.**

Support Documentation



Cooler Receipt Form
AAISE-JUNEAU

Client: CH2M Hill of Alaska
Project: Skagway State Street Mystery

Client Code: 006120

Order #: J0306253

Cooler ID: 1

A. Preliminary Examination Phase:

Date cooler opened: 6/27/2003
Cooler opened by: KU

Signature: [Handwritten Signature]

- 1. Was airbill Attached? Yes
2. Custody Seals? Yes
3. Seals intact? Yes
4. Screened for radiation? No
5. COC Attached? Yes
6. Project Identification from custody paper: Skagway State Street Mystery
7. Preservative: BlueGel
Temperature: 2.5

Designated person initial here to acknowledge receipt:

[Handwritten Signature] Date: 6/30/03

COMMENTS:

B. Log-In Phase: Samples Log-in Date: 6/30/2003 Log-in By: KS Signature: [Handwritten Signature]

- 1. Packing Type: Other
2. Were samples in separate bags? No
3. Were containers intact? Yes
4. Number of bottles received: 24
5. Correct containers used? Yes
6. Sufficient sample volume? Yes
7. Bubbles in VOA samples? No
8. Was Project manager called and status discussed? No
9. Was anyone called? No

COMMENTS:



Cooler Receipt Form

AAI-ANCHORAGE

Client: CH2M Hill of Alaska
Project: Skagway State Street Mystery

Client Code: 006120

Order #: J0306253

Cooler ID: 2

A. Preliminary Examination Phase:

Date cooler opened: 7/1/2003
Cooler opened by: dw

Signature: Dollie Wheeler

1. Was airbill Attached? Yes

Airbill #: 8771697001

Carrier Name: DHL

2. Custody Seals? Yes

How many? 1 Location: lid

Seal Name: KS

3. Seals intact? Yes

4. Screened for radiation? N/A

5. COC Attached? Yes

Properly Completed? Yes

Signed by AEL employee? Yes

6. Project Identification from custody paper: Skagway State Street Mystery

7. Preservative: BlueGel

Temperature: 5.7

Designated person initial here to acknowledge receipt: _____

DW Date: 7-1-03

COMMENTS:

B. Log-In Phase:

Samples Log-in Date: 7/1/2003

Log-in By: dw

Signature: Dollie Wheeler

1. Packing Type: Bubblewrap

2. Were samples in separate bags? Yes

3. Were containers intact? Yes

Labels agree with COC? Yes

4. Number of bottles received: 24

Number of samples received: 6

5. Correct containers used? Yes

Correct preservatives added? Yes

6. Sufficient sample volume? Yes

7. Bubbles in VOA samples? No

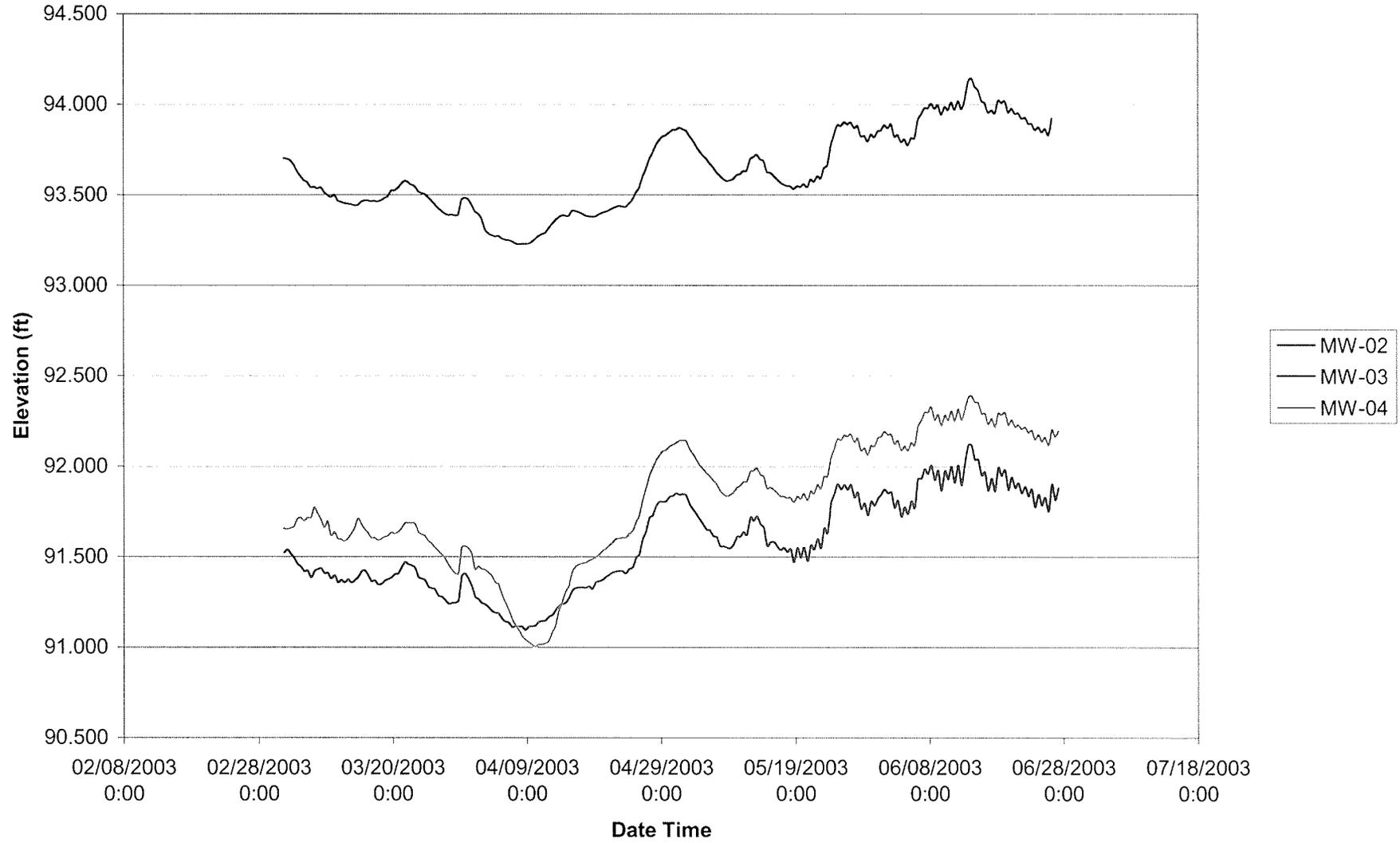
8. Was Project manager called and status discussed? No

9. Was anyone called? No Who was called? _____ By whom? _____ Date: _____

COMMENTS:

Appendix C
Data from Groundwater Level Data Loggers

Groundwater Elevations Skagway State Street Mystery Site



Appendix D

BIOSCREEN Model Results

BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

MW-01 Flowpath

State Street Mystery Site

Run Name

Data Input Instructions:

115

or

0.02

1. Enter value directly....or
2. Calculate by filling in grey cells below. (To restore formulas, hit button below).

Variable* Data used directly in model.

20 Value calculated by model. (Don't enter any data).

1. HYDROGEOLOGY

Seepage Velocity*	Vs	1460.9	(ft/yr)
or		↑ or	
Hydraulic Conductivity	K	3.5E-02	(cm/sec)
Hydraulic Gradient	i	0.006	(ft/ft)
Porosity	n	0.15	(-)

2. DISPERSION

Longitudinal Dispersivity*	alpha x	8.0	(ft)
Transverse Dispersivity*	alpha y	0.8	(ft)
Vertical Dispersivity*	alpha z	0.1	(ft)
or		↑ or	
Estimated Plume Length	Lp	120	(ft)

3. ADSORPTION

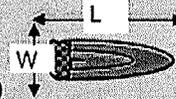
Retardation Factor*	R	1.744	(-)
or		↑ or	
Soil Bulk Density	rho	1.8	(kg/l)
Partition Coefficient	Koc	62	(L/kg)
Fraction Organic Carbon	foc	1.0E-3	(-)

4. BIODEGRADATION

1st Order Decay Coeff*	lambda	6.9E+1	(per yr)
or		↑ or	
Solute Half-Life	t-half	0.01	(year)
or Instantaneous Reaction Model			
Delta Oxygen*	DO	0	(mg/L)
Delta Nitrate*	NO3	0	(mg/L)
Observed Ferrous Iron*	Fe2+	15.4	(mg/L)
Delta Sulfate*	SO4	4.7	(mg/L)
Observed Methane*	CH4	0.16	(mg/L)

5. GENERAL

Modeled Area Length*	400	(ft)
Modeled Area Width*	200	(ft)
Simulation Time*	10	(yr)



6. SOURCE DATA

Source Thickness in Sat.Zone* 5 (ft)

Source Zones:

Width* (ft)	Conc. (mg/L)*
28	0.025
30	0.35
14	0.4
30	0.35
28	0.025

Source Halflife (see Help):

8 80 (yr)

Inst. React. ↑ 1st Order

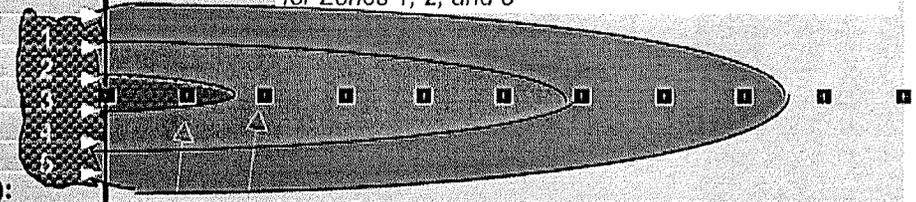
Soluble Mass 100 (Kg)

In Source NAPL, Soil

7. FIELD DATA FOR COMPARISON

Concentration (mg/L)	0	40	80	120	160	200	240	280	320	360	400
Dist. from Source (ft)	.366	.021			.0						

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells
If No Data Leave Blank or Enter "0"

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE

RUN ARRAY

View Output

View Output

Help

Recalculate This Sheet

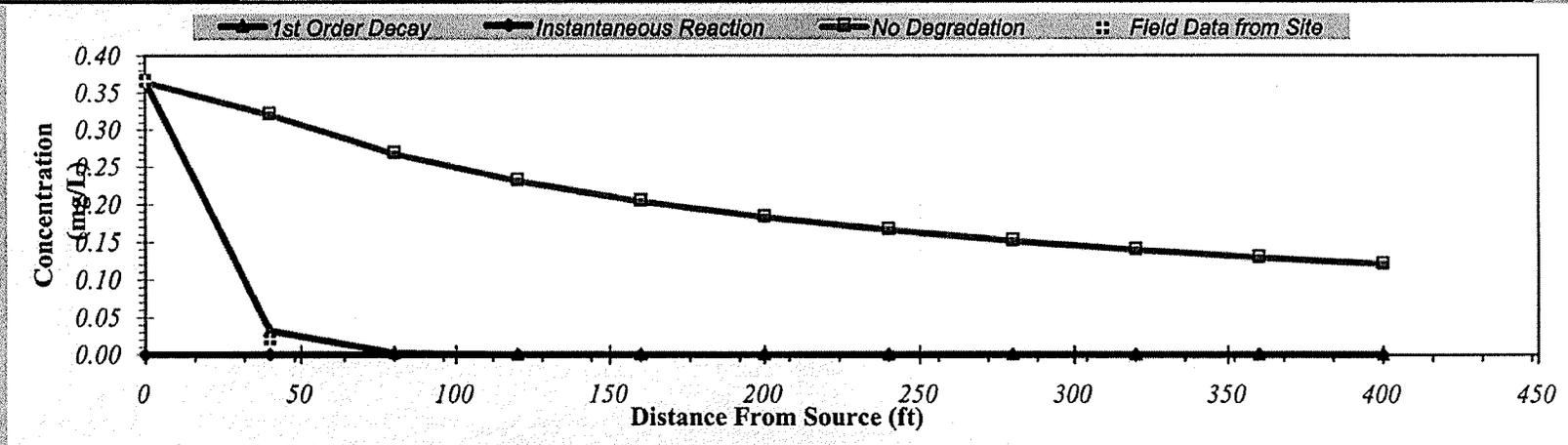
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

BIOSCREEN Input Screen
BTEX Along Groundwater Flowpath Downgradient of MW-01
State Street Mystery Site, Skagway, AK

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft)										
	0	40	80	120	160	200	240	280	320	360	400
No Degradation	0.367	0.322	0.270	0.233	0.206	0.185	0.168	0.154	0.142	0.131	0.123
1st Order Decay	0.367	0.033	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site	0.366	0.021									



Calculate Animation

Time: 10 Years

Return to Input

Recalculate This Sheet

BIOSCREEN Centerline Output
 BTEX Along Flowpath Downgradient of MW-01
 State Street Mystery Site, Skagway, AK

BIOSCREEN Natural Attenuation Decision Support System

Air Force Center for Environmental Excellence

Version 1.4

DP-08 Flowpath
State Street Mystery Site
Run Name

Data Input Instructions:

1. Enter value directly....or
2. Calculate by filling in grey cells below. (To restore formulas, hit button below).
- Variable* Data used directly in model.
Value calculated by model. (Don't enter any data).

1. HYDROGEOLOGY

Seepage Velocity*	Vs	1460.9 (ft/yr)
or		↑ or
Hydraulic Conductivity	K	3.5E-02 (cm/sec)
Hydraulic Gradient	i	0.006 (ft/ft)
Porosity	n	0.15 (-)

2. DISPERSION

Longitudinal Dispersivity*	alpha x	8.0 (ft)
Transverse Dispersivity*	alpha y	0.8 (ft)
Vertical Dispersivity*	alpha z	0.1 (ft)
or		↑ or
Estimated Plume Length	Lp	120 (ft)

3. ADSORPTION

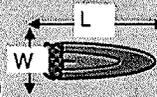
Retardation Factor*	R	1.744 (-)
or		↑ or
Soil Bulk Density	rho	1.8 (kg/l)
Partition Coefficient	Koc	62 (L/kg)
Fraction Organic Carbon	foc	1.0E-3 (-)

4. BIODEGRADATION

1st Order Decay Coeff*	lambda	1.7E+1 (per yr)
or		↑ or
Solute Half-Life	t-half	0.04 (year)
or Instantaneous Reaction Model		
Delta Oxygen*	DO	0 (mg/L)
Delta Nitrate*	NO3	0 (mg/L)
Observed Ferrous Iron*	Fe2+	15.4 (mg/L)
Delta Sulfate*	SO4	4.7 (mg/L)
Observed Methane*	CH4	0.16 (mg/L)

5. GENERAL

Modeled Area Length*	400 (ft)
Modeled Area Width*	200 (ft)
Simulation Time*	10 (yr)



6. SOURCE DATA

Source Thickness in Sat. Zone* 5 (ft)

Source Zones:

Width* (ft)	Conc. (mg/L)*
28	0.025
30	0.35
14	0.4
30	0.35
28	0.025

Source Half-life (see Help):

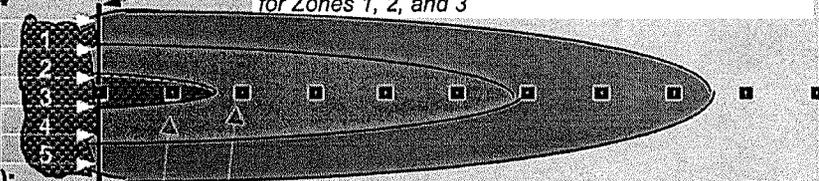
8	80	(yr)
Inst. React.	↑	1st Order
Soluble Mass	100	(Kg)

In Source NAPL, Soil

7. FIELD DATA FOR COMPARISON

Concentration (mg/L)	.352	.154			.0									
Dist. from Source (ft)	0	40	80	120	160	200	240	280	320	360	400			

Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3



View of Plume Looking Down

Observed Centerline Concentrations at Monitoring Wells
If No Data Leave Blank or Enter "0"

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE

RUN ARRAY

View Output

View Output

Help

Recalculate This Sheet

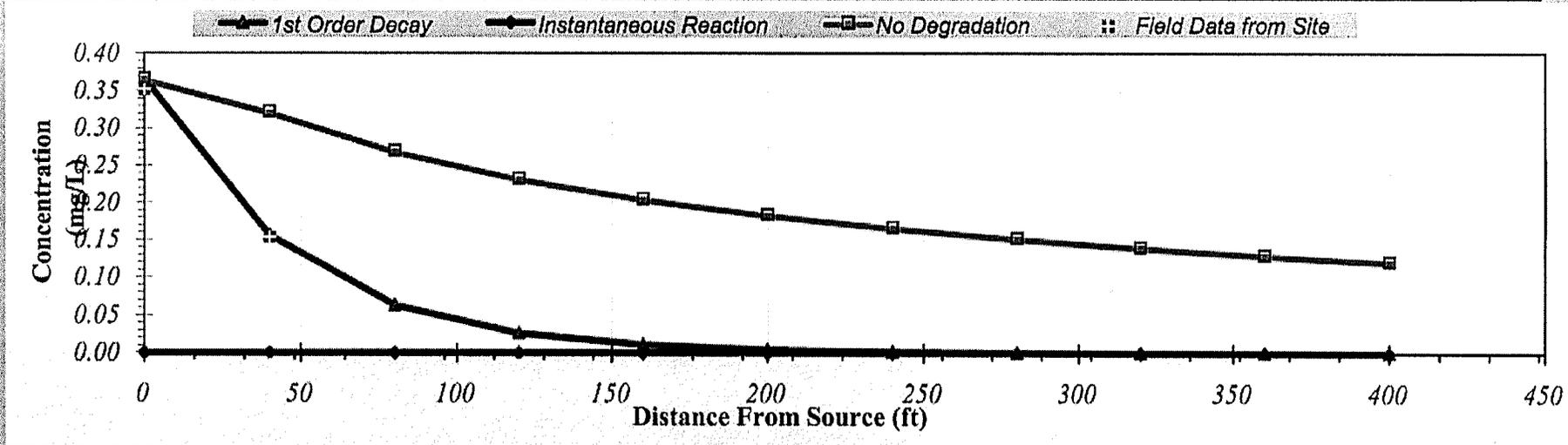
Paste Example Dataset

Restore Formulas for Vs, Dispersivities, R, lambda, other

BIOSCREEN Input Screen
BTEX Along Groundwater Flowpath Downgradient of DP-08
State Street Mystery Site, Skagway, AK

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft)										
	0	40	80	120	160	200	240	280	320	360	400
No Degradation	0.367	0.322	0.270	0.233	0.206	0.185	0.168	0.154	0.142	0.131	0.123
1st Order Decay	0.367	0.157	0.064	0.027	0.011	0.005	0.002	0.001	0.000	0.000	0.000
Inst. Reaction	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site	0.352	0.154									



Calculate Animation

Time:
10 Years

Return to Input

Recalculate This Sheet