

Two Rincon Center 121 Spear Street, 3rd Floor San Francisco, CA 94105 Tel. (415) 836-2660 Fax (415) 836-3167

1504, 38,00)

January 26, 1998

Mr. Jan Supler Wards Cove Packing Company 88 E. Hamlin Street Seattle, Washington 98105

RE: Results of Additional Soil and Groundwater Investigation, Wards Cove Bulk Fuels Facility, Craig, Alaska.

Dear Mr. Supler:

This letter presents the results of additional soil and groundwater assessment activities performed by AIG Environmental Management, Inc. (AIGEM) at the Wards Cove Packing Company (Wards Cove) facility referenced above (Figure 1). This scope of work was proposed in an AIGEM Work Plan (dated July 21, 1997) to Wards Cove (and copied to the Alaska Department of Environmental Conservation (ADEC). The primary purpose of this work was to further characterize the extent of petroleum hydrocarbons in the soil and groundwater at the site. Background information for the site was most recently presented in the AIGEM Work Plan referenced above.

BACKGROUND

The site is located at 302 Main Street in Craig, Alaska, which is located on the western shoreline of Prince of Wales Island in the southeastern part of the state. Site photographs are presented in Attachment 1. The facility is adjacent to the commercial/retail downtown district of Craig (Figure 1). The subject property is owned by Wards Cove, leased by White Pass Alaska, and currently operated by Harbor Enterprises d.b.a. Petro Marine. Prior to Wards Cove purchasing the property, the land was previously used as a fish cannery starting in the early 1920s. The cannery was owned by Mr. Laidenberger and was subsequently purchased by Ms. Libby McNeill. Wards Cove purchased the real estate from Libby McNeill in 1959. Background documents indicate that the bulk fuel facility was constructed by Chevron U.S.A., Inc. (Chevron) in the 1930s and operated by Chevron until 1986 when Ingram Oil temporarily assumed operation of the facility for one year. In 1987,



Figure 1: Site Location, Wards Cove Tank Farm Facility, Craig, Alaska



White Pass assumed operation of the facility until 1995, when Harbor Enterprises, the current operator, assumed control d.b.a. Petro Marine.

The facility is at an elevation of approximately 25 feet above sea level, and is located approximately 200 feet south of the shoreline of Bucareli Bay. The ground surface in the vicinity of the terminal consists predominantly of gravel and sand. Groundwater is generally less than 5 feet below ground surface (bgs), and the direction of groundwater flow is generally to the north toward Bucareli Bay.

The facility is directly surrounded by the Klawok Inlet to the north and west. To the east, the property borders the downtown portion of Craig's retail/business district. To the south, the property is bordered by Main Street, and across the street a are a residential area, small school, and Public Works Sewer Pump Station.

The facility currently includes 11 aboveground steel storage tanks (ASTs), some of which have been in use for almost 60 years. A site plan is presented as Figure 2. The seven oldest ASTs are located within a 3-foot-high unlined earthen bermed area (older tank farm). Four additional ASTs were installed during an expansion in 1991 in a separate tank farm (newer tank farm) located north of the older earthen bermed tank farm area. ASTs in this expanded area are installed on a cement pad and surrounded by a 3-foot-high cement wall. The facility also includes a pump house, a truck trailer loading rack (TTLR), above-grade piping, and a pipeline corridor which extends to a boat fueling dock. A surface water collection system is installed in the TTLR which drains into the unlined earthen bermed area. A site plan is presented as Figure 2.

Environmental investigations at the site were conducted by Geoengineers, Inc. in 1987, Rittenhouse-Zemean and Associates, Inc. (RZA) between 1988 and 1990, America North, Inc. (ANI) in 1991, and AGRA Earth & Environmental (AGRA) in 1995. These investigations reveal that soil and groundwater at the site have been impacted with petroleum hydrocarbons.

Geoengineers observed a sheen on the marine waters in Bucareli Bay during site visits in 1986 and 1987, and observed a small crack in the foundation of Tank 1 that reportedly appeared to be leaking black oil or asphaltic emulsion during a site visit in 1987. In 1987, Geoengineers detected concentrations of gasoline-range hydrocarbons ranging from 490 to 800 parts per million (ppm) in soil samples collected from three of four monitoring wells installed in the vicinity of the older tank farm. Separate-phase hydrocarbons (SPH) were measured in one of the monitoring wells (as much as 0.69 feet in Monitor Well MW-1), and benzene concentrations were as high as 12,000 parts per billion (ppb) in groundwater samples collected and analyzed. The depth to groundwater during the 1987 assessment was approximately 1 foot bgs.

In June 1988, RZA conducted additional soil sampling and installed two additional monitoring wells. Total recoverable petroleum hydrocarbons (TRPHs)

were detected in groundwater samples from all six monitoring wells, with a maximum concentration of 35,000,000 ppb. Benzene was detected in groundwater samples from three of the wells, with a maximum concentration of 67 ppb. In September 1988, RZA installed (but did not startup until April 1989) a vapor-extraction system (VES) in the vicinity of the older tank farm.

In 1989, RZA installed two additional monitoring wells and sampled soils from 11 additional soil borings. Concentrations of total petroleum hydrocarbons (TPH) as high as 11,200 ppm were detected in soil samples. Based on these results, the VES was expanded. Additionally, a passive dewatering trench (French drain) and water treatment system were installed in July and October 1989, respectively. The 8-footdeep French drain is located along the northern border of the older tank farm. Groundwater collected in the French drain was piped to the water treatment system consisting of an oil/water separator and an air-stripping unit. Treated water was discharged to the ground surface approximately 80 feet north of the older tank farm.

Quarterly groundwater monitoring was performed between 1989 and 1991 by RZA and ANI. Additional soil samples were collected by RZA in 1990 and by ANI in 1991. Concentrations of TPH as diesel in soil samples collected by ANI in 1991 were as high as 13,100 ppm.

AGRA performed limited assessment activities in May 1995. During site reconnaissance, AGRA observed the French drain to continue to passively drain groundwater to the non-operating air stripper and water storage tank. Because that system was not operating and the storage tank was full, excess water had leaked from a valve in the piping leading to the storage tank to the ground. Laboratory analytical results of water samples collected from the leaking valve and from water pooled on the ground below indicated the presence of gasoline range organics (as high as 130 ppb) and diesel range organics (as high as 600 ppb). Benzene was detected in the sample collected from the leaking valve at a concentration of 12 ppb. Records do not indicate the volume of water that leaked to this area (approximately 100 feet north of the older tank farm); however, this represents a route of potentially significant migration of petroleum hydrocarbons away from the source area. Further, AGRA observed distressed vegetation near the valves at the base of each AST within the older tank farm, indicating past releases. Additionally, AGRA noted that the effluent from the TTLR surface water collection system continues to be located within the bermed area of the older tank farm, presenting a potential source of ongoing contamination.

In December 1992, the Alaska Department of Environmental Conservation (ADEC) approved a request by Chevron to discontinue operation of the VES system. However, the ADEC did request that Chevron continue to operate the French drain and air stripper, gather volumetric discharge data (throughput) of the groundwater treatment system while collecting process stream samples to estimate contaminant loads, and to perform semi-annual groundwater monitoring and sampling events.

However, operation of the groundwater treatment system was discontinued in 1993 and no groundwater monitoring and sampling events have been performed since July 1993.

In June 1994, AIG Consultants (AIGC) conducted an environmental risk assessment survey to determine general environmental conditions at the facility for pollution insurance purposes. While onsite, AIGC observed significant hydrocarbon staining on the soil and surface water associated with a spring located hydraulically downgradient of the tank farm area. AIGC also observed what appeared to be petroleum hydrocarbon-affected water leaking from hoses associated with the water holding tank (associated with the air stripping unit).

PREVIOUS RELEASES

AGRA presented the results of interviews with Wards Cove personnel regarding previous on-site releases of petroleum hydrocarbons in a document dated June 1996. One interviewee witnessed a 300 gallon fuel spill when an AST in the older tank farm was overfilled by Chevron and was responded to by the United States Coast Guard. Reportedly this release occurred some time after 1959 (exact date unknown).

Another interviewee (not an eyewitness) stated that he had been informed by local sources that on several occasions the ASTs were overfilled. That interviewee stated that the likely source of the known soil and groundwater contamination was from past (AST) filling practices by Chevron. According to the interview presented in the AGRA document referenced above, released fuel from one of those overfill events completely filled the unlined secondary containment of the older tank farm.

In December 1996, Wards Cove was provided excerpts from a report entitled Yukon, B.C. and Alaska Environmental Site Assessments, Draft Summary Sheets (prepared by Golder Associates, Ltd), which contained the following information regarding previous releases:

• Spills: 1991: AST #7 overfilled. Approximately 1,136 liters diesel released into containment area. Approximately 50% recovered.

Approximately 1985: AST #1 overfilled. Approximately 189 liters diesel fuel released. Sorbent used to recover release.

Prior to 1985: Anecdotal evidence of earthen berm half-filled with gasoline from AST overflow.

• Leaks: September 1994: Minor pipeline leak into bay (under 24-hour duration).

4

500

1993: Diesel fuel pipeline "popped" from annual pressure test. Small leak. Leak located within three hours.

Spring 1993: Leak in foam injection line to AST #8 due to bad check valve along western edge of earthen berm. Line disconnected.

Approximately 1988-1989: Pipeline drip in barge connection. Repaired immediately.

• Other: Tanks #1 and #2 need new bottoms. Sludge pits dug for tank bottom disposal prior to 1980. Fuel odors under valves of ASTs #2, #3, #5, #6, and #7.

SEPTEMBER 1997 ASSESSMENT ACTIVITIES PERFORMED

PREFIELD ACTIVITIES

Prior to initiation of field activities, AIGEM prepared a site-specific Health and Safety Plan to address potential safety hazards and considerations. Additionally, AIGEM complied with all pre-drilling requirements of the ADEC.

INSTALLATION OF TEMPORARY SOIL BORINGS AND SOIL SAMPLE COLLECTION

On September 9 through 11, 1997, AIGEM installed 22 temporary soil borings (SB-1 through SB-7, and SB-9 through SB-23) onsite to better define the extent of petroleum hydrocarbons in the soil. The soil borings were installed at the locations presented in Figure 2. All boring and sampling equipment was decontaminated with a detergent wash and clean-water rinse prior to use. Rinsate from decontamination procedures was contained in 55-gallon drums and stored onsite pending disposal by Wards Cove.

All soil borings were installed using portable power augering equipment, with the exception of SB-1 through SB-3, SB-22, and SB-23, which were installed using a shovel. Undisturbed soil samples were collected at selected intervals using a slide hammer sampler equipped with brass sample liners. Upon sample collection, selected brass sample liners were removed from the sampler, sealed with Teflon tape and plastic end caps, properly labeled, and placed on ice. Selected soil samples were used to log each exploratory soil boring using the Unified Soil Classification System.

INSTALLATION OF TEMPORARY GROUNDWATER MONITOR WELLS AND GROUNDWATER SAMPLE COLLECTION

Soil borings in which groundwater were encountered were converted to temporary groundwater monitor wells, so that groundwater samples could be collected to better define the extent of petroleum hydrocarbons in the groundwater. The soil borings were converted to temporary groundwater monitor wells by installing 2-inch diameter Schedule 40 PVC casing with 0.01-inch slotted casing to the total depth of each boring. After casing installation, groundwater was allowed to stabilize for a minimum of 2 hours. Upon stabilization, groundwater samples were collected from selected temporary monitor wells by lowering a disposable polyethylene bailer inside the casing. Groundwater samples were collected from the following temporary monitor wells: SB-4 through SB-7, SB-9 through SB-11, SB-13, SB-15, SB-16, SB-18, and SB-21. Groundwater samples were collected from soil borings SB-22 and SB-23 by lowering a disposable bailer into the boring and transferring the samples to appropriate sample containers. In addition to the temporary groundwater monitor wells and soil borings, groundwater samples were also collected from two existing groundwater monitor wells (MW-11 and MW-13).

Prior to sampling, the wells were measured for the presence of LPH using an oil/water interface probe. Each well was developed by purging the casing of at least 3 casing volumes of groundwater. During purging, the groundwater was monitored for pH, temperature, and specific conductivity. Groundwater samples were collected from each well by lowering a disposable polyethylene bailer into each well. The groundwater samples were transferred to the appropriate containers, properly labeled, and placed on ice.

Upon completion of collection of groundwater samples, the temporary casings were removed from the temporary monitor wells and the soil borings were destroyed by backfilling each boring with its respective drill cuttings to 1 foot below ground surface, and then completing well abandonment with cement grout to ground surface.

Surface water samples were collected on September 9, 1997. One sample of surface water that was pooled approximately 5 feet north of the air stripper (Surface Water Air Stripper) was collected into sample containers. A surface water sample was also collected 5 feet south of the air stripper unit (SB-23) where groundwater was observed leaching to the ground surface (as described in the Hydrogeology section below). Soil Boring SB-23 was installed to a depth of 6 inches below grade in order to collect the leaching water so that a sample could be collected with a bailer. Additionally, a sample of water observed to be dripping from PVC piping (plumbed to the influent side of the non-operational air stripper) (Air Stripper Piping) was collected into sample containers.

LABORATORY ANALYSIS OF SOIL AND GROUNDWATER SAMPLES

All soil and groundwater samples were transported to Zymax Laboratory in San Luis Obispo, California (Zymax) for analysis, along with appropriate chain-ofcustody documentation. Selected soil and groundwater samples were analyzed for total petroleum hydrocarbons (TPH) as diesel, TPH as gasoline, benzene, toluene, ethylbenzene, and xylenes (BTEX), and methyl-t-butyl ether (MTBE) by USEPA Method 8260 and 8270 with GC/MS combination.

REINTERPRETATION OF LABORATORY ANALYTICAL DATA

At the request of AIGEM, Zymax reviewed the laboratory analytical results for selected soil and groundwater samples and prepared a breakdown of petroleum hydrocarbon concentrations by specific carbon-chain ranges, and by aliphatic-versus-aromatic specification. This was performed to compare the laboratory analytical results to ADEC's most-recent soil and groundwater cleanup standards that are presented in its Draft Water Quality Standards and Oil and Hazardous Substances Pollution Control Regulations and Cleanup Standards dated November 12, 1997 (1997 Draft Cleanup Standards).

Zymax reviewed mass spectral data from the 8260 analysis to quantitate Carbon 6 to Carbon 10 (C6-C10) carbon-chain ranges. To quantitate Carbon 10 to Carbon 25 (C10-C25) and Carbon 25 to Carbon 36 (C25-C36) carbon-chain ranges, Zymax reviewed the mass spectral data from the 8270 analysis. Zymax also reviewed the mass spectral data from the 8270 analysis to determine polynuclear aromatic hydrocarbon concentrations.

As recommended in ADEC's Water Quality Standards and Oil and Hazardous Substances Pollution Control Regulations and Draft Cleanup Standards dated December 18, 1996 (1996 Draft Cleanup Standards), AIGEM applied default percent compositions presented as Table 10 of that document to quantify aliphatic and aromatic fractions of the specific carbon-chain ranges referenced above.

RESULTS OF SEPTEMBER 1997 ASSESSMENT

HYDROGEOLOGY

Site topography generally slopes to the north toward Bucareli Bay. Surface water runoff from the site follows the natural grade to the north into Bucareli Bay and Klawok Inlet. A mire area measuring approximately 100 feet wide and 100 feet long in surface area (Figure 1) is located between the tank farm and Bucareli Bay. Muddy surface soil and heavy vegetative growth identify the mire. On October 21, 1997, AIGEM conducted a telephone interview with Mr. Carl Asplund. Mr. Asplund worked as a temporary employee at the subject site from 1947 until 1959, and as a

full-time employee from 1959 until 1990. Mr. Asplund stated that the site surface soils from the north side of the winch house (identified in Figure 1 as Existing Building) to the beach have been naturally saturated and muddy as long as he could remember, even during the dry seasons. It is AIGEM's opinion that groundwater might leach from the sloping hillside to some degree in the area of the mire to cause these year-round muddy conditions.

During the subject assessment, it was observed that the groundwater gradient generally reflected the site's northward-sloping topography, with the exception of the area at and north of the air stripper unit. It appears that in order to install the cement pad for the air stripper, a depression was excavated in that area of the site to level the sloping ground surface. It should be noted that groundwater was observed leaching from the south wall of that depression. Additionally, surface water was pooled in a topographically-flat area to the north of the air stripper unit's cement pad. This surface water covered a surface area of approximately 100 square feet. It is assumed that downslope drainage of that surface water flows through the mire area and toward Bucareli Bay.

Sandy gravel was encountered in all soil borings from immediately below ground surface (bgs) to 6 feet bgs. Exploratory boring logs are presented as Attachment 2. The depth to stabilized groundwater ranged from approximately 2 feet bgs (SB-6) to 5 feet bgs (SB-13). Some soil borings did not yield measurable groundwater (SB-12, SB-14, and SB-17). Table 1 presents the depth-to groundwater measurements collected on September 10 and 11, 1997.

LABORATORY ANALYTICAL RESULTS

Soil

Laboratory analytical results for soil samples collected in September 1997 are summarized in Table 2 and presented graphically in Figure 3. Historical concentrations of petroleum hydrocarbons detected in soil samples are presented graphically in Figure 5. Certified laboratory analytical reports are presented as Attachment 3. Concentrations of TPH as diesel in soil samples ranged from below laboratory method detection limits (ND) to 14,000 milligrams per kilogram (mg/kg). TPH as gasoline ranged from ND to 500 mg/kg. Concentrations of benzene in soil samples ranged from ND to 0.2 mg/kg. Concentrations of toluene ranged from ND to 0.5 mg/kg. Concentrations of ethylbenzene ranged from ND to 11 mg/kg. Concentrations of xylenes ranged from ND to 11 mg/kg. MTBE was not detected in any soil samples.

A breakdown of carbon-chain ranges and aliphatic and aromatic fractions based on a review of laboratory analytical results for selected soil samples is presented in Table 4. The significance of the results is discussed below.

Groundwater

Laboratory analytical results for groundwater samples collected in September 1997 are summarized in Table 3 and presented graphically in Figure 4. Historical results of petroleum hydrocarbons detected in groundwater samples are presented graphically in Figure 6. Certified laboratory analytical reports are presented as Attachment 3. Concentrations of TPH as diesel in groundwater samples ranged from ND to 48,000 micrograms per liter (μ g/L). Concentrations of TPH as gasoline in groundwater samples ranged from ND to 10,000 μ g/L. Concentrations of benzene ranged from ND to 160 μ g/L. Concentrations of toluene ranged from ND to 29 μ g/L. Concentrations of ethylbenzene ranged from ND to 25 μ g/L. Concentrations of xylenes ranged from ND to 240 μ g/L. MTBE concentrations ranged from ND to 3.1 μ g/L.

A breakdown of carbon-chain ranges and aliphatic and aromatic fractions based on a review of laboratory analytical results for selected groundwater samples is presented in Table 5. The significance of the results is discussed below.

Surface Water

TPH as diesel was detected in the sample that was collected from surface water pooled approximately 5 feet north of the air stripper (Surface Water Air Stripper) at a concentration of 1,100 μ g/L. TPH as diesel was also detected in a surface water sample collected from Soil Boring SB-23 (at a concentration of 250 μ g/L). As stated previously, groundwater was observed leaching from the south wall of the air stripper depression at this location.

Additionally, a sample of water observed to be dripping onto the ground from PVC piping (plumbed to the influent (south) side of the non-operational air stripper) was collected and analyzed. TPH as diesel, TPH as gasoline, and benzene were detected in this sample a concentrations of 910 μ g/L, 210 μ g/L, and 4.6 μ g/L, respectively. AIGEM measured the drip rate from the piping to the ground to be 1 liter per 13 minutes.

On September 9, 10, and 11, 1997, a sheen was observed floating on Bucareli Bay adjacent to the site during high tide events (see photograph in Attachment 1). The sheen extended out from the intertidal zone to a distance of approximately 30 feet north of the beach.

SITE CLEANUP GOALS

SOIL

In a September 5 telephone conversation between Darryl Snow of AIGEM and Sally Schlichting of ADEC, Ms. Schlichting indicated that ADEC was considering requests from responsible parties that ADEC's Draft Water Quality Standards and Oil and Hazardous Substances Pollution Control Regulations and Cleanup Standards dated December 18, 1996 (1996 Draft Standards) be applied to sites upon request. On September 5 and October 28, 1997, Ms. Schlichting interpreted those 1996 Draft Standards to equate to the following cleanup goals for this site:

Soil Cleanup Goals

Contaminant	Soil < 1 Foot in Depth	Soil > 1 Foot in Depth
TPH as Diesel	1,250 mg/kg	5,000 mg/kg
TPH as Gasoline	140 mg/kg	1,400 mg/kg
Benzene	3 mg/kg	3 mg/kg

Figure 5 graphically presents the historical concentrations of petroleum hydrocarbons in soil samples collected at the site. Contaminant concentrations in soil samples exceed the above soil cleanup levels at almost all sample locations within the old tank farm, and at Soil Borings SB-14 and HB-1 which are located north of the newer tank farm.

On November 21, 1997, ADEC communicated to AIGEM (via electronic mail) that due to inherent changes in ADEC policy, it would be prudent to apply the cleanup standards listed in Table B of the 1997 Draft Cleanup Standards document (using the "migration to groundwater" and "greater than 40 inches annual rainfall" values). Those cleanup standards are presented below:

Contaminant	Soil Cleanup Standards (milligrams per kilogram)
C6-C10 Total petroleum hydrocarbons	1,500
C6-C10 Aliphatics	400
C6-C10 Aromatics	130
C10-C-25 Total petroleum hydrocarbons	12,500
C10-C25 Aliphatics	10,000
C10-C25 Aromatics	90
C25-C36 Total petroleum hydrocarbons	22,500
C25-C-36 Aliphatics	20,000
C25-C36 Aromatics	3,000

Sample	Date	C6-C10	C6-C10	C6-C10	C10-C25	C10-C25	C10-C25	C25-C36	C25-C36	C25-C36	
Number	Collected	TPH	Aliphatic	Aromatic	TPH	Aliphatic	Aromatic	TPH	Aliphatic	Aromatic	PNAs
SB5: 2.5'-3'	10-Sep-97	ND<10	ND<10	ND<10	6,680	5,344	2,672	120	108	36	ND
SB9: 0.5'-1'	10-Sep-97	100	70	50	10,500	8,400	4,200	500	450	150	ND
SB9: 2.5'-3'	10-Sep-97	200	140	100	13,500	10,800	5,400	500	450	150	8.9 (a)
SB10: 0.5'-1'	10-Sep-97	500	350	250	13,800	11,040	5,520	200	180	60	ND
SB10: 2.5'-3'	10-Sep-97	100	70	50	7,710	6,168	3,084	90	81	27	ND
SB11: 0.5'-1'	10-Sep-97	80	56	40	2,760	2,208	1,104	40	36	12	ND
SB11: 2.5'-3'	10-Sep-97	500	350	250	4,350	3,480	1,740	50	45	15	ND
SB14: 0'-0.5'	9-Sep-97	ND<10	ND<10	ND<10	3,260	2,608	1,304	540	486	162	ND
SB15: 3.5'-4'	9-Sep-97	20	14	ND<10	1,230	984	492	70	63	21	ND

Table 4:Breakdown of Soil Analytical Results by Carbon Chain RangesWards Cove Bulk Fuel Facility, Craig, Alaska

Shaded concentrations are those that exceed ADEC Soil Cleanup Standards (Table B from Draft Cleanup Standards dated 11/12/97 assuming migration to groundwater and over 40 inches annual rainfall)

All results in milligrams per kilogram

TPH = Total petroleum hydrocarbons

PNAs = Polynuclear aromatic hydrocarbons

ND = Not detected (listed with laboratory method detection limit)

Results reported by Zymax Envirotechnology in San Luis Obispo, California

(a) Naphthalene

The following percentages were used to break down the TPH into aliphatic and aromatic composition:

Carbon Range	Percent Aliphatic	Percent Aromatic
C6-C10	70	50
C10-C-25	80	40
C25-C36	90	30

Table 4 identifies six soil sample locations from the subject investigation where contaminant concentrations exceed cleanup standards derived from the 1997 Draft Cleanup Standards. Those sample locations are SB-6, SB-9, SB-10, SB-11, SB-15, and SB-16.

GROUNDWATER

AIGEM understands ADEC's current position to be that groundwater at this site is not considered to be a potential drinking water source at this time or in the foreseeable future, and that cleanup of groundwater at this site to drinking water standards is not currently required.

Alaska Statute 46.03.900 defines pollution as "the contamination or altering of waters, land or subsurface land of the state in a manner which creates a nuisance or makes waters, land or subsurface land unclean, or noxious, or impure, or unfit so that they are actually or potentially harmful or detrimental or injurious to public health, safety or welfare, to domestic, commercial, industrial, or recreational use, or to livestock, wild animals, birds, fish, or other aquatic life."

Figures 4 and 6 graphically indicate that petroleum hydrocarbons in the groundwater have migrated from the tank farm area to the intertidal zone (SB-22) of Bucareli Bay. It is AIGEM's opinion that migration of petroleum hydrocarbons in the on-site groundwater to Bucareli Bay water represents a potential nuisance and is potentially harmful or detrimental or injurious to public health, safety and welfare, to recreational use, to wild animals, and to fish and other aquatic life. If ADEC concurs with this opinion, it is expected that ADEC will require one or more of the three actions below:

- 1. Prevention of future migration of dissolved petroleum hydrocarbons via groundwater to Bucareli Bay,
- 2. Reduction of concentrations of petroleum hydrocarbons in groundwater to levels that do not adversely affect human health and the environment,
- 3. Preparation of an environmental risk assessment to determine concentrations of dissolved petroleum hydrocarbons in groundwater that will not adversely affect human health and the environment.

On November 21, 1997, ADEC communicated to AIGEM (via electronic mail) that where groundwater is contaminating surface water, then groundwater cleanup standards presented in Table C of the 1997 Draft Cleanup Standards document apply. Those cleanup standards are as follows:

Contaminant	Groundwater Cleanup Standards (micrograms per liter)
C6-C10 Total petroleum hydrocarbons	2,000
C6-C10 Aliphatics	2,500
C6-C10 Aromatics	1,000
C10-C-25 Total petroleum hydrocarbons	1,000
C10-C25 Aliphatics	7,000
C10-C25 Aromatics	20,000
C25-C36 Total petroleum hydrocarbons	1,000
C25-C-36 Aliphatics	Not applicable (insoluble)
C25-C36 Aromatics	1,000

As presented above, AIGEM observed a sheen floating on Bucareli Bay adjacent to the site during high tide events during the subject assessment; additionally, sheens had previously been observed and reported by others. Further, it is AIGEM's opinion that groundwater might leach from the site's sloping hillside to some degree in the area of the mire to cause the year-round muddy conditions. Given this, it is AIGEM's opinion that groundwater cleanup standards presented in Table C of the 1997 Draft Cleanup Standards should be considered for this site. Table 5 identifies six groundwater sample locations from the subject investigation where contaminant concentrations exceed cleanup standards presented in the Table C of the 1997 Draft Cleanup Standards. Those sample locations are SB-6, SB-9, SB-10, SB-11, SB-15, and SB-16.

SURFACE WATER

As stated above, a sample of water observed to be dripping onto the ground from PVC piping (plumbed to the influent (south) side of the non-operational air stripper) was collected and analyzed. TPH as diesel, TPH as gasoline, and benzene were detected in this sample at concentrations of 910 μ g/L, 210 μ g/L, and 4.6 μ g/L, respectively. AIGEM measured the drip rate from the piping to the ground to be approximately 1 liter per 13 minutes. On September 10, 1997, Cambria Environmental Technology repaired the leaking piping; however, records indicate that this leak had been ongoing since at least May 1995. Based on laboratory analytical results of samples collected from the leaking piping on September 9, 1997, the following calculations present an estimate of the daily release of petroleum hydrocarbons at this area.

1 liter/13 minutes x 1440 minutes/day x 910 µg TPH as diesel/liter x

1 gram/1,000,000 µg x 0.002205 pounds/gram

= .0002 pounds TPH as diesel per day

12

- 1 liter/13 minutes x 1440 minutes/day x 210 μg TPH as gasoline/liter x 1 gram/1,000,000 μg x 0.002205 pounds/gram = <u>.00005 pounds TPH as gasoline per day</u>
- 1 liter/13 minutes x 1440 minutes/day x 4.6 µg benzene/liter x
- 1 gram/1,000,000 μg x 0.002205 pounds/gram
- = .000001 pounds benzene per day

ADEC Draft Standards indicate that in addition to addressing the human health risks due to petroleum contamination and the protection of groundwater resources, several other issues arise, such as aesthetic and nuisance concerns, when considering petroleum cleanup levels.

It is possible that the natural mire area is the result of leaching groundwater that has migrated from the subsurface of the tank farm area to the mire area. It is the opinion of AIGEM that groundwater that has leached from the south wall of the depression where the air stripper is installed, coupled with the air-stripper-piping leak, have resulted in the concentrations of petroleum hydrocarbons detected in the pool of surface water located to the north of the air stripper unit, and that these are potential sources of contamination to the natural mire area. It is also AIGEM's opinion that the contaminated surface water represents a potential nuisance and is potentially harmful or detrimental or injurious to public health, safety and welfare, and to wild animals and birds. Further, surface runoff from this area to Bucareli Bay is potentially harmful to fish and other aquatic life." If ADEC concurs with this opinion, it is expected that ADEC will require one or more of the three actions below:

- 1. Prevention of future migration of dissolved petroleum hydrocarbons via surface runoff to Bucareli Bay,
- 2. Reduction of concentrations of dissolved petroleum hydrocarbons in surface water to levels that do not adversely affect human health and the environment,
- 3. Preparation of an environmental risk assessment to determine concentrations of dissolved petroleum hydrocarbons in surface water that will not adversely affect human health and the environment.

DISCUSSION

In January 1992 Chevron requested that the air stripping unit be removed from the groundwater treatment system. This request was supported by the following site conditions:

• White Pass would continue to operate the bulk fuels terminal as a "controlled industrial site", and the land use in the area would not change.

13

• The diesel-range hydrocarbons in the soil did not appear to have the chemical characteristics that represent a health threat based on toxicity or leachibility.

In a letter dated April 2, 1992, ADEC acknowledged a request by Chevron to discontinue operation of the vapor extraction system that had been operating, and substitute an aeration device for treatment of discharged water, and granted that request based on the following criteria:

- The extensive remediation that had taken place
- Continued operation of the facility as a bulk fuels terminal
- Continued semi-annual groundwater sampling
- Collection of volumetric throughput data for discharged water for estimation of contaminant loads

The site is adjacent to residences and Bucareli Bay, in addition to the downtown portion of Craig's retail/business district. As presented in Figure 1, various City of Craig offices and services in the surrounding area include Craig City Hall, Craig Primary Health Care Facility, Craig Public Library, Craig Fire Hall, Craig Police Department, and Craig City Gymnasium. It is AIGEM's opinion that (based on the limited risk assessment previously performed by Chevron's consultant and levels of petroleum hydrocarbons in the subsurface and surface water) it has not been determined that existing concentrations of petroleum hydrocarbons at the site do not present a threat to human health and the environment. Further, uses other than as a bulk fuels terminal are being considered for this site. Lastly, Chevron failed to continue semi-annual groundwater sampling from 1993 to September 1998, and failed to calculate throughput data for estimation of contaminant loads. Based on this information, it is AIGEM's opinion that Chevron has been negligent in its environmental management responsibilities and has failed to provide corrective action at this site.

It is in Wards Cove's interest for this site to be restored to its full potential use and value with respect to future site development. It should be requested that future recommendations by ADEC regarding this site strongly consider the interests of Wards Cove with respect to future site development, in addition to those of ADEC, and that expeditious remedial action by Chevron be required for this site to allow for future unconditional site development.

RECOMMENDED REMEDIAL ACTION

At a minimum, AIGEM recommends that soil excavation be performed in the area of the older tank farm as a source removal effort. As presented in the Work Plan dated July 25, 1997, this is the area where previous releases occurred. Additionally, laboratory analytical results confirm that contaminant concentrations in soil samples exceed ADEC soil cleanup levels at almost all sample locations within the older tank farm. Further, source removal in this area will mitigate continued migration of

dissolved petroleum hydrocarbons in the groundwater and surface water to Bucareli Bay.

Excavation and disposal of contaminated soil in the older tank farm area could be performed concurrently with site-decommissioning activities that would precede site redevelopment. Figure 7 graphically presents the proposed lateral extent of soil excavation. Additional excavation in the areas of borings SB-14, SB-15, SB-16, and HB-1 is also proposed. It should be noted that the sample locations identified in Figure 7 as being areas where petroleum hydrocarbon concentrations exceed ADEC soil cleanup levels are based on soil cleanup standards presented in both the 1996 and 1997 Draft Cleanup Standards. Given the significant concentrations of petroleum hydrocarbons historically detected at the site, it is AIGEM's opinion that this is a reasonable approach to estimate likely dimensions of the proposed excavation. The proposed excavation dimensions would extend to a depth of approximately 3 feet below ground surface (the depth where groundwater is generally encountered). It is estimated that at least 900 cubic yards of contaminated soil would be generated during the excavation for transportation to a disposal facility. Upon completion of soil excavation and disposal activities, clean imported backfill material would be placed in the excavation and backfilled to engineered specifications.

Data and information presented in this document indicate that groundwater cleanup standards presented in Table C of the 1997 Draft Cleanup Standards have not been achieved at this site, and that groundwater is affecting surface waters as evidenced by sheening observed on Bucareli Bay. If ADEC concurs, then a remedial action plan to address groundwater should be developed.

AIGEM recommends that Wards Cove requests that ADEC prepare a formal response to this document and that the response address the following issues.

- 1. ADEC's response regarding the soil excavation activities proposed above,
- 2. ADEC's response regarding site-related surface and groundwater issues identified in this document,
- 3. Level of cleanup required by ADEC to allow unconditional residential development of this site, and
- 4. ADEC's comments regarding responsible party allocation.

AIGEM appreciates the opportunity to provide environmental services to Wards Cove. If you have any questions regarding this project, please call me at (415) 836-2623.

Best regards, AIG Environmental Management

1

Darryl Snow) Environmental Consultant

Kennel AP.

Kenneth A. Pisciotto, Ph.D., R.G. Senior Environmental Consultant

Attachments: Table 1:

- Groundwater Monitoring Data (September 10 and 11, 1997)
- Table 2:Soil Laboratory Analytical Results
- Table 3:Groundwater Analytical Results
- Table 4:Breakdown of Soil Analytical Results by Carbon Chain
Ranges
- Table 5:Breakdown of Groundwater Analytical Results by
Carbon Chain Ranges
- Figure 1: Site Location
- Figure 2: Site Plan
- Figure 3: Petroleum Hydrocarbons in Soil September 1997
- Figure 4: Petroleum Hydrocarbons in Groundwater September 1997
- Figure 5: Historical Petroleum Hydrocarbons in Soil
- Figure 6: Historical Petroleum Hydrocarbons in Groundwater
- Figure 7: Proposed Limit of Soil Excavation
- Attachment 1: Site Photographs
- Attachment 2: Exploratory Soil Boring Logs
- Attachment 3: Copies of Certified Laboratory Analytical Reports

xc: Ms. Sally Schlichting, ADEC, 410 Willoughby Avenue, Suite 105, Juneau, Alaska, 99801-1795

Mr. Bob Gondek, Chevron Products Company, P.O. Box 6004, San Ramon, California 94583-0804

Well	Date	Depth to	Temperature	Conductivity	рН	Comments
	Monitored	Groundwater	(Fahrenheit)	(a)	••••	
SB-4	10-Sep-97	2.70	56	110	7.6	Sheen observed
SB-5	10-Sep-97	2.20	55	290	7.8	Sheen observed
SB-6	10-Sep-97	2.00	61	176	6.2	Sheen observed
SB-7	10-Sep-97	2.10	57	213	79	
SB-9	10-Sep-97	2.20	59	185	6.9	Sheen observed
SB-10	10-Sep-97	2.20	56	186	7.5	Sheen observed
SB-11	10-Sep-97	3.00	56	288	7.5	Sheen observed
SB-12	10-Sep-97					No groundwater vield
SB-13	10-Sep-97	5.00	55	303	84	no groundwater yield
SB-14	10-Sep-97	* *				No groundwater vield
SB-15	10-Sep-97	4.40	56	131	75	Sheen observed
SB-16	10-Sep-97	4.65	55	212	7.6	Sheen observed
SB-17	10-Sep-97					No groundwater viold
SB-18	10-Sep-97	1.60	58	21	67	No groundwater yield
SB-19	10-Sep-97				0.1	No groundwater viold
SB-20	10-Sep-97		-			No groundwater yield
SB-21	10-Sep-97					No groundwater yield
MW-11	11-Sep-97	NM	NM	NM	NM	No groundwater yield
MW-13	11-Sep-97	NM	NM	NM	NM	

Table 1:Groundwater Monitoring DataWards Cove Tank Farm Facility, Craig, Alaska

(a) microsiemens per centimeter

NM Not measured

-- Well did not yield sufficient groundwater to monitor or sample

Sample	Collected	TPH-D	TPH-G	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
SB1: 0'-0.5'	11-Sep-97	190	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB2: 0'-0.5'	11-Sep-97	170	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB3: 0'-0.5'	11-Sep-97	44	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB4: 0.5'-1'	10-Sep-97	590	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB4: 2.5'-3'	10-Sep-97	390	ND<10	ND<0.1	ND<0.1	ND<0.1	ND<0.1	ND<0.1
SB5: 0.5'-1'	10-Sep-97	350	ND<10	ND<0.1	ND<0.1	ND<0.1	ND<0.1	ND<0 1
SB5: 2.5'-3'	10-Sep-97	6,800	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB6: 0.5'-1'	10-Sep-97	630	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB6: 2.5'-3'	10-Sep-97	49	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB7: 2.5'-3'	10-Sep-97	35	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB9: 0.5'-1'	10-Sep-97	11,000	100	ND<0.1	ND<0.1	ND<0.1	2.9	ND<0.1
SB9: 2.5'-3'	10-Sep-97	14,000	200	ND<0.1	0.3	0.6	11	ND<0.1
SB10: 0.5'-1'	10-Sep-97	14,000	500	ND<0.1	0.5	0.3	2.4	ND<0.1
SB10: 2.5'-3'	10-Sep-97	7,800	100	ND<0.1	ND<0.1	0.1	0.8	ND<0.1
SB11: 0.5'-1'	10-Sep-97	2,800	80	ND<0.1	ND<0.1	0.2	1	ND<0.1
SB11: 2.5'-3'	10-Sep-97	4,400	500	0.2	ND<0.1	1.5	8.8	ND<0.1
SB12: 2.5'-3'	10-Sep-97	ND<10	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB13: 3'-3.5'	9-Sep-97	ND<10	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB14: 0'-0.5'	9-Sep-97	3,800	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB14:4.5'-5'	10-Sep-97	110	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB15: 3.5'-4'	9-Sep-97	1,300	ND<10	ND<0.1	ND<0.1	ND<0.1	ND<0.1	ND<0.1
SB16: 4'-4.5'	9-Sep-97	300	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB17: 3.5'-4'	9-Sep-97	88	ND<10	ND<0.1	ND<0.1	ND<0.1	ND<0.1	ND<0 1
SB18: 2.5'-3'	10-Sep-97	320	ND<10	ND<0.1	ND<0.1	ND<0.1	ND<0.1	ND<0.1
SB19: 2.5'-3'	10-Sep-97	ND<10	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB20: 2.5'-3'	10-Sep-97	55	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB21: 2.5'-3'	10-Sep-97	33	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB23: 0.5'-1'	11-Sep-97	ND<10	ND<10	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005

Table 2:Soil Laboratory Analytical ResultsWards Cove Bulk Fuel Facility, Craig, Alaska

Table 2:Soil Laboratory Analytical ResultsWards Cove Bulk Fuel Facility, Craig, Alaska

TPHG = Total petroleum hydrocarbons as gasoline TPHD = Total petroleum hydrocarbons as diesel All results in milligrams per kilogram NA = Not analyzed ND = Not detected TPHG and BTEX analysis by USEPA Method 8260 and GC/MS combination TPHD analysis by GC/MS combination (extracted by USEPA Method 3510) TPHD analytical range is C8-C40 Samples analyzed by Zymax Envirotechnology in San Luis Obispo, California

Sample	Collected	TPHD	TPHG	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE*
SB4	10-Sep-97	NA	ND<50	ND<0.5	ND<0.5	ND<0.5	2.8	ND<0.5
SB5	10-Sep-97	NA	ND<100	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0
SB6	10-Sep-97	3,100	1,000	7.3	3.9	1.4	7.1	3.1
SB7	10-Sep-97	NA	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
SB9	10-Sep-97	NA	2,000	2.9	13	25	240	ND<2.0
SB10	10-Sep-97	NA	3,000	32	29	9.9	58	ND<2.0
SB11	10-Sep-97	10,000	5,000	160	9.3	41	210	ND<2.0
SB13	10-Sep-97	ND<100	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
SB15	10-Sep-97	48,000	ND<100	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0
SB16	10-Sep-97	NA	10,000	13	2.4	4	21	ND<2.0
SB18	10-Sep-97	280	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
SB21	10-Sep-97	NA	ND<50	ND<0.5	0.7	ND<0.5	ND<0.5	ND<0.5
SB22	11-Sep-97	150	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
SB23	11-Sep-97	250	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
MW-11	11-Sep-97	130	ND<50	ND<0.5	1.1	ND<0.5	ND<0.5	ND<0.5
MW-13	11-Sep-97	160	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
Air Stripper								
Piping	9-Sep-97	910	210	4.6	0.5	0.9	0.9	ND<0.5
Surface Water								
Air Stripper	9-Sep-97	1,100	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5

Table 3:Groundwater Laboratory Analytical ResultsWards Cove Bulk Fuel Facility, Craig, Alaska

TPHD = Total petroleum hydrocarbons as diesel

TPHG = Total petroleum hydrocarbons as gasoline

All results in micrograms per liter

ND = Not detected

NA = Not analyzed because sample destroyed in transit to laboratory

TPHG and BTEX analysis by USEPA Method 8260 and GC/MS combination

TPHD analysis by GC/MS combination (extracted by USEPA Method 3550)

MTBE = Methyl-t-Butyl Ether

Samples analyzed by Zymax Envirotechnology in San Luis Obispo, California

Sample	Date	C6-C10	C6-C10	C6-C10	C10-C25	C10-C25	C10-C25	C25-C36	C25-C36	C25-C36	DNAc
Number	Collected	ТРП	Allphauc	Aromatic		Aliphatic	Alomatic		Allphatic	Alumatic	
SB6	10-Sep-97	1,000	700	500	2,850	2,280	1,140	250	225	/5	ND<2
SB9	10-Sep-97	2,000	1,400	1,000	NA	NA	NA	NA	NA	NA	NA
SB10	10-Sep-97	3,000	2,100	1,500	NA	NA	NA	NA	NA	NA	NA
SB11	10-Sep-97	5,000	3,500	2,500	9,800	7,840	3,920	200	180	60	(a)
SB15	10-Sep-97	ND<100	ND<100	ND<100	44,600	35,680	17,840	3,400	3,060	1,020	ND<20
SB16	10-Sep-97	10,000	7,000	5,000	NA	NA	NA	NA	NA	NA	ND<2.0
Air											
Stripper											
Piping	9-Sep-97	ND<50	ND<50	ND<50	810	648	324	100	90	30	ND<2
Surface											
Water Air											
Stripper	9-Sep-97	ND<50	ND<50	ND<50	590	472	236	510	459	153	ND<2

Table 5:Breakdown of Groundwater Analytical Results by Carbon Chain RangesWards Cove Bulk Fuel Facility, Craig, Alaska

Shaded concentrations are those that exceed ADEC Groundwater Cleanup Standards (Table C from Draft Cleanup Standards dated 11/12/97).

All results in micrograms per liter

TPH = Total petroleum hydrocarbons

PNAs = Polynuclear aromatic hydrocarbons

ND = Not detected (listed with laboratory method detection limit)

NA = Not analyzed (sample destroyed in transit to laboratory)

Results reported by Zymax Envirotechnology in San Luis Obispo, California

(a) Concentrations of fluorene, naphthalene, and phenanthrene detected at 2.5, 12, and 5 micrograms per liter, respectively

Carbon Range C6-C10	Percent Aliphatic 70	Percent Aromatic 50	
C10-C-25	80	40	
C25-C36	90	30	



710.141629 E:\AIG\CHEVRON\CHEV00



9710.141705 E:\AIG\CHEVRON\CHEV003









PROPOSED LIMIT OF SOIL EXCAVATION





ATTACHMENT 1:

SITE PHOTOGRAPHS

Photo 3. View from middle (North edge) of Fuel Facility facing north toward Buchareli Bay. Note air stripper in center and thick vegetation associated with mire area.



Photo 4 Photo of sheen observed on Buchareli Bay in front of Fuels Facility during high tide events. Sheen extended approximately 30 feet out from beach.



AIG Environmental Management, Inc.

Photo 1. View of Fuels Facility from boardwalk (facing southeast) Note residence on right and mire area on left.



Photo 2 View from Fuels Facility facing northeast. Note business and public pier on right and mire area on left.



AIG Environmental Management, Inc.

Photo 5. Close up of brown biomass growing under leak in air stripper piping. Note water dripping to ground.



Photo 6. View of leaking air stripper influent piping and valve. Note brown biomass growing under leaking area.





ATTACHMENT 2:

EXPLORATORY SOIL BORING LOGS

Project:	roject: BULK FUEL FACILITY - CRAIG, ALASKA											Log of Boring/Monitoring Well:		
Boring L	ocation	: 5	B-4	(SE	EFIC	W.	2)	20			1	GR /		
Subcontr	actor	and E	quipm	ent:	AIGE	М			Logged By:	D. SNOW		50-4		
Sampling) Metho	od: 4	" AU	GEF	र			Monitoring	Device: 🕳			Comments:		
Start Date: 9/10/91								Finish Date	··· 9/10,	/97				
First Wa	ter (bg	s): N	<u> </u>					Stabilized \	Water Level (be	s): 2.70 FT.				
Sample Number	Blows/foot		Depth (Feet)	Recovery	USCS Symbol	Water Level	Surface El	evation: N Ll' (color, grain	A Cas THOLOGIC Di size, consiste	ing Top Elevatio ESCRIPTION ency, moisture, c	n: NA	Boring Abandonr Well Construction	nent/ Details	
58-4- 05-1.0 58-4- 25-3.0			$\begin{array}{cccccccccccccccccccccccccccccccccccc$				DARK E 80-90% sand, ma	of boring a	DY GRAVEL d gravel, 10 tt 3.00 ft.	(GP) -20% fine to (COGrse		kfilled with Cutting	
		!				Ā	eviewed By:			Date:				

199710.061459 E: \LOCS\WARDS\SB-04 AIG ENVIRONMENTAL MANAGEMENT, INC.

Revised By:

Date:

Page_1_of_1_
Project:		B	ULK	FUE	EL FA		Y - CRA	NG, ALASKA			Log	g of Boring/Monitoring Well:
Boring l	ocatio	n: 5	B-5	(SE	E FIG	JUK.	_)			\cup		SB_5
Subcont	ractor	and E	quipm	ient:	AIGE	M		L(ogged By: D.S	NOW		
Samplin	g Melh	od: 4	" AU	GEF	२			Monitoring Devi	ce: -		Col	mments:
Start De	ate:	9.	/10/9	17				Finish Date:	9/10/97			•
First Wo	T]s): N I	A I			1		Stabilized Wate	r Level (bgs): 🔰	2.20 FT.		
Sample Numbe	Blows/foot		Depth (Feet)	Recovery	USCS Symbol	Water Level	Surface El	levation: NA LITHO (color, grain siz	Casing Tr LOGIC DESCR e, consistency, r	op Elevation: IPTION moisture, other)	NA	Boring Abandonment/ Well Construction Details
58-5- 0.5-1.0			$\begin{array}{cccccccccccccccccccccccccccccccccccc$				DARK E BO-409 sand, ma Bottom	BROWN SANDY & subrounded g oist of boring at 3	GRAVEL (GP) ravel, 10-20%	Pine to coar	5 <i>c</i>	Coment Grout

AIG ENVIRONMENTAL MANAGEMENT, INC.

199710.061627 E: \LOGS\WARDS\SB-05

Revised 8y:

Project:		E	ULK	FUE	EL FA	רי ון בי	Y - CRA	IG, ALASK	A		0	Log	of Boring/Monitoring Well:
Boring L	ocatio	1: 5	B-6	(SE	EFIC	J	2)				0		GB_6
Subcont	ractor	and E	quipm	ent:	AIGE	M			Logged B	y. D. SNOW	1		90-0
Sampling	g Meth	od: 4	<u> AU</u>	GEF	२			Monitoring [Device: _			Corr	aments:
Start Do	ite:	9	/10/9	11				Finish Date:	9/1	0/97			
First Wa	ter (be	js): N	<u>A</u>					Stabilized W	later Level	(bgs): 2.00	FT.		
ple Number	rs/foot		th (Feet)	overy	S Symbol	er Level	Surface El	evation: NA	HOLOGIC	Casing Top Ele DESCRIPTIC	evation: NA		Boring Abandonment/ Well Construction Details
Sam	Blov		O Dep	Rec	0 0 0 0 0	Wat					ne, other)		2224
58-6- 05-1.0			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		00000000000000000000000000000000000000	•	DARK E 80-909 sand, mo	BLACK SANI 6 subrounded oist	DY GRAVI	EL (GP) 10-20% fine	to coarse		Coment Grout
58-6- 2 <i>5-</i> 3.0			3 4 5 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10				Bottom	of boring at	: 3.50 ft.				
						F	eviewed Rv			0			

199710.061648 E: \LOCS\WARDS\SB~06

AIG ENVIRONMENTAL MANAGEMENT, INC.

Reviewed By: __ Revised By:

-

Date: ____

Date: _

Project:	BULK FU	EL FACI	TY - CRA	IG, ALASK	(A	\sim	Log of Boring/Monitoring Well:
Boring Location:	SB-7 (SE	E FIGU	2)				
Subcontractor an	d Equipment:	AIGEM			Logged By: D. S	BNOW	<u> </u>
Sampling Method	4" AUGE	R		Monitoring	Device: _		Comments:
Stort Date:	9/10/97			Finish Date:	9/10/97		
First Water (bgs)	NA	<u> </u>		Stabilized V	Vater Level (bgs): 💈	2.10 FT.	
Sample Number Blows/foot	Depth (Feet) Recovery	USCS Symbol Water Level	Surface El	evation: NA LIT (color, grain	Casing T THOLOGIC DESCR size, consistency,	op Elevation: NA RPTION moisture, other)	Boring Abandonment/ Well Construction Details
98-7- 2.5-3.0	$ \begin{array}{c} 0 \\ 1 \\ 1 \\ 1 \\ 2 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$		Bottom	of boring a	DY GRAVEL (GP, d gravel, 10-209 t 3.00 ft.) 6 fine to coarse	Coment Grout

Reviewed By: _

Revised By

Date: ____

Project:		В	ULK	FVE	EL FA		Y - CRA	IG, ALASK	A	-	Lo	g of Boring/Monitoring Well:
Boring L	ocatio	1: S	B-9	(SE	e fie	JUR.	.)	127—5°——		0		GR_d
Subconti	roctor	and E	quipm	ient:	AIGE	M			Logged By: D.	SNOW		۲ -4
Sampling	} Meth	od: 4	<u>" AU</u>	GE	२			Monitoring	Device: -		Co	mments:
Start Do	ite:	٩,	/10/9	17		-	2	Finish Date:	9/10/97			
First Wa	ter (bo	s): N	<u>A</u>					Stabilized V	Vater Level (bgs):	2.20 FT.		
Sample Number	Blows/foot		Depth (Feet)	Recovery	USCS Symbol	Water Level	Surface El	evation: NA LII (color, grain	A Casing HOLOGIC DESC size, consistency,	Top Elevation: RIPTION moisture, other	NA	Boring Abandonment/ Well Construction Details
58-4- 05-1.0 58-4- 25-3.0			$\begin{array}{c} 0 \\ 1 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 $				DARK E BO-90% sand, ma Bottom	of boring a	DY GRAVEL (Gf d gravel, 10-20 t 300 ft.	P) % fine to coa	r38	Coment Grout
						F	Reviewed Rv			Date		

199710.061632 E: \LOGS\WARDS\SB-09

Reviewed By: _

Revised By:

Project:		B	ULK	FU	EL FA		Y - CRA	IG, ALASK	(A		~	Log	of Boring/Monitoring Well:
Boring L	ocation	1: 5	B-IC) (S	EE FI	SU	2)	······		((5B-10
Subcontr	actor	and E	quipm	ient:	AIGE	М			Logged By:	D. SNOW			
Sampling) Meth	od: 4	<u>" AU</u>	GE	२			Monitoring	Device: 🗕			Com	iments:
Start Da	te:	٩,	/10/	17				Finish Date	9/10	2/97			
First Wa	ter (bg	s): N	<u>A</u>					Stabilized V	Valer Level (b	gs): 2.20 F	Τ.		
Sample Number	Blows/foot		Depth (Feet)	Recovery	USCS Symbol	Water Level	Surface El	evation: N/ LI7 (color, grain	A Co THOLOGIC [size, consist	sing Top Eleva DESCRIPTION ency, moisture	tion: NA		Boring Abandonment/ Well Construction Details
58-10- 0.5-1.0 58-10- 2.5-3.0			$\begin{array}{cccccccccccccccccccccccccccccccccccc$				DARK E 80-909 sand, ma Bottom	of boring a	DY GRAVE d gravel, k t 3.00 ft.	- (<i>GP</i>) >-20% fine ta	o coarse		Comont Grout
						F	Reviewed By:			Dat	e:		

199710.061635 E: \LOCS\WARDS\SB-10 AIG ENVIRONMENTAL MANAGEMENT, INC.

e١

Revised By:

Date:

Project:		e	ULK	FUE	L FA	CILI	ry - CRA	IG, ALASK	(A			Log	g of Boring/Monitoring Well:
Boring L	ocation	1: 5	B-II	(SE	EFIC	JU ^r	2)				()		CR II
Subconti	ractor	and E	quipn	nent:	AIGE	M			Logged	By: D. SNC	DM C		50-11
Sampling	g Meth	od: 4	" AL	GEF	र			Monitoring	Device: -			Cor	mments:
Start Do	ite:	٩	/10/	17		- 52		Finish Date	: 0	1/10/97			
First Wa	ter (bg	is): N	<u>A</u>					Stabilized V	Vater Leve	l (bgs): 3.0	O FT.		
Sample Number	Blows/foot		Depth (Feet)	Recovery	USCS Symbol	Water Level	Surface El	evation: NA Ll ¹ (color, grain	A THOLOGI size, cor	Casing Top C DESCRIP1 sistency, moi	Elevation: N TON sture, other)		Boring Abandonment/ Well Construction Details
58-11- 05-1.0 58-11- 2.5-3.0			$\begin{array}{c} 0 \\ 1 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 $				DARK E BO-909 sand, ma Bottom	of boring a	t 3.00 f	VEL (GP) I, 10-20% flr t.	ne to coarse		Coment Grout
						R	eviewed By:				Date:		

AIG ENVIRONMENTAL MANAGEMENT, INC.

- 2000 - -

Revised By:

Date: ____

Bang Leading Leading Hill ALGER [3] 2) Semantical and Experiment ALGER Mentioning Device - Sint Date 4/A/QT Finih Date 4/A/QT Frain Date 4/A/QT Finih Date 4/A/QT Frain Date 4/A/QT Finih Date 4/A/QT Frain Date 4/A/QT Finih Date 4/A/QT Santace Breatilion: NA Casing Tap Envelion: NA Boring Abandomment/ Well Construction Details DARC ERC/HI SANDY GRAYEL (GP) DO-10% subconded gravel, IC-20% free to coorse and meat Sector 2 Sector 2 Se	Project:	BULK	FUE	L FA		Y - CRA	IG, ALASK	Α		Log	of Boring/Monitoring Well:
Subcatterior and Explanant: AIGEM I Logod By: D. SNOW Comments: Subcatterior of Explanant: AIGEM Mainting Derive: - Start Date: 4/LOGMT Finish Date: 4/LOGMT Frat Water (bas): NA Subview Water Low (bas): NA Boring Abandonment/ Well Construction Details Subview Water Location To Prevation: NA Boring Abandonment/ Well Construction Details Boring Abandonment/ Well Construction Details Subview date subview date gravel. IO-2018 fine to coarse send, moist Sector and moist	Boring Location:	SB-12	2 (SE	E Fk	SU	2)			\square		SB-12
Sampling Method: 4* AUGER Monitoring Device: - Comments: Star Date: 9/LO/4T Freih Date: 9/LO/4T Freih Date: 0/LO/4T Tax Water (cop): NA Stabilized Wate Level (top): NA Boring Abandonment/ Well Extra Stabilized Wate Level (top): NA Conservation: NA Big Extra Stabilized Wate Level (top): NA Boring Abandonment/ Well Construction Details Maintering Water Level (top): NA Boring Abandonment/ Well Construction Details Extra Stabilized Water Level (top): Na Boring Abandonment/ Well Construction Details Extra Stabilized Water Level (top): Stabilized Water Stabilized Water, other) Well Construction Details Second Extra Stabilized gravel, IC-20% fire to coarse Extra Stabilized Water	Subcontractor a	and Equipr	nent:	AIGE	M		1	Logged By: D.	SNOW		
Start Dole 9/LO/RT Field Dole 9/LO/RT Frait Woler (tsp) NA Stabilized Woler Level (tsp): NA Boring Abandomment/ Well Construction Details Stabilized Woler Casing Top Elevation: NA Boring Abandomment/ Well Construction Details Well Construction Details Sector grain size, consistency, moisture, other) Boring Abandomment/ Well Construction Details Sector grain size, consistency, moisture, other) Sector grain size, consistency, moisture, other, moist size, consistency, moisture, other, moist size, consistency, moisture, other, moist size, consistency, moist	Sampling Metho	d: 4" A l	JGEF	र			Monitoring [)evice: _		Cor	nments:
First Woter (tep): NA Subtracted woter Level (tep): NA Boring Abandomment/ Well Construction Details	Start Date:	9/10/	97				Finish Date:	9/10/97			
Better Surface Elevation: NA Casing Top Elevation: NA Boring Abandomment/ Well Construction Details Better Better Better Detect Become Samer Generation: NA Boring Abandomment/ Well Construction Details Better Better Better Detect Become Samer Generation: NA Boring Abandomment/ Well Construction Details Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better Better <td>First Water (bgs</td> <td>s): NA</td> <td>1</td> <td>1</td> <td>1</td> <td></td> <td>Stabilized W</td> <td>ater Level (bgs):</td> <td>NA</td> <td></td> <td></td>	First Water (bgs	s): NA	1	1	1		Stabilized W	ater Level (bgs):	NA		
38-10- 25-30 3 0 <t< td=""><td>Sample Number Blows/foot</td><td>Depth (Feet)</td><td>Recovery</td><td>USCS Symbol</td><td>Water Level</td><td>Surface El</td><td>evation: NA LIT (color, grain</td><td>HOLOGIC DESC size, consistency,</td><td>Top Elevation: NA RIPTION , moisture, other)</td><td><u> </u></td><td>Boring Abandonment/ Well Construction Details</td></t<>	Sample Number Blows/foot	Depth (Feet)	Recovery	USCS Symbol	Water Level	Surface El	evation: NA LIT (color, grain	HOLOGIC DESC size, consistency,	Top Elevation: NA RIPTION , moisture, other)	<u> </u>	Boring Abandonment/ Well Construction Details
	58-12- 25-3.0					DARK E 80-909 sand, ma Bottom	of boring a	DY GRAVEL (6 d gravel, 10-20 t 3.00 ft.	P) % fine to coarse		Coment Grout

199710.061639 E:\LOCS\WARDS\S8-12

Reviewed By: ___

Revised By:

Project:		B	ULK	FUE	EL FA		Y - CRA	IG, ALASK	< <u>A</u>				Log	of Boring/Monitoring Well:	
Boring L	ocatio	1: 5	B-13	5 (SI	E FIG	51/	_2)				\bigcirc			5B-13	
Subcontr	actor	and E	quipm	ent:	AIGE	M		T	Logged	d By: D. S	SNOW				
Sampling	Meth	od: 4	" AU	IGEI	२			Monitoring	Device:	-			Com	ments:	
Start Da	ite:	9	19/9	7				Finish Date	:	9/9/97			Į		
First Wo	ter (bç I	gs): N	A	1				Stabilized V	Water Lev	vel (bgs):)	A		<u> </u>		
Sample Number	Blows/foot		Depth (Feet)	Recovery	USCS Symbol	Water Level	Surface El	evation: N Ll' (color, grain	A THOLOG size, co	Casing T SIC DESCF prisistency,	op Elevation: RIPTION moisture, oth	NA er)		Boring Abandonment/ Well Construction Detai	ls
SB-13- 3.0-3.5			$\begin{array}{cccccccccccccccccccccccccccccccccccc$				DARK E 80-909 sand, ma Bottom	of boring a	tDY GR	AVEL (GP el, 10-209) 6 fine to co	arse		Comont Grue	alth
						f	Reviewed By	<i>r</i>			Date:				

AIG ENVIRONMENTAL MANAGEMENT, INC.

Revised By:

Date:

Project:		B	ULK	FVE	L FA	<u>, ij</u>	Y - CRA	IG, ALASKA			Log	g of Boring/Monitoring Well:
Boring L	ocatio	n: S	B-14	I (SE	E FK	50	2)			\bigcirc		SB-14
Subcont	ractor	and E	quipm	nent:	AIGE	M		Lo	gged By: D.	SNOW		
Samplin	g Meth	od: 4	" AU	IGEI	२			Monitoring Devic	:e: +		Cor	nments:
Start Do	ite:	<u>q</u>	/9/9	1				Finish Date:	9/9/97			
First Wa	ter (bo	js): N	A	1	1			Stabilized Water	Level (bgs):	NA		
Sample Number	Blows/foot		Depth (Feet)	Recovery	USCS Symbol	Water Level	Surface El	LITHO (color, grain size	Casing OGIC DESCI	Top Elevation: RIPTION moisture, other)	NA	Boring Abandonment/ Well Construction Details
GRUA			0 -				TOP SO					
58-14- 0-05			$\begin{array}{c} 0 \\ - \\ - \\ 1 \\ 1 \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 $				TOP 50 DARK E 80-409 sand, mo	of boring at 5.0	SRAVEL (GF avel, IO-201	?) % fine to coars	50	Coment Grout
						F	Reviewed By:	<u> </u>		Date:		

199710.061706 E: \LOGS\WARDS\S8~14

AIG ENVIRONMENTAL MANAGEMENT, INC.

Revised By:

Date:

Project:		BULK	FUE	L FA	9	Y - CRA	NG, ALASKA		0	Log	of Boring/Monitoring Well:
Boring Loco	ation:	SB-15	(SE	E FIC	5 0,	2)					SB_IS
Subcontrac	ctor an	d Equipm	ient:	AIGE	M		Log	iged By: D. S	NOW		
Sampling M	lethod:	4" AU	IGER	२			Monitoring Device	e: _		Cor	nments:
Start Date:	:	9/10/4	11				Finish Date:	9/10/97			
First Water	r (bgs):	NA					Stabilized Water	Level (bgs): 4	.40 FT.		
Sample Number	Blows/foot	Depth (Feet)	Recovery	USCS Symbol	Water Level	Surface El	Levation: NA LITHOL (color, grain size,	Casing To OGIC DESCR consistency, r	op Elevation: IPTION noisture, other)	NA	Boring Abandonment/ Well Construction Details
						DARK E 80-909 sand, ma Bottom	BROWN SANDY 6 8 subrounded gr olst	5RAVEL (6P) avel, 10-20%	fine to coars	50	Coment Grout
					F	Reviewed By:	c		Date:		

Boring Location: SB-16 (SEE FIGU 2) SB-16 Subcontractor and Equipment: AIGEM Logged By: D. SNOW Comments: Sampling Method: 4" AUGER Monitoring Device: - Comments: Start Date: 9/4/97 Finish Date: 9/4/97 Finish Date: 9/4/97 First Water (bgs): NA Stabilized Water Level (bgs): 4.65 FT. Boring Abandonment/ Well Construction Details Boring Abandonment/ Surface Elevation: NA Casing Tap Elevation: NA Boring Abandonment/ UITHOLOGIC DESCRIPTION Well Construction Details Well Construction Details Boring Abandonment/ 0 0 0 DARK BROWN SANDY GRAVEL (GP) Comment Score Boring Abandonment 0 0 0 0 Connent Score Connent Score Boring Abandonment 0 0 0 0 Colore Connent Score Connent Score Boring Abandonment/ 0 0 0 0 Colore Connent Score Boring Abandonment/ 0 0 0 0 Connent Score Connent Score Boring Abandonment/	Project: BULK FUEL FACILITY - C	RAIG, ALASKA	Log of Boring/Monitoring Well:
Subcontractor and Equipment: AIGEM Lagged By: D. SNOW Comments: Sampling Method: 4" AUGER Monitoring Device: - Comments: Start Date: q/q/qT Finish Date: q/q/qT First Water (bgs): NA Stabilized Water Level (bgs): 4.65 FT. Boring Abandonment/ Well Construction Details Surface Elevation: NA Casing Top Elevation: NA Boring Abandonment/ Well Construction Details Surface Elevation: Surface Elevation: NA Boring Abandonment/ Well Construction Details Surface Elevation: Surface Elevation: NA Boring Abandonment/ UTHOLOCIC DESCRIPTION Color Color Construction Details Surface Elevation: NA Cosing rain size, consistency, moisture, other) Construction Details UTHOLOCIC DESCRIPTION Color Color Construction Details UTHOLOCIC DESCRIPTION Color Color Construction Details UTHOLOCIC DESCRIPTION Color Color Color UTHOLOCIC DESCRIPTION Color Color <t< td=""><td>Boring Location: SB-16 (SEE FIGU 2)</td><td></td><td></td></t<>	Boring Location: SB-16 (SEE FIGU 2)		
Sompling Method: 4" AUGER Monitoring Device: - Comments: Start Date: q/q/qT Finish Date: q/q/qT First Water (bqs): NA Stabilized Water Level (bqs): 4,65 FT. Boring Abandonment/ Boring Abandonment/ Surface Elevation: NA Costing Top Elevation: NA Boring Abandonment/ Boring Abandonment/ Surface Elevation: NA Costing Top Elevation: NA Boring Abandonment/ Boring Abandonment/ Stabilized Water Level (bqs): 4,65 FT. Well Construction Details Boring Abandonment/ Stabilized Water Level (bqs): Action: NA Boring Abandonment/ Boring Abandonment/ Well Construction Details Comments: Boring Abandonment/ Well Construction Details Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Well Construction Details Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Well Construction Details Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ Boring Abandonment/ <	Subcontractor and Equipment: AIGEM	Logged By: D. SNOW	
Start Date: 4/4/4T Finish Date: 4/4/4T First Water (bgs): NA Stabilized Water Level (bgs): 4.65 FT. Boring Abandonment/ Well Construction Details Well Construction Details Color, grain size, consistency, moisture, other) Well Construction Details Image: Start Date: Image: Stabilized Water Level (bgs): A.65 FT. Image: Stabilized Water Level (bgs): A.65 FT. Well Construction Details Image: Stabilized Water Level (bgs): Image: Stabilized Water Level (bgs): Gravel (color, grain size, consistency, moisture, other) Image: Stabilized Water Level (bgs): Color, grain size, consistency, moisture, other) Well Construction Details Image: Stabilized Water Level (bgs): Gravel (color, grain size, consistency, moisture, other) Image: Stabilized Water Level (bgs): Gravel (color, grain size, consistency, moisture, other) Image: Stabilized Water Level (bgs): Gravel (color, grain size, consistency, moisture, other) Image: Stabilized Water Level (bgs): Gravel (color, grain size, consistency, moisture, other) Image: Stabilized Water Level (bgs): Gravel (color, gravel, IO-20% fine to coarse Image: Stabilized Water Level (bgs): Gravel (color, gravel (color, gravel, IO-20% fine to coarse Image: Stabilized Water Level (bgs): Gravel (color, gravel (col	Sampling Method: 4" AUGER	Monitoring Device: -	Comments:
First Water (bgs): NA Stabilized Water Level (bgs): 4.65 FT. add by the stabilized Water Level (bgs): 4.65 FT. Surface Elevation: NA Boring Abandonment/ add by the stabilized Water Level (bgs): 4.65 FT. Surface Elevation: NA Boring Abandonment/ add by the stabilized Water Level (bgs): 4.65 FT. Surface Elevation: NA Boring Abandonment/ add by the stabilized Water Level (bgs): 4.65 FT. Surface Elevation: NA Boring Abandonment/ add by the stabilized Water Level (bgs): 4.65 FT. Surface Elevation: NA Boring Abandonment/ add by the stabilized Water Level (bgs): 4.65 FT. Surface Elevation: NA Boring Abandonment/ add by the stabilized Water Level (bgs): 4.65 FT. Surface Elevation: NA Boring Abandonment/ add by the stabilized Water Level (bgs): 50 FT. DARK BROWN SANDY GRAVEL (GP) Sufface Subrounded gravel, IO-20% Fine to coarse sand, molst add by the stabilized Water Level (bgs): 1 FT. Good to the stabilized Water Level (bgs): 4.65 FT. FT. add by the stabilized Water Level (bgs): 50 FT. DARK BROWN SANDY GRAVEL (GP) Sufface Subrounded gravel, IO-20% Fine to coarse FT. add by the stabilized Water Level (bgs): 50 FT. Good to the stabilized Water Level (bgs): 50 FT. FT. Sufface Autor Subrounded gravel, IO-20% Fine to coarse add by the stabilized Water Level (bgs): 50 FT. Good to the stabilized Water Level (bgs): 50 FT. FT. <	Start Date: 9/9/97	Finish Date: 9/9/97	_
and burger to and burger to burger Main the to coarse burger Booktrilled will fill coating Image: term of the top of the to	First Water (bgs): NA	Stabilized Water Level (bgs): 4.65 FT.	
0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.00000 0.000000	Sample Number Blows/foot Depth (Feet) Recovery USCS Symbol Water Level	Elevation: NA Casing Top Elevation: NA LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)	Boring Abandonment/ Well Construction Details
Sp-16- 40-45 4 - <t< td=""><td>BB-16- 4.0-45 0</td><td>K BROWN SANDY GRAVEL (GP) 10% subrounded gravel, 10-20% fine to coarse , moist</td><td>Coment Grout</td></t<>	BB-16- 4.0-45 0	K BROWN SANDY GRAVEL (GP) 10% subrounded gravel, 10-20% fine to coarse , moist	Coment Grout

AIG ENVIRONMENTAL MANAGEMENT, INC.

Revised By:

159710.061701 E: \LOCS\WARDS\SB-16

Date:

Bering Location: SPI-TI (SEE FIGU. 2) Suborhadrotion one forkment: AGEM Suborhadrotion one forkment: AGEM Sampling Method: 4 AUCER Start Uote: 94/0471 First Water (bap) NA Start Uote: 94/0471 Comments: Start Uote: 94/0471 First Water (bap) NA Start Uote: 94/0471 Comments: Bart Water (bap) NA Start Uote: 94/0471 Start Uote: 94	Boring Location: SB-17 (SEE FIGU. 2)	
Subcontractor and Equipment: ALGEM Itaged By: D, SNCM Convents Start Date: 4/6/47 Frish Date: 4/6/47 First Water (bp): NA Stabilized Water Level (bp): NA Boring Abondonment// Well Construction Details By: gring Wellow (bp): NA Stabilized Water Level (bp): NA Boring Abondonment// Well Construction Details By: gring Wellow (bp): NA Stabilized Water Level (bp): NA Boring Abondonment// Well Construction Details By: gring Wellow (bp): NA Total Stabilized Water Level (bp): NA Boring Abondonment// Well Construction Details By: gring Wellow (bp): NA Total Stabilized Water Level (bp): NA Boring Abondonment// Well Construction Details By: gring Wellow (bp): NA Total Stabilized Water Level (bp): NA Boring Abondonment// Well Construction Details By: gring Wellow (bp): Stabilized Water Level (bp): Stabi		_17
Sampling Method: 4 Au/GER Monitoring Device: Comments: Stort Date: q46/47 Finish Date: q46/47 Finish Date: q46/47 Stabilized wither Level (bg): NA Boring Abandonment/ Well Construction Details Image: Stabilized wither Level (bg): NA Casing Top Devotion: NA Image: Stabilized wither Level (bg): NA Boring Abandonment/ Well Construction Details Image: Stabilized wither Level (bg): NA Casing Top Devotion: NA Image: Stabilized with Level (bg): NA Casing Top Devotion: NA Image: Stabilized with Level (bg): NA Casing Top Devotion: NA Image: Stabilized with Level (bg): NA Casing Top Devotion: NA Image: Stabilized with Level (bg): DARK BROWN SANCY GRAVEL (GP) Comments: Comments: Image: Stabilized with Level (bg): Image: Stabilized with Method Devoting at 450 ft. Image: Stabilized with Method Devoting at 450 ft. Image: Stabilized with Method Devoting at 450 ft. Image: Stabilized with Image: Stabili	Subcontractor and Equipment: AIGEM Logged By: D. SNOW	
Stort Date: q/6/qT Finish Date: q/6/qT Finish Date: q/6/qT Finish Date: lawl (bg): NA Boring Abandonment/ Well Construction Details	Sampling Method: 4" AUGER Monitoring Device: - Comments:	
Frail Water (bg): NA Sublicited Water Level (bg.): NA Bage of the second seco	Start Date: 9/6/97 Finish Date: 9/6/97	
Borng Tool	First Water (bgs): NA Stabilized Water Level (bgs): NA	
90 0	And Well Constr And Casing Top Elevation: NA Boring Ab And Well Constr And Casing Top Elevation: NA Boring Ab And Well Constr And Casing Top Elevation: NA Boring Ab And Well Constr And Casing Top Elevation: NA Boring Ab	oandonment/ ruction Details
	98-17- 33-40 0 <t< td=""><td>Backfilled with Fill Cutting</td></t<>	Backfilled with Fill Cutting

199710.061653 E: \LOGS\WARDS\S8-17

AIG ENVIRONMENTAL MANAGEMENT, INC.

Revised By

~

Date:

Project:		B	ULK	FUE	EL FA	<u>c ''</u>	Y - CRA	IG, ALASK	(A		Log	of Boring/Monitoring Well:
Boring	Location	1: 5	B-18) (SI	EE FI	SU	2)			U		SB-18
Subcon	tractor	and E	quipm	ent:	AIGE	M		T	Logged By: D. SNC	2M		
Samplin	g Meth	od: 4	" AU	GEF	२			Monitoring I	Device: _		Com	ments:
Start D	art Date: 9/10/97 Finish Date: 9/10/97				art Date: 9/10/97 Finish Date: 9/10/97							
First Wo	iter (be)s): N.	A					Stabilized W	Vater Level (bgs): 1.60	<u>2 FT.</u>		
mbe			et)		pol	-	Surface El	evation: N⁄	Casing Top	Elevation: NA		Boring Abandonment/
e Nr	/fool		(Fe	ery	Sym	Leve		LIT	HOLOGIC DESCRIPT	TON		Well Construction Details
dma	lows		epth	ecov	scs	oter		(color, grain	size, consistency, moi	sture, other)		
Ň			0	æ		3						
58-18- 2.5-3.0			$\begin{array}{cccccccccccccccccccccccccccccccccccc$				DARK E 80-90% sand, ma	of boring a	DY GRAVEL (GP) d gravel, 10-20% fil t 3.00 ft.	ne to coarse		Coment Grout

Reviewed By: Revised By:

Date:

Project:		E	ULK	FUE	LFA	<u>()</u>	Y - CRA	NG, ALASK	A				Log of	Boring/Monitoring Well:
Boring L	ocation	1: S	B-19	(SE	E FIC	SUI	2)				0			SB-19
Sameling	OCIOP	and E	dribu Maria	ient:	AIGE	M		Maniforing P	Logged	By: D. SN	IOW			
Start Da	te	d 		GEI 17	<u> </u>			Finish Date:		10/07			Comme	nts:
First Wat	ter (bo	ns): N	<u>A</u>	11				Stabilized W	ater Leve	(bos): NA				
e							Surface El	levation: NA		Casina Ton	Elevation:	NA		Paring Abandana I (
de Numb	s/foot		h (Feet)	very	Symbol	r tevel		LIT	HOLOGI		PTION		w	ell Construction Details
Samp	Blow		Dept	Reco	nsc:	Wate		(color, grain	size, con	isistency, m	oisture, othe	нг) 		
58-14- 25-3.0			$\begin{array}{cccccccccccccccccccccccccccccccccccc$				DARK E 80-90% sand, ma Bottom	of boring at	27 GRA 2 grave	VEL (GP) I, IO-20%	fine to cod	2°30		Coment Grout
							eviewed By	•		··	Date			

AIG ENVIRONMENTAL MANAGEMENT, INC.

199710.061644 E: \LOCS\WARDS\SB-19

Reviewed By: ___

Revised By:

Date: _ Date: _____

Boring Location	: SB	-20	(SFF F		-1			and the second se	and the second se		,
	or and Equipment: AIGEM								U		SB_20
Subcontractor (and Equ	ipmen	I: AIGE	M			Logged B	D. SNOM	۷		50-20
Sampling Metho	od: 4"	AUG	ER			Monitoring I	Device: -			Com	iments:
Start Date:	9/10	0/97				Finish Date:	9/1	0/97			
First Water (bg	<u>s): NA</u>	·				Stabilized W	later Level ((bgs): NA			
Sample Number Blows/foot		Depth (Feet) Recovery	USCS Symbol	Water Level	Surface El	evation: NA L17 (color, grain	HOLOGIC size, consis	DESCRIPTIC	evation: NA DN ure, other)		Boring Abandonment/ Well Construction Details
58-20- 25-3.0	0 1 2 3 4 5 6 7 7 8 9 9 10				Bottom	of boring of	DY GRAVI d gravel, i t 3.00 Pt.	EL (GP) 10-20% fine	e to coarse		Backfilled with Fill Cutting

199710.061646 E: \LOCS\WARDS\SB-20

Reviewed By: _

Revised By:

......

Project:		В	ULK	FVE	LFA		Y - CRA	NG, ALASKA			Log	of Boring/Monitoring Well:
Boring L	ocation	n: 5 and E	B-2	(Si		SU	2)					SB-21
Sampling	1 Meth	ond E		GFI	AIGE	.[*]		Monitoring Devic	gged By: D. SN		Cor	nmente:
Start Do	ite:	9	/10/	17	<u> </u>		.1.	Finish Date:	a/10/97	<u></u>		innerrta.
First Wa	irst Water (bgs): NA							Stabilized Water	Level (bgs): N4	4		
ole Number	s/foot		h (Feet)	very	s Symbol	r Level	Surface El	levation: NA LITHOL	Casing Top OGIC DESCRIF	Elevation: N	A	Boring Abandonment/ Well Construction Details
Samp	Blow		o Dept	Reco	nsce	Wate		(color, grain size	, consistency, m	oisture, other)		
58-21- 25-3.0			$\begin{array}{cccccccccccccccccccccccccccccccccccc$				DARK E 80-90% sand, ma Bottom	BROWN SANDY of subrounded groist	SRAVEL (GP) avel, 10-20%	fine to coars		Coment Grout
						F	eviewed Rv	r —		Date		

199710.061647 E: \LOGS\WARDS\SB~21

Reviewed By: Revised By:

:

ATTACHMENT 3:

COPIES OF CERTIFIED LABORATORY ANALYTICAL REPORTS

Client: Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-1 09/09/97 09/17/97 Aqueous	
Project: Wards Cove / Craig	Sample Descript	tion:	
Project Number: Collected by: D. Snow/D. Imperato	Analyzed: Method:	Bay Water 09/22/97 See Below	
CONSTITUENT	PQL*	RESULT*	*
	ug/L	ug/L	
Benzene	0.5	ND	
Toluene	0.5	ND	
Ethylbenzene	0.5	ND	
Xylenes	0.5		
Methyl-t-Butyl Ether (MTBE)	0.5	ND	
Percent Surrogate Recovery		100	
TOTAL PETROLEUM HYDROCARBONS			
Gasoline	50.	ND	
STX as a Percent of Fuel		N/A	

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-1.xls JMM/jgt/mh

		REPORT OF ANALYTICAL RES
Client: Darryl Snow	Lab Number:	12211-2
AIG Environmental Management	Collected:	09/09/97
2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
San Francisco, CA 94105	Matrix:	Aqueous
Project: Wards Cove / Craig	Sample Descript	tion:
Project Number		Air Stripper Piping
Project Number;	Analyzed:	09/23/97
D. Snow/D. Imperato	Method:	See Below
ONSTITUENT	PQL*	BESULT**
	ug/L	ug/L
Senzene		
Foluene	0.5	4.6
thylbenzene	0.5	0.5
(vienes	0.5	0.9
Aethyl-t-Butyl Ether (MTRE)	0.5	0.9
	0.5	ND
ercent Surrogate Recovery		94
OTAL PETROLEUM HYDROCARBONS		
asoline	50.	210.
TX as a Percent of Fuel		3

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #1 12211-2.xls JMM/jgt/mh

	en rotechnolog	У	REPORT OF ANALYTICAL RESULT
Client:	Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor	Lab Number: Collected: Received:	12211-3 09/09/97 09/17/97
	San Francisco, CA 94105	Matrix:	Aqueous
Project:	Wards Cove / Craig	Sample Descrip	tion:
Project N Collected	lumber: I by: D. Snow/D. Imperato	Analyzed: Method:	Surface Water Air Stripper 09/23/97 See Below
CONSTIT	FUENT	PQL*	RESULT**
		սց/Լ	ug/L
Benzene		0.5	ND
Toluene		0.5	ND
Ethylbena	zene	0.5	ND
Xylenes		0.5	ND
Methyl-t-	Butyl Ether (MTBE)	0.5	ND
Percent S	Surrogate Recovery		103
TOTAL P	ETROLEUM HYDROCARBONS		
Gasoline		50.	ND
BTX as a	Percent of Fuel		N/A
ZymaX er	nvirotechnology, inc. is certified by CA Departm	ent of Health Servi	ces: Laboratory #1717

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-3.xls JMM/jgt/mh/wj

Client: Darryl Snow	Lab Number:	12211 4
AIG Environmental Management	Collected:	00/11/07
2 Rincon Ctr., 121 Spear St., 3rd Floor	Beceived:	09/11/97
San Francisco, CA 94105	Matrix:	Soil
Project: Wards Cove / Craig	Sample Description	:
		SB1: 0'-0.5'
Project Number:	Analyzed:	09/21/97
Collected by: D. Snow/D. Imperato	Method:	See Below
CONSTITUENT	PQL*	
	mg/kg	mg/kg
Senzene	0.005	
Toluene	0.005	ND
Ethylbenzene	0.005	ND
(vlenes	0.005	ND
Methyl-t-Butyl Ether (MTBE)	0.005	ND ND
Percent Surrogate Recovery		
		100
TOTAL PETROLEUM HYDROCARBONS		
Gasoline	10.	ND
STX as a Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-4.xls JMM/jgt/mh/kh

Client:	Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-5 09/11/97 09/17/97 Soil
Project:	Wards Cove / Craig	Sample Descript	ion:
Project N Collected	lumber: I by: D. Snow/D. Imperato	Analyzed: Method:	SB2: 0'-0.5' 09/21/97 See Below
CONSTIT	TUENT	PQL* mg/kg	RESULT** mg/kg
Benzene Toluene Ethylbenz Xylenes Methyl-t-	zene Butyl Ether (MTBE)	0.005 0.005 0.005 0.005 0.005	ND ND ND ND
Percent S	Surrogate Recovery		99
TOTAL P	ETROLEUM HYDROCARBONS		
Gasoline		10.	ND
BTX as a	Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-5.xls JMM/jgt/mh/kh

Client: Darryl Snow	Lab Number:	12211.0
AIG Environmental Management	Collected:	12211-0
2 Rincon Ctr., 121 Spear St., 3rd Floor	Beceived:	09/11/97
San Francisco, CA 94105	Matrix:	09/17/97
		Soll
Project: Wards Cove / Craig	Sample Description:	
• • • • •	SB	3: 0'-0.5'
Project Number:	Analyzed: 09/	21/97
Collected by: D. Snow/D. Imperato	Method: See	Below
CONSTITUENT	POI +	DECIUTA
	ma/ka	RESULT**
		mg/kg
3enzene	0.005	ND
Toluene	0.005	ND
Ethylbenzene	0.005	
Xylenes	0.005	ND
Methyl-t-Butyl Ether (MTBE)	0.005	
	0.003	ND
Percent Surrogate Recovery		99
TOTAL PETROLEUM HYDROCARBONS		
Gasoline	10.	ND
TX as a Percent of Fuel		N/Δ

VIDAOV

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-6.xls JMM/jgt/mh/kh

	en rotechnolog	У	REPORT OF ANALYTICAL RESUL
Client:	Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-7 09/10/97 09/17/97 Soit
Project:	Wards Cove / Craig	Sample Description	on:
Project N Collected	Number: d by: D. Snow/D. Imperato	Analyzed: Method:	SB4: 0.5'-1' 09/21/97 See Below
CONSTI	TUENT	PQL* mg/kg	RESULT** mg/kg
Benzene		0.005	ND
Toluene		0.005	NB
Ethylben:	zene	0.005	NP
(ylenes		0.005	ND
/ietnyi-t-	Butyl Ether (MTBE)	0.005	ND
Percent S	Surrogate Recovery		112
TOTAL P	ETROLEUM HYDROCARBONS		
Gasoline		10.	ND
STX as a	Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-7.xls JMM/jgt/mh/kh

Client:	Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-8 09/10/97 09/17/97 Soil
Project:	Wards Cove / Craig	Sample Descript	ion:
Project N Collected	lumber: I by: D. Snow/D. Imperato	Analyzed: Method:	SB4: 2.5'-3' 09/24/97 See Below
CONSTIT	UENT	PQL* mg/kg	RESULT** mg/kg
Benzene		0.1	ND
Toluene		0.1	ND
cunyidenz Xvlanas	zene	0.1	ND
Methyl-t-	Butyl Ether (MTBE)	0.1	ND ND
Percent S	Surrogate Recovery		97
TOTAL P	ETROLEUM HYDROCARBONS		
Gasoline		10.	ND
BTX as a	Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

Jehn MacMurphey **Laboratory Director**

MSD #1 12211-8.xls JMM/jgt/mh/ds

			REPORT O	F ANALYTICAL RE
Client:	Darryl Snow	Lab Number:		12211-9
	AIG Environmental Management	Collected:		09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:		09/17/97
	San Francisco, CA 94105	Matrix:	·	Aqueous
Project:	Wards Cove / Craig	Sample Descript	tion:	
			SB4	
Project N	umber:	Analyzed:	09/23/97	
Sollected	by: D. Snow/D. Imperato	Method:	See Below	
CONSTIT	UENT	PQL*		RESULT * *
	2:	ug/L	·	ug/L
Benzene		0.5		ND
Toluene		0.5		ND
Ethylbenz	ene	0.5		
Xylenes		0.5		2.8
Methyl-t-l	Butyl Ether (MTBE)	0.5		ND
Percent S	urrogate Recovery			105
TOTAL PE	ETROLEUM HYDROCARBONS			
Gasoline		50.		ND
BTX as a	Percent of Fuel			N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

7vm v

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-9.xis JMM/jgt/mh/wj

	en rotechnolog	IY (REPORT OF ANALYTICAL RESU
Client:	Darryl Snow	Lab Number:	12211-10
	AIG Environmental Management	Collected:	09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
	San Francisco, CA 94105	Matrix:	Soil
Project:	Wards Cove / Craig	Sample Descript	tion:
			SB5: 0.5'-1'
Project N	lumber:	Analyzed:	09/24/97
Collected	by: D. Snow/D. Imperato	Method:	See Below
CONSTIT	TUENT	PQL*	RESULT**
		mg/kg	mg/kg
Benzene		0.1	ND
Toluene		0.1	ND
Ethylbenz	zene	0.1	ND
Xylenes		0.1	ND
Methyl-t-	Butyl Ether (MTBE)	0.1	ND
Percent S	Surrogate Recovery		98
TOTAL P	ETROLEUM HYDROCARBONS		
Gasoline		10.	ND
BTX as a	Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-10.xls JMM/jgt/mb/ds

Client:	Darryl Snow	Lab Number:	12211-	11
	AIG Environmental Management	Collected:	09/10/9	17
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/9	7
	San Francisco, CA 94105	Matrix:	Soil	
Project:	Wards Cove / Craig	Sample Descript	ion:	
			SB5: 2.5'-3'	
Project N	lumber:	Analyzed:	09/21/97	
Collected	by: D. Snow/D. Imperato	Method:	See Below	
CONSTI	FUENT	PQL*	RI	ESULT**
		mg/kg	-···	mg/kg
lenzene		0.005		ND
foluene		0.005		
thylben	zene	0.005		
Kylenes		0.005		
Aethyl-t-	Butyl Ether (MTBE)	0.005		ND
Percent S	Surrogate Recovery			97
OTAL P	ETROLEUM HYDROCARBONS			
asoline		10.		ND
TX as a	Percent of Fuel			N/A

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 *PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

7vma¥ ____

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-11.xls JMM/jgt/mh/kh

	en rotechnolog	y (REPORT O	F ANALYTICAL RESU
Client:	Darryl Snow	Lab Number:	······································	12211-12
	AIG Environmental Management	Collected:		09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:		09/17/97
	San Francisco, CA 94105	Matrix:		Aqueous
Project:	Wards Cove / Craig	Sample Descript	tion:	
			SB5	
Project N	lumber:	Analyzed:	09/24/97	
Collected	D. Snow/D. Imperato	Method:	See Below	
CONSTIT	TUENT	PQL*		RESULT**
		ug/L		ug/L
Benzene		1.0		ND
Toluene		1.0		ND
Ethylben:	zene	1.0		ND
Xylenes		1.0		
Methyl-t-	Butyl Ether (MTBE)	1.0		
				ND
	Surrogate Recovery			107
TOTAL P	ETROLEUM HYDROCARBONS			
Gasoline		100.		ND
BTX as a	Percent of Fuel			N/A

-

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-12.xls JMM/jgt/mh/wj

			REPORT OF ANALYT	CAL RES
Client:	Darryl Snow	Lab Number:	12211-1;	3
	AIG Environmental Management	Collected:	09/10/97	-
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97	,
	San Francisco, CA 94105	Matrix:	Soil	
Project:	Wards Cove / Craig	Sample Descript	ion:	
	lumb ou		SB6: 0.5'-1'	
Project P	iumber:	Analyzed:	09/21/97	
Collected	D. Snow/D. Imperato	Method:	See Below	
CONSTI	TUENT	PQL*	RES	SULT**
<u></u>		mg/kg	n	ng/kg
Benzene		0.005		
Toluene		0.005		ND
Ethylben	zene	0.005		
Kylenes		0.005		ND
viethyl-t-	Butyl Ether (MTBE)	0.005		ND
-		0.000		ND
Percent \$	Surrogate Recovery			113
TOTAL P	ETROLEUM HYDROCARBONS			
Gasoline		10.		ND
BTX as a	Percent of Fuel			N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-13.xls JMM/jgt/mh/kh

Client: Darryl Snow AlG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-14 09/10/97 09/17/97 Soil
Project: Wards Cove / Craig Project Number: Collected by: D. Snow/D. Imperato	Sample Descript Analyzed: Method:	ion: SB6: 2.5'-3' 09/21/97 See Below
CONSTITUENT	PQL* mg/kg	RESULT** mg/kg
Benzene Toluene Ethylbenzene Xylenes Methyl-t-Butyl Ether (MTBE)	0.005 0.005 0.005 0.005 0.005	ND ND ND ND ND
Percent Surrogate Recovery		91
TOTAL PETROLEUM HYDROCARBONS		
Gasoline	10.	ND
STX as a Percent of Fuel		N/A

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 *PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

7vma¥ ____

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #1 12211-14.xls JMM/jgt/mh/kh

Client: Darryl Snow AlG Environmental 2 Rincon Ctr., 121 San Francisco, CA	Management Spear St., 3rd Floor 94105	Lab Number: Collected: Received: Matrix:		12211-15 09/10/97 09/17/97 Aqueous
Project: Ware	ds Cove / Craig	Sample Descript	ion:	
Project Number: Collected by: D. S	now/D. Imperato	Analyzed: Method:	SB6 09/24/97 See Below	
CONSTITUENT		PQL*		RESULT**
<u> </u>		ug/L		ug/L
Benzene		1.0		7 3
Toluene		1.0		7.3
Ethylbenzene		~ 1.0		3.9
Kylenes		1.0		7 1
Methyl-t-Butyl Ether (MTBE)		1.0		3.1
Percent Surrogate Recovery				108
TOTAL PETROLEUM HYDRO	CARBONS			
Gasoline		100.		1000.
STX as a Percent of Fuel				2

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #1 12211-15.xis JMM/jgt/mh/wj

Client:	Darryl Snow	Lab Number:	122	211-16
	AIG Environmental Management	Collected:	09/	10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/	17/97
	San Francisco, CA 94105	Matrix:	Soil	
Project:	Wards Cove / Craig	Sample Descript	ion:	
D	Marine R. J. J.		SB7: 2.5'-3'	
Project i	Number:	Analyzed:	09/21/97	
Collecte	d by: D. Snow/D. Imperato	Method:	See Below	
CONSTI	TUENT	PQL*	······································	RESULT**
		mg/kg		mg/kg
Benzene		0.005		ND
Toluene		0.005		ND
Ethylben	zene	0.005		
Xylenes		0.005		ND
Methyl-t	-Butyl Ether (MTBE)	0.005		ND
Percent	Surrogate Recovery			101
TOTAL F	PETROLEUM HYDROCARBONS			
Gasoline		10.		ND
BTX as a	Percent of Fuel			N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

VmaY

~

Submitted by, ZymaX envirotechnology, inc.

U John MacMurphey Laboratory Director

MSD #1 12211-16.xis JMM/jgt/mh/kh

Client:	Darryl Snow AIG Environmental Management	Lab Number:		12211-17
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:		09/10/97 09/17/97
_	San Francisco, CA 94105	Matrix:		Aqueous
Project:	Wards Cove / Craig	Sample Descript	ion:	
Project N Collected	Number: d by: D. Snow/D. Imperato	Analyzed: Method:	SB7 09/23/97 See Below	
CONSTI	TUENT	PQL*		RESULT**
		ug/L		ug/L
Benzene		0.5		ND
Toluene		0,5		ND
Ethylben	zene	0.5		ND
Kylenes		0.5		ND
/lethyl-t-	Butyl Ether (MTBE)	0.5		ND
Percent (Surrogate Recovery			105
ΓΟΤΑL Ρ	ETROLEUM HYDROCARBONS			
Gasoline		50.		ND
STX as a	Percent of Fuel			N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-17.xls JMM/jgt/mh

Client:	Darryl Snow	Lab Number:	12211-18
	AIG Environmental Management	Collected:	09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
	San Francisco, CA 94105	Matrix:	Soil
Project:	Wards Cove / Craig	Sample Descript	tion:
			SB9: 0.5'-1'
Project N	lumber:	Analyzed:	09/24/97
Collected	by: D. Snow/D. Imperato	Method:	See Below
CONSTI	TUENT	PQL*	RESULT**
		mg/kg	mg/kg
Benzene		0.1	NO
Foluene		0.1	ND
thylben	zene	0.1	ND
Kylenes		0.1	UN
Nethyl-t-	Butyl Ether (MTBE)	0.1	2.9
		0.1	ND
'ercent S	Surrogate Recovery		93
OTAL P	ETROLEUM HYDROCARBONS		
asoline		10.	100.
TX as a	Percent of Fuel		3

7vm v

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-18.xls JMM/jgt/mh/ds

				ANALY TICAL RES
Client:	Darryl Snow	Lab Number:		12211-19
	AIG Environmental Management	Collected:		09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:		09/17/97
	San Francisco, CA 94105	Matrix:		Soil
Project:	Wards Cove / Craig	Sample Descript	tion:	
	to and a second		SB9: 2.5'-3	•
Project N		Analyzed:	09/24/97	
ollected	D. Snow/D. Imperato	Method:	See Below	
CONSTI	TUENT	PQL*		RESULT**
		mg/kg		mg/kg
Benzene		0.1		
Toluene		0.1		ND
Ethvlben	zene	0.1		0.3
Kylenes		0.1		0.6
viethvl-t-	Butyl Ether (MTBF)	0.1		11.
, ,		0.1	<u>.</u>	ND
Percent S	Surrogate Recovery			98
TOTAL P	ETROLEUM HYDROCARBONS			
Gasoline		10.		200.
STX as a	Percent of Fuel			6

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-19.xls JMM/jgt/mh/ds
ZymaX	enTrotechnology	y (REPORT O	F ANALYTICAL RESU
Client: Darryl Snow AIG Environmenta 2 Rincon Ctr., 121 San Francisco, CA	l Management Spear St., 3rd Floor 94105	Lab Number: Collected: Received: Matrix:		12211-20 09/10/97 09/17/97 Aqueous
Project: War Project Number: Collected by: D. S	ds Cove / Craig	Sample Descrip	tion: SB9 09/24/97	
CONSTITUENT		PQL* ug/L	See Below	RESULT**
Benzene Toluene Ethylbenzene Xylenes Methyl-t-Butyl Ether (MTBE)		2.0 2.0 2.0 2.0 2.0 2.0		2.9 13. 25. 240. ND
Percent Surrogate Recovery				102
TOTAL PETROLEUM HYDRC	CARBONS			
Gasoline		200.		2000.
3TX as a Percent of Fuel				13

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-20.xls JMM/jgt/mh/wj

ZymaX	enGrotechnology
-------	-----------------

	Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-21 09/10/97 09/17/97 Soil
Project: Project Nu Collected b	Wards Cove / Craig mber: by: D. Snow/D. Imperato	Sample Descript Analyzed: Method:	tion: SB10: 0.5'-1' 09/25/97 See Below
CONSTITU	ENT	PQL* mg/kg	RESULT** mg/kg
Benzene		0.1	
Toluene		0.1	0.5
Ethylbenze	ne	0.1	0.3
Xylenes		0.1	2.4
Methyl-t-Bı	utyl Ether (MTBE)	0.1	ND
Percent Su	rrogate Recovery		93
TOTAL PET	ROLEUM HYDROCARBONS		
Gasoline		10.	500.
BTX as a P	ercent of Fuel		<1

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 *PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

Sohn MacMurphey Laboratory Director

MSD #1 12211-21.xls JMM/jgt/mh/ds

San Luis Obispo, California 93401

Client:	Darryl Snow	Lab Number:	12211-22
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Collected:	09/10/97
	San Francisco, CA 94105	Matrix:	Soil
Project:	Wards Cove / Craig	Sample Descrip	tion:
Project N	Number:	Analyzed:	SB10: 2.5'-3' 09/26/97
Collected	d by: D. Snow/D. Imperato	Method:	See Below
CONSTI	TUENT	PQL*	RESULT**
		mg/kg	mg/kg
Benzene		0.1	ND
Toluene		0.1	ND
Ethylben	zene	0.1	0.1
Xylenes		0.1	0.8
Methyl-t-	-Buty! Ether (MTBE)	0.1	ND
Percent S	Surrogate Recovery		97
TOTAL P	PETROLEUM HYDROCARBONS		
Gasoline		10.	100.
BTX as a	Percent of Fuel		<1

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

VmaY

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-22.xls JMM/jgt/mh/mh

	en rotechnolog	і <u>у</u> (F ANALYTICAL RESULT
Client:	Darryl Snow	Lab Number:		12211-23
	AIG Environmental Management	Collected:		09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:		09/17/97
	San Francisco, CA 94105	Matrix:	· · · · · · · · · · · · · · · · · · ·	Aqueous
Project:	Wards Cove / Craig	Sample Descript	tion:	
			SB10	
Project I	Number:	Analyzed:	09/24/97	
Collecte	d by: D. Snow/D. Imperato	Method:	See Below	
CONST	TUENT	PQL*		RESULT**
L	· ····································	ug/L		ug/L
Benzene		2.0		32.
Toluene		2.0		29.
Ethylben	zene	2.0		9.9
Xylenes		2.0		58.
Methyl-t	-Butyl Ether (MTBE)	2.0		ND
Percent	Surrogate Recovery			111
TOTAL F	PETROLEUM HYDROCARBONS	······		
Gasoline		200.		3000.
BTX as a	Percent of Fuel			4

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

wm o V

Submitted by, ZymaX envirotechnology, inc.

Yohn MacMurphey

Laboratory Director

MSD #1 12211-23.xls JMM/jgt/mh/wj

Client: Darryl Snow	Lab Number:	12211-24
AIG Environmental Management	Collected:	09/10/97
2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
San Francisco, CA 94105	Matrix:	Soil
Project: Wards Cove / Craig	Sample Description:	
	SE	311: 0.5'-1'
Project Number:	Analyzed: 09	9/25/97
Collected by: D. Snow/D. Imperato	Method: Se	e Below
CONSTITUENT	PQL*	RESULT**
	mg/kg	mg/kg
Benzene	0.1	ND
Toluene	0.1	
thylbenzene	0.1	0.2
(ylenes	0.1	1.0
1ethyl-t-Butyl Ether (MTBE)	0.1	ND
ercent Surrogate Recovery		97
OTAL PETROLEUM HYDROCARBONS		
iasoline	10.	80.
TX as a Percent of Fuel		1

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-24.xis JMM/jgt/mh/ds

ZymaX	entrotechnology
	ereen ereegy

Client:	Darryl Snow	Lab Number:	12211-25
	AIG Environmental Management	Collected:	09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
<u> </u>	San Francisco, CA 94105	Matrix:	Soil
Project:	Wards Cove / Craig	Sample Descript	tion:
			SB11: 2.5'-3'
Project N	Number:	Analyzed:	09/25/97
Collected	d by: D. Snow/D. Imperato	Method:	See Below
CONSTI	TUENT	BOL +	
		PQL"	KESULI**
		nig/kg	mg/kg
Benzene		0.1	0.2
Toluene		0.1	ND
Ethylben	zene	0.1	1.5
Xylenes		0.1	8.8
Methyl-t-	-Butyl Ether (MTBE)	0.1	ND
Percent S	Surrogate Recovery		107
TOTAL P	PETROLEUM HYDROCARBONS		
Gasoline		10.	500.
BTX as a	Percent of Fuel		2

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #1 12211-25.xis JMM/jgt/mh



Client:	Darryl Snow AIG Environmental Management	Lab Number:	12	211-26
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Beceived	09	/10/97
	San Francisco, CA 94105	Matrix.	09	/1//9/
		Midtix.	Ad	ueous
Project:	Wards Cove / Craig	Sample Descrip	tion:	
Project I	Number:	Analyzed:	SB11 09/24/97	
Collecte	d by: D. Snow/D. Imperato	Method:	See Below	
CONST	TUENT	PQL*		RESULT**
		ug/L		ug/L
D		<u> </u>		
Benzene		2.0		160.
loluene		2.0		9.3
Ethylben	izene	2.0		41.
Xylenes		2.0		210.
Methyl-t	-Butyl Ether (MTBE)	2.0		ND
Percent	Surrogate Recovery			108
TOTAL F	PETROLEUM HYDROCARBONS			
Gasoline		200.		5000.
BTX as a	a Percent of Fuel			8

***PQL - Practical Quantitation Limit**

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-26.xls JMM/jgt/mh/wj



Client: Darryl Snow	Lab Number:	12211-27
AIG Environmental Management	Collected:	09/10/97
2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
San Francisco, CA 94105	Matrix:	Soil
Project: Wards Cove / Craig	Sample Descript	lon:
Project Number: Collected by: D. Snow/D. Imperato	Analyzed: Method:	SB12: 2.5'-3' 09/21/97 See Below
CONSTITUENT	PQL*	RESULT**
	mg/kg	mg/kg
Benzene	0.005	ND
Toluene	0.005	ND
Ethylbenzene	0.005	ND
Xylenes	0.005	ND
Methyl-t-Butyl Ether (MTBE)	0.005	ND
Percent Surrogate Recovery		99
TOTAL PETROLEUM HYDROCARBONS		
Gasoline	10.	ND
BTX as a Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #1 12211-27.xls JMM/jgt/mh/kh



Client:	Darryl Snow	Lab Number:	12211-28
	AIG Environmental Management	Collected:	09/09/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
	San Francisco, CA 94105	Matrix:	Soil
Project:	Wards Cove / Craig	Sample Descript	lion:
Project N	imhor		SB13: 3'-3.5'
Collected	by: D. Snow/D. Imperato	Analyzed:	09/21/97 See Below
00107171			
CONSTITU	UEN I	PQL*	RESULT**
		mg/kg	mg/kg
Benzene		0.005	ND
Toluene		0.005	ND
Ethylbenzo	ene	0.005	ND
Xylenes		0.005	ND
Methyl-t-B	Butyl Ether (MTBE)	0.005	ND
Percent So	urrogate Recovery		101
TOTAL PE	TROLEUM HYDROCARBONS		
Gasoline		10.	ND
BTX as a l	Percent of Fuel		N/A

*PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #1 12211-28.xls JMM/jgt/mh/kh

en rotechnolog	y (REPORT O	F ANALYTICAL RES
Client: Darryl Snow	Lab Number;		12211-29
AIG Environmental Management	Collected:		09/10/97
2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:		09/17/97
San Francisco, CA 94105	Matrix:		Aqueous
Project: Wards Cove / Craig	Sample Descript	tion:	
- 12		SB13	
Project Number:	Analyzed:	09/23/97	
Collected by: D. Snow/D. Imperato	Method:	See Below	
CONSTITUENT	PQL*		RESULT**
	ug/L		ug/L
Benzene	0.5		ND .
Toluene	0.5		ND
Ethylbenzene	0.5		ND
Xylenes	0.5		ND
Methyl-t-Butyl Ether (MTBE)	0.5		ND
Percent Surrogate Recovery			105
TOTAL PETROLEUM HYDROCARBONS			
Gasoline	50.		ND
STX as a Percent of Fuel			N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-29.xls JMM/jgt/mh



Client: D	arryl Snow	Lab Number:	12211-30
A	IG Environmental Management	Collected:	09/09/97
2	Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
S	San Francisco, CA 94105	Matrix:	Soil
Project:	Wards Cove / Craig	Sample Descript	tion:
			SB14: 0'-0.5'
Project Nun	nber:	Analyzed:	09/25/97
Collected by	y: D. Snow/D. Imperato	Method:	See Below
CONSTITUE	ENT	PQL*	RESULT*
		mg/kg	mg/kg
Benzene		0.005	
Toluene		0.005	ND
Ethylbenzen	ne l	0.005	ND
Xvlenes		0.005	ND
Methyl-t-Bu	tyl Ether (MTBE)	0.005	ND
Percent Sur	rogate Recovery		95
TOTAL PET	ROLEUM HYDROCARBONS		
Gasoline		10.	ND
RTX as a Po	ercent of Fuel		N1/A

*PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-30.xls JMM/jgt/mh

Client:	Darryl Snow	I ab North and		
Onone,	AIG Environmental Management	Lab Number:	12	211-31
	2 Rincon Ctr 121 Spear St 3rd Floor	Collected:	09	0/10/97
	San Francisco, CA 94105	Received;	09)/17/97
			<u> </u>	
Project:	Wards Cove / Craig	Sample Descript	ion:	
			SB14: 4.5'-5'	
Project I	Number:	Analyzed:	09/21/97	
Collecte	d by: D. Snow/D. Imperato	Method:	See Below	
CONSTITUENT		PQL*		BESULT**
		mg/kg		mg/kg
Benzene		0.005		
Foluene		0.005	12	
Ethylbenzene		0.005		ND
Cylenes		0.005		ND
Aethyl-t	-Butyl Ether (MTBE)	0.005		ND
Percent Surrogate Recovery				102
TOTAL F	PETROLEUM HYDROCARBONS			
Gasoline		10.		ND
BTX as a Percent of Fuel				N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

() John MacMurphey

Laboratory Director

MSD #1 12211-31.xls JMM/jgt/mh

ZymaX	enrotechnology
-------	----------------

Client: Da	arryl Snow	Lab Number:	12211-32
A	IG Environmental Management	Collected:	09/09/97
2	Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
San Francisco, CA 94105	Matrix:	Soit	
Project:	Wards Cove / Craig	Sample Descript	tion:
Project Num	ther.		SB15: 3.5'-4'
Collected by	/: D. Snow/D. Imperato	Analyzed:	09/25/97 See Below
CONSTITUE	INT		
CONSTITUE	.14.1	PQL*	RESULT*
		mg/kg	mg/kg
Benzene		0.1	
Toluene		0.1	
Ethylbenzen	e	0.1	
Xylenes		0.1	
Methyl-t-But	tyl Ether (MTBE)	0.1	
Percent Surr	ogate Recovery		96
TOTAL PET	ROLEUM HYDROCARBONS		
Gasoline		10.	20.
BTX as a Pe	BTX as a Percent of Fuel		N/A

*PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #1 12211-32.xls JMM/jgt/mh/ds

Client: Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-33 09/10/97 09/17/97 Aqueous
Project: Wards Cove / Craig Project Number: Collected by: D. Snow/D. Imperato	Sample Description Analyzed: Method:	on: SB15 09/23/97 See Below
CONSTITUENT	PQL* ug/L	RESULT** ug/L
Benzene Toluene Ethylbenzene Xylenes Methyl-t-Butyl Ether (MTBE)	1.0 1.0 1.0 1.0 1.0	ND ND ND ND ND
Percent Surrogate Recovery		96
TOTAL PETROLEUM HYDROCARBONS		
Gasoline	100.	ND
3TX as a Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-33.xls JMM/jgt/mh



Client: D A	arryl Snow IG Environmental Management	Lab Number: Collected:	12211-34
2	Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
S	San Francisco, CA 94105	Matrix:	Soil
Project:	Wards Cove / Craig	Sample Descript	tion:
Project Nun Collected by	nber: /: D. Snow/D. Imperato	Analyzed: Method:	SB16: 4'-4.5' 09/21/97 See Below
CONSTITUE	INT	PQL*	RESULT**
		mg/kg	mg/kg
Benzene		0.005	ND
Toluene		0.005	
Ethylbenzen	e	0.005	ND
Xylenes		0.005	ND
Methyl-t-Bu	tyl Ether (MTBE)	0.005	ND
Percent Sur	rogate Recovery		101
TOTAL PET	ROLEUM HYDROCARBONS		
Gasoline		10.	ND
BTX as a Percent of Fuel			N/A

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 *PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed POL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

Ď John MacMurphey

Laboratory Director

MSD #1 12211-34.xls JMM/jgt/mh/kh



Client:	Darryl Snow	Lab Number:		12211-35
	AIG Environmental Management	Collected:		09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:		09/17/97
	San Francisco, CA 94105	Matrix:		Δημους
				Addeoda
Project:	Wards Cove / Craig	Sample Descript	tion:	
			SB16	
Project N	Number:	Analyzed:	09/24/97	
Collected	d by: D. Snow/D. Imperato	Method:	See Below	
CONSTI	TUENT	POI *		
		rut"		RESULT**
		ug/L		ug/L
Benzene		2.0		12
Toluene		2.0		13.
Ethylben:	zene	2.0		2.4
Xylenes		2.0		4.0
Methyl-t-Butyl Ether (MTBF)		2.0		21.
	······································	2.0		ND
Percent S	Surrogate Recovery			105
TOTAL P	PETROLEUM HYDROCARBONS			
Gasoline		200.		10000.
3TX as a	Percent of Fuel			<1

***PQL - Practical Quantitation Limit**

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-35.xls JMM/jgt/mh/wj

	envirotechnolog	a y	REPORT OF ANALYTICAL RESULTS		
Client:	Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-36 09/09/97 09/17/97 Soil		
Project:	Wards Cove / Craig	Sample Description:			
Project N Collected	Number: d by: D. Snow/D. Imperato	Analyzed: Method:	SB17: 3.5'-4' 09/25/97 See Below		
CONSTI		PQL* mg/kg	RESULT** mg/kg		
Benzene		0.1	ND		
i oluene Ethylhenzene		0.1	ND		
Xvlenes		0.1	ND		
Methyl-t-	-Butyl Ether (MTBE)	0.1			
Percent \$	Surrogate Recovery		99		
TOTAL P	ETROLEUM HYDROCARBONS				
Gasoline		10.	ND		
BTX as a	Percent of Fuel		N/A		

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

VmaY

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-36.xls JMM/jgt/mh/kh

	envirotechnology		
			REPORT OF ANALYTICAL RESULT
Client:	Darryl Snow	Lab Number:	12211-37
	AIG Environmental Management	Collected:	09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
L	San Francisco, CA 94105	Matrix:	Soil
Project:	Wards Cove / Craig	Sample Descript	ion:
			SB18: 2.5'-3'
Project Ni	umber:	Analyzed:	09/25/97
Collected	by: D. Snow/D. Imperato	Method:	See Below
CONSTIT	UENT	POL+	DEC111 T++
L		mg/kg	mg/kg
Benzene		0.1	
Toluene		0.1	ND
Ethylbenz	ene	0.1	ND
Xylenes		0.1	
Methyl-t-E	Butyl Ether (MTBE)	0.1	ND
		0.1	ND
Percent Si	urrogate Recovery		100
TOTAL PE	TROLEUM HYDROCARBONS		22 22
Gasoline		10.	ND
BTX as a l	Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-37.xls JMM/jgt/mh/ds

ZymaX		
		REPORT OF ANALYTICAL RESULTS
Client: Darryl Snow	Lab Number:	12211-38
AIG Environmental Management	Collected:	09/10/97
2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
San Francisco, CA 94105	Matrix:	Aqueous
Project: Wards Cove / Craig	Sample Description	
		SR18
Project Number:	Apalyzed	09/24/97
Collected by: D. Snow/D. Imperato	Method:	See Below
CONCTITUENT		
CONSTITUENT	PQL*	RESULT**
	ug/L	ug/L
Benzene	0.5	
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Xvlenes	0.5	ND
Methyl-t-Butyl Ether (MTBE)	0.5	ND
	0.5	ND
Percent Surrogate Recovery		110
TOTAL PETROLEUM HYDROCARBONS		
Gasoline	50.	ND
BTX as a Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-38.xls JMM/jgt/mh/wj

Client: Da Al 2	arryl Snow G Environmental Management Rincon Ctr., 121 Spear St., 3rd Floor	Lab Number: Collected: Beceived:	12: 09/	211-39
Sa	n Francisco, CA 94105	Matrix:	Soi	
Project:	Wards Cove / Craig	Sample Descript	ion:	
Project Num Collected by	ber: D. Snow/D. Imperato	Analyzed: Method:	SB19: 2.5'-3' 09/21/97 See Below	
CONSTITUE	NT	PQL* mg/kg		RESULT** mg/kg
Benzene		0.005		ND
Toluene		0.005		ND
thylbenzen	9	0.005		ND
(ylenes		0.005		ND
Aethyl-t-But	yl Ether (MTBE)	0.005		ND
Percent Surr	ogate Recovery			100
TOTAL PETF	OLEUM HYDROCARBONS	<u> </u>		
Gasoline		10.		ND
3TX as a Percent of Fuel				N/A

VIDAOV

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-39.xls JMM/jgt/mh/kh

ZymaX	envirotechnology
-------	------------------

Client:	Darryl Snow	Lab Number:	12211-40
	AIG Environmental Management	Collected:	09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
	San Francisco, CA 94105	Matrix:	Soil
Project:	Wards Cove / Craig	Sample Descript	ion:
			SB20: 2.5'-3'
Project	Number:	Analyzed:	09/21/97
Collecte	d by: D. Snow/D. Imperato	Method:	See Below
CONST	ITUENT	PQL*	RESULT**
		mg/kg	mg/kg
Benzene		0.005	ND
Toluene	-	0.005	ND
Ethylber	nzene	0.005	ND
Xylenes	i de la constante d	0.005	ND
Methyl-	t-Butyl Ether (MTBE)	0.005	ND
Percent	Surrogate Recovery		84
TOTAL	PETROLEUM HYDROCARBONS		
Gasoline	e	10.	ND
BTX as	a Percent of Fuel		N/A
7 1/			

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717

*PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #1 12211-40.xls JMM/jgt/mh/kh

	envirotechnology	(REPORT O	F ANALYTICAL RESUL
Client:	Darryl Snow	Lab Number:		12211-41
	AIG Environmental Management	Collected:	100 C	09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:		09/17/97
	San Francisco, CA 94105	Matrix:		Aqueous
Project:	Wards Cove / Craig	Sample Descript	lion:	
			SB21	
Project N	lumber:	Analyzed:	09/24/97	
Collected	by: D. Snow/D. Imperato	Method:	See Below	
CONSTIT	TUENT	PQL*		RESULT**
		ug/L		ug/L
Benzene		0.5		ND
Toluene		0.5		0.7
Ethylbena	zene	0.5		ND
Xylenes		0.5		ND
Methyl-t-	Butyl Ether (MTBE)	0.5		ND
Percent S	Surrogate Recovery			104
TOTAL P	ETROLEUM HYDROCARBONS			· · · · · · · · · · · · · · · · · · ·
Gasoline		50.		ND
BTX as a	Percent of Fuel			N/A
ZymaX or	nvisotechnology inc. is contified by OA D			

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-41.xls JMM/jgt/mh/wj

	envirotechnolog	עו	REPORT O	F ANALYTICAL RESUL
Client:	Darryl Snow AIG Environmental Management	Lab Number: Collected:		12211-42 09/11/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Received: Matrix:		09/17/97 Aqueous
Project:	Wards Cove / Craig	Sample Descrip	tion:	
Project N Collected	Number: d by: D. Snow/D. Imperato	Analyzed: Method:	SB22 09/24/97 See Below	
CONSTI	TUENT	PQL*		RESULT**
		ug/L		ug/L
Benzene		0.5		ND
oluene		0.5		ND
thylben	zene	0.5		ND
lylenes		0.5		ND
lethyl-t-	-Butyl Ether (MTBE)	0.5		ND
ercent S	Surrogate Recovery			105
OTAL P	ETROLEUM HYDROCARBONS			
iasoline		50.		ND
TX as a	Percent of Fuel			N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-42.xls JMM/jgt/mh/wj

	en rotechnolog	y (F ANALYTICAL RESULTS
Client:	Darryl Snow	Lab Number:		12211.43
1	AIG Environmental Management	Collected:		09/11/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:		09/17/97
	San Francisco, CA 94105	Matrix:		_Aqueous
Project:	Wards Cove / Craig	Sample Descript	tion:	
Project N	umber:	Analyzed	SB23	
Collected	by: D. Snow/D. Imperato	Method:	See Below	
CONSTIT	UENT	+ 109		DECIII T++
		ug/L		ug/L
Benzene	3 ⁴			
Toluene		0.5		ND
Ethylbenz	2000	0.5		ND
Yvlanae	.616	0.5		ND
Mothul + i		0.5		ND
Methyl-t-i	Butyr Ether (MTBE)	0.5		ND
Percent S	urrogate Recovery			102
TOTAL PI	ETROLEUM HYDROCARBONS			
Gasoline		50.		ND
BTX as a	Percent of Fuel			N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-43.xls JMM/jgt/mh/wj

Client:	Darryl Snow	Lab Number:	12211-44
	AIG Environmental Management	Collected:	09/11/97
	2 Aincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA, 94105	Received:	09/17/97
		Watrix:	Soil
Project:	Wards Cove / Craig	Sample Descript	ion:
			SB23: 0.5'-1'
Project N	lumber:	Analyzed:	09/25/97
Collected	by: D. Snow/D. Imperato	Method:	See Below
CONSTIT	TUENT	PQL*	
		- mg/kg	ma/ka
_	2.0.4	8	
Benzene		0.005	ND
loluene		0.005	ND
thylben:	zene	0.005	ND
Kylenes		0.005	ND
/lethyl-t-	Butyl Ether (MTBE)	0.005	ND
Percent S	Surrogate Recovery		98
TOTAL P	ETROLEUM HYDROCARBONS		
Gasoline		10.	ND
BTX as a	Percent of Fuel		N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-44.xls JMM/jgt/mh



Client:	Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:		12211-45 09/11/97 09/17/97 Aqueous
Project: Project N Collected	Wards Cove / Craig umber: by: D. \$now/D. Imperato	Sample Descrip Analyzed: Method:	tion: MW-11 09/24/97 See Below	
CONSTIT	UENT	PQL* ug/L		RESULT** ug/L
Benzene Toluene Ethylbenz Xylenes Methyl-t-	zene Butyl Ether (MTBE)	0.5 0.5 0.5 0.5 0.5		ND 1.1 ND ND ND
Percent S				105
Gasoline BTX as a	Percent of Fuel	50.		ND N/A

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717

*PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-45.xls JMM/jgt/mh/wj

en irotechno	logy	REPORT OF ANALYTICAL RESUL
Client: Darryl Snow	Lab Number:	12211-46
AIG Environmental Management	Collected:	09/11/97
2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
San Francisco, CA 94105	Matrix:	Aqueous
Project: Wards Cove / Craig	Sample Description	on:
		MW-13
Project Number:	Analyzed:	09/24/97
Collected by: D. Snow/D. Imperato	Method:	See Below
CONSTITUENT	PQL*	RESULT**
	ug/L	ug/L
Benzene	0.5	
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Xylenes	0.5	ND
Methyl-t-Butyl Ether (MTBE)	0.5	ND
	0.0	ND
Percent Surrogate Recovery		107
TOTAL PETROLEUM HYDROCARBONS		
asoline	50.	ND
3TX as a Percent of Fuel		N/ A

.....

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-46.xls JMM/jgt/mh/wj

	ei rotechnolog	עו	PERCET OF AMALYTICAL PER
			REPORT OF ANALYTICAL RES
Client:	Darryl Snow	Lab Number:	12211-47
	AIG Environmental Management	Collected:	09/10/97
	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
·	San Francisco, CA 94105	Matrix:	Soil
roject:	Wards Cove / Craig	Sample Descript	tion:
			SB21: 2.5'-3'
Project N	lumber:	Analyzed:	09/25/97
Collected	by: D. Snow/D. Imperato	Method:	See Below
ONSTIT	TUENT	PQL*	RESULT**
	~S-0	mg/kg	mg/kg
enzene	-	0.005	
oluene		0.005	ND
thylben:	zene	0.005	ND
ylenes		0.005	ND
Iethyl-t-	Butyl Ether (MTBE)	0.005	ND
		0.000	ND
ercent S	Surrogate Recovery		99
OTAL P	ETROLEUM HYDROCARBONS		
iasoline		10.	ND
TX as a	Percent of Fuel		N/A
ZvmaX ei	nvirotechnology inc. is certified by CA Depart	ment of Health Card	N/A

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by EPA 8260 and GC/MS Combination.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

MSD #1 12211-47.xls JMM/jgt/mh



Client:	Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	See Below 09/09/97 09/17/97
Project:	Wards Cove / Craig	Sample Descrip	tion:
Project N Collected	umber: by: D. Snow/D. Imperato	Analyzed: Method:	09/19/97 See Below

TOTAL PETROLEUM HYDROCARBONS - DIESEL

LAB	SAMPLE	PQL*	RESULT**	SURROGATE
NUMBER	DESCRIPTION	ug/L	ug/L	
12211-2	Air Stripper Piping	100.	910.	78
12211-3	Surface Water Air Stripper	100.	1100.	17

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 *PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Analyzed by GC/MS Combination.

Note: Extracted by EPA 3510 on 09/16/97.

Note: Analytical range is C8-C40.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #5 12211ta.xls JMM/jgt/dz/jc/ps



REPORT OF ANALYTI	CAL RESULTS
-------------------	-------------

Client: Da Al(2 F Sa	rryl Snow G Environmental Management Rincon Ctr., 121 Spear St., 3rd Floor n Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	See Below 09/09/97 - 09/11/97 09/17/97 Soil
Project:	Wards Cove / Craig	Sample Description	on:
Project Numb Collected by:	er: D. Snow/D. Imperato	Analyzed: Method:	See Below 09/24/97 - 09/26/97 See Below

TOTAL PETROLEUM HYDROCARBONS - DIESEL

LAB	SAMPLE	PQL+	BESIN T**	SUPPOCATE
NUMBER	DESCRIPTION	ma/ka	malka	SURRUGATE
		mg/kg	mg/kg	RECOVERY
12211-4	SB1: 0'-0.5'	10.	190.	80
12211-5	SB2: 0'-0.5'	10.	170.	84
12211-6	SB3: 0'-0.5'	10.	44.	78
12211-7	SB4: 0.5'-1'	100.	590.	***
12211-8	SB4: 2.5'-3'	10.	390.	77
12211-10	SB5: 0.5'-1'	10.	350.	66
12211-11	SB5: 2.5'-3'	500.	6800.	***
12211-13	SB6: 0.5'-1'	100.	630.	***
12211-14	SB6: 2.5'-3'	10.	49.	74
12211-16	SB7: 2.5'-3'	10.	35.	81
12211-18	SB9: 0.5'-1'	500.	11000.	***
12211-19	SB9: 2.5'-3'	500.	14000.	* * *
12211-21	SB10: 0.5'-1'	500.	14000.	* * *
12211-22	SB10: 2.5'-3'	500.	7800.	* * *
12211-24	SB11: 0.5'-1'	200.	2800.	* * *
12211-25	SB11: 2.5'-3'	500.	4400.	* * *
12211-27	SB12: 2.5'-3'	10.	ND	85
12211-28	SB13: 3'-3.5'	10.	ND	90
12211-30	SB14: 0'-0.5'	200.	3800	***
12211-31	SB14: 4.5'-5'	10.	110.	81
12211-32	SB15: 3.5'+4'	200.	1300	***
12211-34	SB16: 4'-4.5'	10.	300	80
12211-36	SB17: 3.5'-4'	10.	88	80
12211-37	SB18: 2.5'-3'	10.	320	50 61
12211-39 🔍	SB19: 2.5'-3'	10.	ND	76
12211-40	SB20: 2.5'-3'	10.	55	70
12211-44	SB23: 0.5'-1'	10.	ND	19
12211-47	SB21: 2.5'-3'	10.	33	0/ 77
			00.	//

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 *PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

***Surrogate not detected due to dilution.

Note: Analyzed by GC/MS Combination.

Note: Extracted by EPA 3550 on 09/23/97.

Note: Analytical range is C8-C40.

MSD #4 12211tc.xls JMM/jgt/dz/jc/sk ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

Submitted by,





Client:	Darryl Snow	Lab Number:	See Below
	AIG Environmental Management	Collected:	09/10/97 - 09/11/97
:	2 Rincon Ctr., 121 Spear St., 3rd Floor	Received:	09/17/97
	San Francisco, CA 94105	Matrix:	Aqueous
Project: Wards Cove / Craig		Sample Descript	tion:
			See Below
Project Nu	mber:	Analyzed:	09/18/97 - 09/19/97
Collected b	by: D. Snow/D. Imperato	Method:	See Below

TOTAL PETROLEUM HYDROCARBONS - DIESEL

LAB	SAMPLE	PQL*	RESULT**	SURROGATE
NUMBER	DESCRIPTION	ug/L	ug/L	RECOVERY
12211-15	SB6	1000.	3100.	100
12211-26	SB11	1000.	10000.	80
12211-29	SB13	100.	ND	84
12211-33	SB15	5000.	48000.	* * *
12211-38	SB18	100.	280.	86
12211-42	SB22	100.	150.	68
12211-43	SB23	100.	250.	63
12211-45	MW-11	100.	130.	78
12211-46	MW-13	100.	160.	79

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717

***PQL - Practical Quantitation Limit**

**Results listed as ND would have been reported if present at or above the listed PQL.

***Surrogate not detected due to dilution.

Note: Analyzed by GC/MS Combination.

Note: Extracted by EPA 3510 on 09/17/97.

Note: Analytical range is C8-C40.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #5 12211tb.xls JMM/jgt/dz/jc/ps

It Manage $\triangle AA^{1/2} \in A^{-1/2} (A^{-1/2} A^{-1/2} (A^{-1$	Winnlast 0.5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	A BOGISAA BE	SC 20 C T C C T C C C C C C C C C C C C C C	A JENIG- Holl X X X X X X X X X X X X X X X X X X	136 alyaia Requested alyaia	Ramarka Ramarka Litter Breken Litter Breken	
ody seals cf container types	λυ	Time			1207 1021	TAY BE LAISE	

P. 02, 06 4912928SIF

20:60 1661-11-dBS

Prolifet Manager	10 - sen luis obispo	. ce 93401 - J	ax 805/644	8226 · 1el	805/544	4696	cnain of custody	
Company	Pitane		^J an					
244	Project Number				75	Analysis Requested	+	
	Project Name CU Ar	EDS COVE	CEARC		220 1071 - 1 1219			
	Sampler				70 D9			
Semple Oascrigton	Samplad	Semulat	Matrix	Preterve	-H.J.L RS			
HAM WE RESID	7-10-97.	1200	3	57-11CC1	× ×		Remark	
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	9-10-97	5411	S	۲ <u>۶</u> ۲			LITER BROK	73
18 17: 2.5'-3'	7-10-97	1150	S	52-	XX			
	9-10-97	ZIEL	\mathcal{A}	97-	X			
1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	9-10-97	1400	S	-27	X X			
	9-9-97	1300	S	87-	×××			
	9-10-97	0900	N	67	×			
<u>58 1/1:0-0.5</u>	6.9.97	1030	S	Sc	× ×			1
14. 4. 5 5.	19-0-67	1330	S	-31	X			1
10 - 12 : 35 - 4	9-9.97.	1400	S	-32	X			1
uunauuuu SR 15	9-10-97	0001	3	E E	X			1
Special Billing/Comments:				3				
	Heinquished by. Signature					Received by:		齨闘
	Print				1	Signature		
	Company Date		Time			Company		1
						Date	time	
Semple Integrity upon receipt: Samoles received intere	Kelnquished by: Signature	е			1-	leceived for ZymeX	ργ: Δ ο	
Samples received cold	Print Company -					Print 01	21 TAY White	\sim
Correct container types 1813 WILLIN 312	Date		Time		+ 1	Date 0 -17	-9-7 Time /2	15
					1	19 Martin States		

Lymax environschudugy 71 2000 fons, suite	110 - seu juja objspo, ca 91401, seu ont ir a	chain of custody
Project Managar X		1 805/544 4698
Company L. S Now	Fex	
Address	reste ct Number	
	Project Name UARDS COVE/CRAIC	1. J.
	Bampler	×1) D 9
Sample Description	and the part of the second	- 11/9
	Sampled is in Sampled in the second sec	
A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	K-11081 S 0091 12-2-2	X / Nomarks
9/ 00	4-10-471030 W -35	
1	9-8-97 1630 S 34	XX X X X X X X X X X X X X X X X X X X
18:2.5'- 3' S'- 3'	9-10-87 1600 S -34	
100 /S	9-10-67 1630 W -38	
10 28 19: 2.5' 3'	9-10-67 1700 5 -34	
11 2 3 3 2 3 - 3 - 3 - 3 - 3 - 3 - 3 - 3 -	9-10-97 1730 5 -21	
11685	9-10-57 1800 101	
S & J	1- 1- 2 A	
	2h- M S/20 1 4-11-2	
5432:0 C. I.	7-11-87 0930 60 -43	
	4-11-47 1845 S 44	
Special Billing/Commente:	Relinguished hv.	
	Signature	Received by:
	Print	Bint
	Date	Company
		Date
Sample integrity upon receipt; Samples versived forces	Relinquished by: Signature	Received for ZymaX by
Samples received cold	Print Company	Print INE ALLEN CLUCIC
Carrect container types	Date	Date 9-(7-G7) Time (7-2
		ndenor
		apable with the or the

Control Andrets Andrets <t< th=""><th>Project Manager D. Swow</th><th>Phone Frank Control of Control of</th><th></th></t<>	Project Manager D. Swow	Phone Frank Control of	
Address Takes from the free free free free free free free fr	Company	Project Number	is Requested
Annolo Description Jame Annolo Sample of the completion Data Time Annolo Annolo Description Data Annolo Annolo Annolo Description Annolo Annolo Annolo Annolo Description Annolo Annolo Annolo Annolo Description Annolo Annolo Annolo Annolo Annolo <td< td=""><td>Address</td><td>Projact Name LUARDS COVE / COVE / COVE</td><td></td></td<>	Address	Projact Name LUARDS COVE / COVE / COVE	
Serons Description Serons Description Time Matrix Means K K Denoise K K M.M11 9.11-5		Bempler CAPA A	
MW・13 7:1+47 0930 W 20145人名 B M 20145人名 M 20145人A M 20145\end{pmatrix}A M 20145A	Sumple Descriptions	Canolad Canolad Canolad Canolad Canolad Canolad Canolad	
M.W.13 9-11-51 3-21 2-10-77 7-600 5 -11 X N SP21: 2.55-3 9-10-77 7-600 5 -11 X N No 1 1 1 1 1 1 No 1 1 1 1 1 1 1 No 1 1 1 1 1 1 1 1 No 1 1 1 1 1 1 1 1 No 1 1 1 1 1 1 1 1 No 1 1 1 1 1 1 1 1 No	MW-11	9.11-47 502 N 122 14 1	Remarks
SQ112.5-31 P-10-P7 1900 5 -47 X Image: SQ12.5-31 Prove and the solution of the solution	MW-13	X X 41. N JADW 15-11-6	
Special Billing/Comments: Relevand by: Signature Signature Signature	5321:2.5-31	9-10-97 1600 5 -417 X X	
Special Biling/Comments: Reline of the second price Signature Signature Company Signature Signature Signature Signature Signature Context container types Signature Context container types Signature			
Residue Filmoutine dor. Special Biling/Commands: Relevand by: Signature Signature Signature Signature <tr< td=""><td>Lucition 2011</td><td></td><td></td></tr<>	Lucition 2011		
Special Biling/Commans: Reinquished by: Signature Signature Signature	的眼睛的間		
Special Biling/Comments: Releved by: Signature Signature Signature Signature <td></td> <td></td> <td></td>			
Special Billing/Comments: Relinguithed by: Signature Signature Signature Find Signature Signature Signature Find Signature Signature Signature Signature Signature Find Signature Signature Signature Find Company Date Consol Date Contany Pane Contany Find Contany Pane Contany Pane Contany Pane Contany Pane Contany Pane			
Special Billing/Comments: Relined by: Special Billing/Comments: Relined by: Signature Find Signature Find Samples received intact Signature Signature Find Company Date Samples received cold Company Cost Date Context Signature Signature Find Company Date Cost Date Context Signature Signature Find Company Date Context Find Context Date Signature Find Context Find Context Pate			
Special Billing/Commants: Relined by: Special Billing/Commants: Relined by: Signature Relined by: Signature Filt Sample Integrity upon receipt: Signature Samples received cold Filt Custody sails Signature Correct container types Enter Correct container types Enter			
Special Billing/Commants: Relinquished by: Signature Signature Signature Signature Print Company Sample Integrity upon receipt: Signature Sample received clud Company Sample received clud Signature Sample received clud Signature Sample received clud Signature Sample received clud Signature Custody saals Company Correct container types Date Time Date			
Special Biling/Comments: Relinquished by: Signature Frint Print Signature Print Company Bample Integrity upon receipt: Date Samples received cold Time Samples received cold Date Custody saals Date Contract container types Time			
Signature Fint Print Signature Print Company Date Time Sample Integrity upon receipt: Signature Samples received intact Signature Samples received intact Signature Samples received cold Signature Custody saals Company Correct container types Date Time Date	Special Biling/Comments:	Relinquished by:	の日本を決めたいたないない
Sample Integrity upon received integr		Signature	bd by: ture
Sample Integrity upon receipt: Date Time Company Samples received intact Signature Date Time Time Samples received intact Signature Signature Signature Signature Samples received cold Company Print Print Print Custody saals Company Time Date Date Correct container types Date Time Date Date		Company	
Sample Integrity upon receipt: Relinquished by: Samples received intact Signature Samples received intact Signature Samples received cold Signature Custody seals Print Custody seals Company Correct container types Pate		Date Date Date	Aue
Samples received intact Samples received intact Samples received cold Custody seals Correct container types Correct	Samola Interview week.	Relinquished by:	BM21
Samples received cold Company Company Print 1.32, TAP. B.2 Custody sails Correct container types 212 Time Date 2-12-92 Time 13.15	Samples received intact	Signature Signat	a rar (ymy) by: ura Dart Curil ar
Lorrect container types invasion with the 1215 me 1215 me	Semples received cold Custody seals	Company Company Compa	IN STUDY TAY, BR.
	correct container types Registering and the		7-17-92 Time 1215

P. 06: '06 4912928STr

59:68 /66T-/T-J99

ZymaX

TPH

LAB	SAMPLE	C6-C10	C10-C25	C25-C36
NUMBER	DESCRIPTION	ug/L	ug/L	ug/L
12211-2	Air Stripper Piping	< 50.	810.	100.
12211-3	Surface Water Air Stripper	< 50.	590.	510.
12211-15	S86	1000.	2850.	250.
12211-20	SB9	2000.		
12211-23	SB10	3000.		
12211-26	SB11	5000.	9800.	200.
12211-33	S815	< 100.	44600.	3400.
12211-35	SB16	10000.		

ALIPHATIC

LAB	SAMPLE	C6-C10	C10-C25	C25-C36
NUMBER	DESCRIPTION	ug/L	ug/L	ug/L
12211-2	Air Stripper Piping	< 50.	648.	90.
12211-3	Surface Water Air Stripper	< 50.	472.	459.
12211-15	SB6	700.	2280.	225.
12211-20	589	1400.		
12211-23	SB10	2100.		,;
12211-26	SB11	3500.	7840.	180. 🛸
12211-33	SB15	< 100.	35680.	3060.
12211-35	SB16	7000.		

AROMATIC

LAR	SAMPLE	C6-C10	C10-C25	C25-C36
NUMBER	DESCRIPTION	ug/L	ug/L	ug/L
12211-2	Air Stripper Piping	< 50.	324.	30.
12211-3	Surface Water Air Stripper	< 50.	236.	153
12211-15	SE6	500.	1140.	75.
12211-20	SB9	1000.		
12211-23	SB10	1500.		· · · ·
12211-26	S811	2500.	3920.	60.
12211-33	\$815	<100.	17840.	1020.
12211-35	SB16	5000.		· · ·

The following percentages were used to break down the TPH into aliphatic and aromatic composition:

CARBON	PERCENT	PERCENT
RANGE	ALIPHATIC	AROMATIC
C6-C10	70	50
C10-C25	80	40
C25-C36	90	30
Lynar envir oreenneregy 01-14-1320 04+4266 echnology RE. ORT OF ANALYTICAL RESULTS 12211-2 Lab Number: **Darryl Snow** Client: 09/09/97 Collected: AIG Environmental Management 09/17/97 **Received:** 2 Rincon Ctr., 121 Spear St., 3rd Floor Aqueous Matrix: San Francisco, CA 94105 Sample Description: Wards Cove / Craig Project: Air Stripper Piping 09/19/97 Analyzed: Project Number: EPA 8270 Method: D. Snow/D. Imperato Collected by: RESULT** POL* CONSTITUENT ug/L ug/L POLYNUCLEAR AROMATIC HYDROCARBONS ND 2.0 Acenaphthene ND' 2.0 Acenaphthylene ND 2.0 Anthracene ND 2.0 Benz (a) anthracene ND 2.0 Benzo (b) fluoranthene ND 2.0 Benzo (k) fluoranthene ND 2.0 Benzo (a) pyrene ND 2.0 Benzo (ghi) perylene ND 2.0 Chrysene ND 2.0 Dibenzo (a,h) anthracene ND 2.0

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717

*PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3510 on 09/16/97.

MSD #5 12211-2n.xls JMM/jgt/dz/jc/ps

Fluoranthene

Naphthalene

Phenanthrene

Indeno (1,2,3-cd) pyrene

Fluorene

Pyrene

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

2.0

2.0

2.0

2.0

2.0

e-mail: zymax@ZymaXusa.com

ND

ND

ND

ND

ND

ma

C.			
envil	.ec	hno	logy

ORT OF ANALYTICAL RESULTS

Client: Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105		Lab Number:12211-3Collected:09/09/97Received:09/17/97Matrix:Aqueous			
Project: Project Number	Wards Cove / Craig : D. Snow/D. Imperato	Sample Descript Analyzed: Method:	tion: Surface Water Air Stripper 09/19/97 EPA 8270		
CONSTITUENT	3	PQL* ug/L	RESULT** ug/L		

POLYNUCLEAR AROMATIC HYDROCARBONS

	2.	0 ND	
Acepaphthylene	2.	0 ND	
	2.	0 ND	
	2.	0 ND	
Benzo (b) fluoranthene	2.	0 ND	
Benzo (k) fluoranthene	2.	0 ND	
	2.	0 ND	
Benzo (a) pyrene Benzo (abi) pervlene	2.	0 ND	
Chrysene	2.	0 ND	2
Dibenzo (a b) anthracene	2.	0 ND	
Elugraphage	2.	0 ND	
Eluoran	2.	0 ND	
Indone (1, 2, 3-od) pyrepe	2.	O ND	
highthologo	2	0 ND	
Naphthalene	2	0 ND	
	2	0 ND	
Pyrene	6e •	•	

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 *PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3510 on 09/16/97.

MSD #5 12211-3n.xls JMM/jgt/dz/jc/ps

John MacMurphey

Laboratory Director

V mas Y

envi echnolog	У	ORT OF ANALYTICAL RESULT				
Clinety Darry Snow	Lab Number:		2211-15			
AIG Environmental Management	Collected:	0	9/10/97			
2 Bincon Ctr. 121 Snear St., 3rd Floor	Received:	C	9/17/97			
San Francisco, CA_94105	Matrix:	queous				
Project: Wards Cove / Craig	Sample Descrip	tion:				
		SB 6		S		
Project Number:	Analyzed:	09/19/97				
Collected by: D. Snow/D. Imperato	Method:	EPA 8270				
	PQL*		RESULT**			
	ug/L		ug/L			
Acenaphthene Acenaphthylene Anthracene Benz (a) anthracene	2.0 2.0 2.0 2.0	10. .e				
Benzo (b) fluoranthene	2.0					
Benzo (k) fluoranthene	2.0		ND			
Benzo (a) pyrene	2.0		ND			
Benzo (ghi) perylene	2.0		ND			
Chrysene	2.0		ND			
Dibenzo (a,h) anthracené	2.0		ND			
Fluoranthene	2.0		ND			
Huorene	2.0		ND			
Indeno (1,2,3-ca) pyrene	2.0		IND			
Naphthalene	2.0		ND			
menanthrene	2.0		S ND			

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 ***PQL - Practical Quantitation Limit**

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3510 on 09/17/97.

MSD #5 1221115n.xls JMM/jgt/dz/jc/ps

Pyrene

Submitted by, ZymaX envirotechnology, inc.

2.0

John MacMurphey Laboratory Director

e-mail: zymax@ZymaXusa.com

-			_		_		_							
	n	V	ĩ	٢_	J	e	С	h	n	0	l	0	g	У

ORT OF ANALYTICAL RESULTS

Client: Darryl AlG E 2 Rind San F	Snow nvironmental Management con Ctr., 121 Spear St., 3rd Floor rancisco, CA 94105	Lab Number: Collected: Received: Matrix:	ŝ	12211-26 09/10/97 09/17/97 Aqueous
Project: Project Number Collected by:	Wards Cove / Craig : D. Snow/D. Imperato	Sample Descrip Analyzed: Method:	otion: SB 11 09/19/97 EPA 8270	
CONSTITUENT		PQL* ug/L	2	RESULT** ug/L
POLYNUCLEAR	AROMATIC HYDROCARBONS			
		2.0	<i>2</i> 3	ND
Acenaprimene		2.0		NĎ
Acenapritryien	3	2.0		ND
Antinacene Rees (s) sethes	C000	2.0		ND
Benz (d) antina Benze (b) fluori		2.0		ND
Benzo (b) Huori Benzo (k) fluori		2.0		ND
		2.0		ND
Benzo (a) pyrer	vene	2.0		ND
Chrycona	yiono	2.0		ND
Ciuyseile Dihanza (a b) a	othracene	2.0		ND
Eluoranthene		2.0		ND
Fluorene		2.0		2.5
Indeno (1.2.3-	cd) ovrene	2.0		ND
Naphthalene		2.0		12.
Phenanthrene		2.0	~2	5.0
Durana		2.0	(j. 2)	ND

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717

*PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3510 on 09/17/97.

MSD #5 1221126n.xls JMM/jgt/dz/jc/ps Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

e-mail: zymax@ZymaXusa.com

A DED DAA DEED THEF

		۳.		-						_	_		
/	1	١.,	_	¢	Ø	C	h	n	0	ļ	0	g	y

ORT OF ANALYTICAL RESULTS

Client: Darryl AIG Er 2 Rinc San Fr	Snow ivironmental Management on Ctr., 121 Spear St., 3rd Floor ancisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-33 09/10/97 09/17/97 Aqueous	
Project: Project Number:	Wards Cove / Craig	Sample Descrip	tion: SB 15 09/19/97	3
Collected by:	D. Snow/D. Imperato	Method:	EPA 8270	
CONSTITUENT		PQL* ug/L	RESULT** ug/L	

POLYNUCLEAR AROMATIC HYDROCARBONS

Acenaphthene	3+	20.		ND
Acenaphthylene		20.		NÐ
Anthracene		20.		ND
Benz (a) anthracena		20.		ND
Benzo (b) fluoranthene		20.		ND
Benzo (k) fluoranthene		20.		ND
		20.		ND
Benzo (a) pyrcho	52	20.		ND
Charleson	2	20.		ND
		20.	,	NĎ
		20.		ND
Fluoranthene		20.		ND
Fluorene		20		ND
Indeno (1,2,3-ca) pyrene	73	20.		ND
Naphthalene		20.		ND
Phenanthrene		20.		ND
Pyrene		20.		

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717

*PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3510 on 09/17/97.

MSD **#5** 1221133n.xls JMM/jgt/dz/jc/ps

John MacMurphey

Laboratory Director



LAB	SAMPLE	C6-C10	C10-C25	C25-C36
NUMBER	DESCRIPTION	i mg/xg	ing/kg	100
12211-11	SB5: 2.5'-3'	<10.	6680.	120.
12211.18	S89: 0.5'-1'	100.	10500	500.
12211-10	SB9- 2 5'-3'	200.	13500.	500.
12211-19	SB3. 2.3 0	500	13800.	200.
12211-21	5810: 0.512	100	7710	90.
12211-22	SB10: 2.5 -3	100.	0700	40
12211-24	SB11: 0.5'-1'	80.	2760.	40.
12211-25	S811: 2.5'-3'	500.	4350.	50.
12211-30	SB14: 0'-0.5'	<10.	3260.	540.
12211-32	SB15: 3.5'-4'	20.	1230.	70.

ZymaX

ALIPHATIC

LAB	SAMPLE	C6-C10 mg/kg	C10-C25 mg/kg	C25-C36 mg/kg
100MBEN	COE. 2 6' 2'	1<10	5344.	108.
12211-11	1565: 2.3 -5		0400	450
12211-18	S89: 0.5'-1'	70.	8400.	+30.
12211-19	SE9: 2.5'-3'	140.	10800.	450
12211-12	SB10: 0.5'-1'	350.	11040.	180.
12211-21	3610. 0.3 -1		6169	81
12211-22	SB10: 2.5'-3'	/U	0100.	<u> </u>
12211-24	SB11: 0.5'-1'	56.	2208.	36.
12211-27	0011-05101	350	3480.	45.
12211-25	5611: 2.5 -3			496
12211-30	SB14: 0'-0.5'	< 10.	2608.	400.
12211-32	SB15: 3.5'-4'	14.	984.	63.

AROMATIC

C25-C36 C10-C25 C6-C10 SAMPLE LAB mg/kg mg/kg_ mg/kg DESCRIPTION NUMBER 36. 2672. < 10. SB5: 2.5'-3' 12211-11 150. 50. 4200. SB9: 0.5'-1' 12211-18 150. 5400. 100. 12211-19 SB9: 2.5'-3' 60. 5520. 250. 12211-21 SB10: 0.5'-1' 27. 3084. 50. SB10: 2.5'-3' 12211-22 1104. 12. 40. S811: 0.5'-1' 12211-24 15. 1740. 250. S811: 2.5'-3' 12211-25 162. 1304. < 10. SB14: 0'-0.5' 12211-30 492. 21. 10. SB15: 3.5'-4' 12211-32

The following percentages were used to break down the TPH into aliphatic and aromatic composition:

CARBON RANGE	PERCENT ALIPHATIC	PERCENT AROMATIC
C6-C10	70	50
C10-C25	80	40
C25-C36	90	30

Zymax env techno	logy	PORT OF	PORT OF ANALYTICAL RESULTS		
Client: Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:		12211-11 09/10/97 09/17/97 Soil		
Project: Wards Cove / Craig Project Number: Collected by: D. Snow/D. Imperato	Sample Descrip Analyzed: Method:	tion: SB5: 2.5'-3 09/25/97 EPA 8270	•		
CONSTITUENT	PQL* mg/kg		RESULT** mg/kg		
POLYNUCLEAR AROMATIC HYDROCARBONS	5.0		ND		
Acenaphthene	5.0		ND		
Acenaphthylene	5.0		ND		
Anthracene	5.0		ND		
Benz (a) anthracene	5.0		ND		
Benzo (b) fluoranthene	5.0		ND		
Benzo (k) Inforantiene	5.0		ND		
Benzo (a) pyreno Benzo (ahi) pervlene	5.0		ND		
Chrysene	5.0		ND		
Dibenzo (a.h) anthracene	5.0		ND		
Fluoranthene	5.0		ND		
Fluorene	5.0		ND		
Indeno (1,2,3-cd) pyrene	5.0		ND		
Naphthalene	s 5.0 ga		ND		
Phenanthrene	5.0		ND		
Pyrene	5.0		ND		

*POL - Practical Quantitation Limit

0 0001 01 01 01

U1111

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3550 on 09/23/97.

MSD #5 1221111n.xls JMM/lp/dz/rb Submitted by. ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

fax 805.544.8225 rel 805.544.4696

<u>ب</u>			~~		
Z	yma	envi echnology			ANALYTICAL RESULTS
Client: Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105		Lab Number: Collected: Received: Matrix:	~	12211-18 09/10/97 09/17/97 Soil	
Project: Project Collecte	Number: ed by:	Wards Cove / Craig D. Snow/D. Imperato	Sample Descrip Analyzed: Method:	tion: SB9: 0.5'-' 09/26/97 EPA 8270	l'
CONST	ITUENT	194 191	PQL* mg/kg		RESULT** mg/kg
POLYN	UCLEAR ARO	MATIC HYDROCARBONS			्य प्र
Асепар	hthene		5.0		ND
Acenap	hthylene		5.0		ND
Anthrac	cene		5.0	<u>.</u>	ND
Benz (a) anthracene		5.0		ND
Benzo ((b) fluoranthen	e	5.0		ND
Benzo ((k) fluoranthen	e	5.0		ND
Benzo ((a) pyrene		5.0		ND
Benzo ((ghi) perylene		5.0		
Chryse	ne		5.0		
Dibenzo	o (a,h) anthrao	ene	5.0		ND.
Fluoran	ithene		5.0		
Fluoren	e		5.0		ND
Indeno	(1,2,3-cd) pyr	rene	5.0		
Naphth	alene		5.0		
Phenan	threne		5.0		NO
Pyrene			5.0		NU

*POL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed POL.

Note: Extracted by EPA 3550 on 09/23/97.

MSD #5 1221118n.xls JMM/lp/dz/rb

John MacMurphey

John MacMurphey Laboratory Director

Lynna	envi echnology	y	ORT OF	ANALYTICAL RESULT
Client: Darryl Sn AlG Envir 2 Rincon San Franc	ow onmental Management Ctr., 121 Spear St., 3rd Floor isco, CA 94105	Lab Number: Collected: Received: Matrix:		12211-19 09/10/97 09/17/97 Soil
Project: Project Number: Collected by:	Wards Cove / Craig D. Snow/D. Imperato	Sample Descrip Analyzed: Method:	tion: SB9: 2.5'-3' 09/26/97 EPA 8270	
CONSTITUENT		PQL* mg/kg		RESULT** mg/kg
Acenaphthene Acenaphthylene	×	5.0 5.0	12	
Anthracene Benz (a) anthracene Benzo (b) fluoranth	ene	5.0 5.0 5.0		
Benzo (k) fluoranth Benzo (a) pyrene Benzo (ghi) perylen	e	5.0 5.0 5.0		ND ND
Chrysene Dibenzo (a,h) anthr Eluoranthene	acene	5.0 5.0 5.0		ND ND ND
Fluarene Indeno (1,2,3-cd) p	byrene	5.0 5.0 5.0		ND ND 8.9
Naphthalene Phenanthrene Pyrene	≪ %	5.0 5.0		ND ND

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 *PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3550 on 09/23/97.

MSD #5 1221119n.xls JMM/lp/dz/rb

John MacMurphey

Laboratory Director

Zymax envi echnolog	y		ANALYTICAL RESU	JLTS
Client: Darryl Snow AlG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:		12211-21 09/10/97 09/17/97 Soil	
Project: Wards Cove / Craig Project Number: Collected by: D. Snow/D. Imperato	Sample Descript Analyzed: Method:	tion: SB10: 0.5' 09/24/97 EPA 8270	-1'	
CONSTITUENT	PQL*		RESULT**	
Acenaphthene Acenaphthylene	5.0 5.0	· «	ND ND	
Anthracene Benz (a) anthracene Benzo (b) fluoranthene	5.0 5.0 5.0			
Benzo (k) fluoranthene Benzo (a) pyrene Benzo (ghi) perylene	5.0 5.0 5.0			
Chrysene Dibenzo (a,h) anthracene Fluoranthene	5.0 5.0 5.0	822.	ND ND ND	
Fluorene Indeno (1,2,3-cd) pyrene Naphthalene	5.0 5.0 5.0			
a waa part ta ta waa ay ta waxaa ay ta waxaa ay ahaa ahaa ahaa ahaa ahaa ahaa ah				

***POL - Practical Quantitation Limit**

**Results listed as ND would have been reported if present at or above the listed POL.

Note: Extracted by EPA 3550 on 09/23/97.

MSD #5 1221121n.xls JMM/lp/dz/jc/sk

Phenanthrene

Pyrene

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

5.0

5.0

ND.

ND

01-14-1330 04-00FT			JU		
Z	max	env technology			L RESULTS
Client:	Derryl Snow		Lab Number:	12211-22	
Client.	Alg Environment	al Management	Collected:	09/10/97	
	2 Bincon Ctr., 12	1 Spear St., 3rd Floor	Received:	09/17/97	
	San Francisco, C.	A 94105	Matrix:	Soil	
Project:	Wa	ards Cove / Craig	Sample Descript	tion: SB10: 2.5'-3'	
Project Nu	umber:	C(D. I	Analyzed:	09/24/97 FPA 8270	
Collected	by: U.	Snow/D. Imperato	Internou.		
CONSTIT	UENT		PQL+	RESU	LT**
L			mg/kg		ing
POLYNUC		C HYDROCARBONS			
Acenanht	hene	51	5.0	N	D
Acenapht	hvlene		5.0	N	D
Accriopine			5.0	N	D

Anthracene	5.0 🕤	ND
	5.0	ND
	5.0	ND
Benzo (b) fluoranthene	5.0	ND
Benzo (k) fluoranthene	5.0	
Benzo (a) pyrene	5.0	ND
Benzo (chi) narviene	5.0	ND
Chrysene	5.0	ND
Olhonzo (a h) anthracene	5.0	ND
	5.0	ND
Fluoranthene	5.0	
Fluorene	S.0	140
Indeno (1,2,3-cd) pyrene	5.0	ND
Nachthalene	5.0	ND
	5.0	ND
Phenanthrene	5.0	ND
Pyrene	5.0	NU

PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3550 on 09/23/97.

MSD #5 1221122n.xls JMM/lp/dz/jc/sk

John MacMurphey

Laboratory Director

Client: Darryl Snow 12211-24 AlG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor 09/10/97 San Francisco, CA 94105 Received: 09/10/97 Project: Wards Cove / Craig Matrix: Soil Project Number: 0. Snow/D. Imperato Sample Description: SB11: 0.5'-1' Collected by: D. Snow/D. Imperato POL * RESULT** CONSTITUENT POL * RESULT** Matrixacene 2.0 ND Benzo (a) pyrene 2.0 ND Benzo (a) pyrene 2.0 ND Benzo (a) pyrene 2.0 ND Piborene 2.0 ND Proyect (a) pyrene 2.0 ND Benzo (a) pyrene 2.0 ND Benzo (a) pyrene 2.0 ND Benzo (a),h) anthracene 2.0 ND Fluoranthene 2.0 ND Piberae 2.0 ND Benzo (a) pyrene 2.0 ND Benzo (a) pyrene 2.0 ND Benzo (a) pyrene 2.0 ND	Zyma	envilechnology		ORT OF ANALYTICAL RESULT		
Project: Wards Cove / Craig Sample Description: Project Number: Snow/D. Imperato SB11: 0.5'-1' Collected by: D. Snow/D. Imperato Method: EPA 8270 CONSTITUENT POL* RESULT** mg/kg mg/kg mg/kg POLYNUCLEAR AROMATIC HYDROCARBONS 2.0 ND Acenaphthene 2.0 ND Acenaphthylene 2.0 ND Anthracene 2.0 ND Benza (a) anthracene 2.0 ND Benza (b) fluoranthene 2.0 ND Benzo (b) fluoranthene 2.0 ND Benzo (a) pyrene 2.0 ND Dibenzo (a,h) anthracene 2.0 ND Fluoranthene 2.0 ND Fluoranthene 2.0 ND Polene 2.0 ND Polene 2.0 ND Polene 2.0 ND Pol	Client: Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105		Lab Number: Collected: Received: Matrix:	12 09 09 50	211-24 /10/97 /17/97 	
POL* POL* RESULT** mg/kg mg/kg POLYNUCLEAR AROMATIC HYDROCARBONS Acenaphthene 2.0 ND Acenaphthylene 2.0 ND Acenaphthylene 2.0 ND Anthracene 2.0 ND Benz (a) anthracene 2.0 ND Benzo (b) fluoranthene 2.0 ND Benzo (k) fluoranthene 2.0 ND Benzo (a) pyrene 2.0 ND Benzo (ghi) perylene 2.0 ND Chrysene 2.0 ND Dibenzo (a,h) anthracene 2.0 ND Fluorene 2.0 ND Indeno (1,2,3-cd) pyrene 2.0 ND Naphthalene 2.0 ND	Project: Project Number: Collected by:	Wards Cove / Craig D. Snow/D. Imperato	Sample Descrip Analyzed: Method:	tion: SB11: 0.5'-1' 09/24/97 EPA 8270		
mg/kgmg/kgPOLYNUCLEAR AROMATIC HYDROCARBONSAcenaphthene2.0Acenaphthylene2.0Acenaphthylene2.0Anthracene2.0Benz (a) anthracene2.0Benz (a) anthracene2.0Benzo (b) fluoranthene2.0Benzo (k) fluoranthene2.0Benzo (a) pyrene2.0Benzo (a) pyrene2.0Benzo (a) hanthracene2.0Benzo (a) pyrene2.0Benzo (a) hanthracene2.0Dibenzo (a,h) anthracene2.0Fluoranthene2.0Pluoranthene2.0NDNDFluorene2.0Indeno (1,2,3-cd) pyrene2.0Naphthalene2.0Phenanthrene2.0NDNaphthalene2.0NDNaphthalene2.0NDNo </th <th>CONSTITUENT</th> <th></th> <th>PQL*</th> <th></th> <th>RESULT**</th>	CONSTITUENT		PQL*		RESULT**	
Acenaphthylene2.0NDAnthracene2.0NDBenz (a) anthracene2.0NDBenzo (b) fluoranthene2.0NDBenzo (k) fluoranthene2.0NDBenzo (a) pyrene2.0NDBenzo (ghi) perylene2.0NDChrysene2.0NDDibenzo (a,h) anthracene2.0NDFluoranthene2.0NDFluoranthene2.0NDPhenanthrene2.0NDNaphthalene2.0NDPhenanthrene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0ND	Acenaphthene	16g. T.	2.0	•	ND	
Acenaphthylene2.0NDAnthracene2.0NDBenz (a) anthracene2.0NDBenzo (b) fluoranthene2.0NDBenzo (k) fluoranthene2.0NDBenzo (a) pyrene2.0NDBenzo (ghi) perylene2.0NDChrysene2.0NDDibenzo (a,h) anthracene2.0NDFluoranthene2.0NDFluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0NDNaphthalene2.0ND	Acenaphthene	1023) To	2.0	٠		
Antifiadene2.0NDBenzo (a) anthracene2.0NDBenzo (b) fluoranthene2.0NDBenzo (a) pyrene2.0NDBenzo (a) pyrene2.0NDBenzo (ghi) perylene2.0NDChrysene2.0NDDibenzo (a,h) anthracene2.0NDFluoranthene2.0NDFluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0NDNaphthalene2.0ND<	Acenaphthylene		2.0		ND	
Benzo (b) fluoranthene2.0NDBenzo (k) fluoranthene2.0NDBenzo (a) pyrene2.0NDBenzo (ghi) perylene2.0NDChrysene2.0NDDibenzo (a,h) anthracene2.0NDFluoranthene2.0NDFluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0NDNaphthalene2.0ND	Ronz (a) anthracene	10 ¹⁰ 0 =	2.0		ND	
Benzo (k) fluoranthene2.0NDBenzo (a) pyrene2.0NDBenzo (ghi) perylene2.0NDChrysene2.0NDDibenzo (a,h) anthracene2.0NDFluoranthene2.0NDFluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0ND	Benzo (b) fluoranthe	ne	2.0		ND	
Benzo (a) pyrene2.0NDBenzo (ghi) perylene2.0NDChrysene2.0NDDibenzo (a,h) anthracene2.0NDFluoranthene2.0NDFluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0NDNo2.0ND	Benzo (k) fluoranthe	ne	2.0	a.	ND	
Benzo (ghi) perylene2.0NDChrysene2.0NDDibenzo (a,h) anthracene2.0NDFluoranthene2.0NDFluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0ND	Benzo (a) pyrene		2.0		ND	
Chrysene2.0NDDibenzo (a,h) anthracene2.0NDFluoranthene2.0NDFluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0NDNo2.0ND	Benzo (ghi) perylene		2.0		ND	
Dibenzo (a,h) anthracene2.0NDFluoranthene2.0NDFluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0ND	Chrysene		2.0		ND	
Fluoranthene2.0NDFluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0ND	Dibenzo (a,h) anthra	cené	2.0			
Fluorene2.0NDIndeno (1,2,3-cd) pyrene2.0NDNaphthalene2.0NDPhenanthrene2.0ND	Fluoranthene		2.0			
Indeno (1,2,3-cd) pyrene2.0NONaphthalene2.0NDPhenanthrene2.0ND	Fluorene		2.0		ND	
Naphthalene 2.0 ND Phenanthrene 2.0 ND	Indeno (1,2,3-cd) py	rrene	2.0		ND	
Phenanthrene 2.0 ND	Naphthalene		2.0		ND	
	Phenanthrene		2.0		ND	

ZymaX envirotechnology, inc. is certified by CA Department of Health Services: Laboratory #1717 *PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3550 on 09/23/97.

DI IN LUVE CHICK

MSD #5 1221124n.xls JMM/lp/dz/jc/sk Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

e-mail: zymax@ZymaXusa.com

Client: Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	122 09/ 09/ Soil	211-25 10/97 17/97
Project: Wards Cove / Craig Project Number: Collected by: D. Snow/D. Imperato	Sample Descript Analyzed: Method:	tion: SB11: 2.5'-3' 09/24/97 EPA 8270	11
CONSTITUENT	PQL*		RESULT**
Acenaphthylene	5.0 5.0		
Benz (a) anthracene	5.0 5.0		ND ND
Senzo (d) Huoranthene Renzo (k) fluoranthene	5.0		
	0.0		ND
Benzo (a) pyrene Benzo (ghi) perylene	5.0		110
Benzo (a) pyrene Benzo (ghi) perylene Chrysene	5.0 5.0 5.0		ND ND
Benzo (a) pyrene Benzo (ghi) perylene Chrysene Dibenzo (a,h) anthracene Fluoranthene	5.0 5.0 5.0 5.0		
Benzo (a) pyrene Benzo (ghi) perylene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene	5.0 5.0 5.0 5.0 5.0 5.0 5.0		
Benzo (a) pyrene Benzo (ghi) perylene Chrysene Dibenzo (a,h) anthracene Fluoranthene Fluorene Indeno (1,2,3-cd) pyrene Naphthalene Ebeganthrene	5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0		

*POL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3550 on 09/23/97.

MSD #5 1221125n.xls JMM/lp/dz/jc/sk

John MacMurphey

Laboratory Director

Z	ymax envi echnology	•	O'ORT OF	ANALYTICAL RES	ULTS
Client:	Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:		12211-30 09/09/97 09/17/97 Soil	
Project: Project Collecte	Wards Cove / Craig Number: ed by: D. Snow/D. Imperato	Sample Descrip Analyzed: Method:	tion: \$814: 0'-0. 09/25/97 EPA 8270	5'	
CONST	ITUENT	PQL*	2	RESULT**	
POLYN	UCLEAR AROMATIC HYDROCARBONS			5	
Acenap	hthens	2.0		ND	
Acenap	hthylene	2.0		ND	
Anthra	cene	2.0		ND	
Benz (a) anthracene	2.0		ND	
Benzo ((b) fluoranthene	2.0		ND	
Benzo ((k) fluoranthene	2.0			
Benzo	(a) pyrene	2.0	-		
Benzo	(ghi) perylene	2.0		ND	
Chryse	ne	2.0		ND	
Dibenzo	o (a,h) anthracene	2.0		ND	
Fluoran	nthene	2.0		ND	
Fluorer		2.0		ND	
Indeno	(1,2,3-ca) pyrene	2.0		ND	
Naphth		2.0		ND	
Prenan Prenan	1(11.01.0	2.0		ND	

***POL - Practical Quantitation Limit**

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3550 on 09/23/97.

Submitted by, ZymaX envirotechnology, inc.

John MacMurphey Laboratory Director

MSD #5 1221130n.xis JMM/lp/dz/dz/rb

e-mail: zymax@ZymaXusa.com

Inx 805 544 9226 tel 805.544.4696

Client: Darryl Snow AIG Environmental Management 2 Rincon Ctr., 121 Spear St., 3rd Floor San Francisco, CA 94105	Lab Number: Collected: Received: Matrix:	12211-32 09/09/97 09/17/97 Soil	
Project: Wards Cove / Craig Project Number: Collected by: D. Snow/D. Imperato	Sample Descrip Analyzed: Method:	tion: SB15: 3.5'-4.0' 09/25/97 EPA 8270	
CONSTITUENT	PQL* mg/kg	RESULT** mg/kg	
Acenaphthene Acenaphthylene	2.0 2.0 2.0	ND ND ND	
Anthracene Benz (a) anthracene Benzo (b) fluoranthene Benzo (k) fluoranthene	2.0 2.0 2.0		
Benzo (a) pyrene Benzo (ghi) perylene Chrysene	2.0 2.0 2.0		
Dibenzo (a,h) anthracene Fluoranthene Fluorene	2.0 2.0 2.0		
Indeno (1,2,3-cd) pyrene Naphthalene	2.0 2.0 2.0	ND ND ND	
Phenanthrene Pyrene	2.0	ND	

*PQL - Practical Quantitation Limit

**Results listed as ND would have been reported if present at or above the listed PQL.

Note: Extracted by EPA 3550 on 09/23/97.

MSD #5 1221132n.xls JMM/lp/dz/dz/rb Submitted by, ZymaX envirotechnology, inc.

John MacMurphey

Laboratory Director

e-mail: zymax@ZymaXusa.com

(ax 805.544.6220 tel 805.544.4696