

2333.38.013



ALASKA
Department of
Environmental
Conservation

**REPORT FOR GROUNDWATER SAMPLING
COASTAL DRILLING, ADEC FILE NO. 2333.38.013
SOLDOTNA, ALASKA**

December 2, 2008

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Contract Management Section

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ADEC
Kenai Area Office



Prepared by:



oasis

ENVIRONMENTAL

825 W. 8th Ave.
Anchorage, AK 99501

*Reviewed 7-10-09 - OK
PDA*



December 2, 2008

Mr. Dennis Harwood
Alaska Department of Environmental Conservation
555 Cordova St.
Anchorage, AK 99501

**Subject: Report for Coastal Drilling Monitoring Well Sampling
Soldotna, AK
ADEC File No. 2333.38.013; Spill No. 1987230126701**

Dear Mr. Harwood:

This letter presents the report for a monitoring well sampling event conducted by OASIS Environmental, Inc. (OASIS) at the Coastal Drilling Site to update site hydrogeology and groundwater contamination information. The Coastal Drilling Site is located at Mile 0.5 Kenai Spur Highway in Soldotna, Alaska (Figure 1). The work also included well decommissioning, well rehabilitation, and monitoring well network surveying. This report is being submitted as part of the requirements of the Scope of Work. This work is being conducted under OASIS Alaska Department of Environmental Conservation (ADEC) Term Contract No. 18-902813, Notice-to-Proceed No. 18-902813-55.

SITE HISTORY

The Coastal Drilling Facility was developed in 1957 as a maintenance and support facility for petroleum and gas exploration in Cook Inlet. Disposal of old engines, drill rig parts, oil tanks, drums, drilling muds, waste oil, and miscellaneous scrap metal, rubber, and timber is known to have occurred at the site. Two centrally located, adjacent pits (one covered and one uncovered) were reportedly used for much of the disposal and have been the focus of past environmental investigations. The covered pit was also used as a drain field for wastes that were discharged into a metal grate located near a concrete slab. The grate is connected to the pit by a 6-inch-diameter steel pipe. Previous environmental investigations have encountered petroleum hydrocarbons, chlorinated solvents, and polychlorinated biphenyls (PCBs) in surface and subsurface soils. Low to non-detectable levels of aromatic hydrocarbons have been encountered in groundwater beneath the site.

REGULATORY FRAMEWORK

Groundwater laboratory results obtained from the monitoring well network at the Coastal Drilling site were compared to cleanup levels presented in 18 AAC 75.345, Table C (October 9, 2008). The following table presents the cleanup levels that were utilized for comparison to analytical results.

PROJECT GROUNDWATER CLEANUP LEVELS

Parameter / Analytical Method	ADEC Cleanup Level in milligrams per liter (mg/L)
Volatile organic compounds (VOC) / EPA 8260B	Dependent on Analyte
Gasoline range organics (GRO) / AK 101	2.2
Diesel range organics (DRO) / AK 102	1.5
Barium / EPA 6010B	2.0
Chromium / EPA 6010B	0.1
Lead / EPA 6010B	0.015

WORK PERFORMED

OASIS personnel mobilized to the site on September 15, 2008 and met the drilling subcontractor, Hughes Drilling, for well decommissioning and rehabilitation. GW-1 and B-11MW were decommissioned in general accordance with the ADEC Monitoring Well Design and Construction guidance dated February 2008. For B-11MW, the upper 5 feet of the well was removed, and the remaining hole filled with volclay to within 1 foot of the surface. The upper foot was completed with native materials. The casing for GW-1 broke 3 feet below ground surface (bgs). Attempts to reattach to the casing failed. The remaining hole was filled with volclay to within 1 foot of the surface. The upper foot was completed with native materials. Well decommissioning activities were photo-documented; photographs are provided in Appendix A.

GW-2 was rehabilitated by removing the present flush monument, extending the well up by approximately 3 feet, and completing the well with an aboveground, lockable monument. A well lock matching the other site locks were put on the monument to secure the well.

Groundwater levels in GW-2 through GW-7 and B-1MW through B-3MW were then measured. Following groundwater level measuring, wells were purged using disposable bailers on September 15 and 16, 2008. A minimum of three casing volumes were removed from each well; the purge water was observed for sheen and odor. Purge water was containerized. Water from outside the fenced area was segregated from the purge water within the fence to allow for potentially different disposal options.

Upon completion of purging, samples were collected from each well except B-4MW. This well contained approximately one foot of water when measured on September 15, but was found to be dry on September 16.

Volatile analyses (volatile organic compounds [VOCs] and gasoline-range organics [GRO]) were collected first followed by semi- and non-volatile analytes (diesel-range organics [DRO] and dissolved metals [barium, chromium, and lead]). Dissolved metals samples were collected by pumping samples from the bailer through a 0.45 micron filter using a peristaltic pump into the appropriate laboratory provided containers.

Samples were immediately labeled with the monitoring well name, date, time, requested analysis, and sampler's initials. They were then placed in sample coolers with gel ice and maintained at 4 degrees Celsius (°C) until delivered to the laboratory under chain-of-custody procedures.

All site wells were located by a professional land surveyor (PLS). The PLS located all monitoring wells to within 0.5 feet and determine the elevation of all measuring points to the nearest 0.01 foot. The horizontal location of KM-1, a water supply well not included in sampling program, was also determined. Survey information is included in Appendix B.

The individuals who performed the site work met the definition of, or were supervised by a person who meets the definition of, a "qualified person" as per 18 AAC 75.990(100).

GROUNDWATER OBSERVATIONS

Groundwater levels were generally 33 to 40 feet below the top of the well casings (Table 1). Figure 2 presents the inferred groundwater contours for the site. Groundwater flow on the eastern portion of the site is to the west to west north-west with a hydraulic gradient of 0.033. At the fenced area, the groundwater flow direction becomes variable from northward to west-southwestward, and the gradient becomes much flatter, on the order of 0.010 to 0.005 depending on location.

ANALYTICAL RESULTS

Laboratory results are summarized in Table 2. Laboratory reports are provided in Appendix C.

VOCs, GRO, DRO, chromium, and lead results were non-detect (ND) for all samples. Dissolved barium was detected in all samples at a maximum concentration of 0.102 mg/L (GW-5). All concentrations are below the ADEC groundwater cleanup level of 2.0 mg/L.

Data Quality Review

An ADEC Laboratory Data Review Checklist is provided in Appendix C. No data issues were identified by the laboratory or during our review of the data; all data is accepted for the purposes of this report.

CONCLUSIONS

Only barium was detected in the site samples and no concentrations were detected above ADEC cleanup levels in any wells sampled. It appears that groundwater impacts at the site have attenuated over time. All purge/decontamination water from this sampling event can be disposed of on site; we recommend for perception that the drums be emptied inside the fenced area.

As stated in our trip report from ⁵ May 2008 (OASIS 2008), five empty drums and 9 drums with contents are present within the fenced area; two full drums are present outside the fenced area near GW-2. A least ¹ one drum within the fenced area is located within one of the shallow ponded pits (see report cover); it is not known whether this drum is empty or not. Presumably, the contents of the drums are soil and water from past drilling and groundwater sampling activities on the site. In order to bring the site to closure, we recommend that the drums be opened, the contents characterized, and the drums and contents disposed of. Retrieval of the drum in the ponded pit may involve the use of heavy equipment and the removal of some trees and brush.

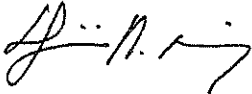
LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same and similar localities, at the time that the work was performed. It is intended for the exclusive use of ADEC. This letter report is not meant to represent a legal opinion, and no other warranty, express or implied, is made.

We appreciate the opportunity to assist ADEC with this project. If you should have any questions regarding this report, please contact us at 907.258.4880.

Sincerely,

OASIS Environmental, Inc.



Herminio R. Muniz, C.P.G.
Sr. Hydrogeologist

Attachments:

1. Table 1 – Groundwater Elevations – September 15 & 16, 2008
2. Table 2 – Groundwater Laboratory Analytical Results
3. Figure 1 – Site Location Map
4. Figure 2 – Site Plan
5. Appendix A – Photographs
6. Appendix B – Survey Information
7. Appendix C – ADEC Laboratory Data Review Checklist and Laboratory Reports

TABLES

Table 1 - Groundwater Elevations - September 15 & 16, 2008
Coastal Drilling Site
Soldotna, Alaska

Well Number	Measuring Point Elevation ¹ in feet	Depth to Water in feet BTOC	Groundwater Elevation in feet
GW-2	101.81	37.97	63.84
GW-3	101.61	37.58	64.03
GW-4	100.80	36.76	64.04
GW-5	99.85	35.66	64.19
GW-6	100.70	36.69	64.01
GW-7	102.99	33.03	69.96
BMW-2	103.02	39.76	63.26
BMW-3	102.03	38.20	63.83
BMW-4	101.90		Well Dry

Notes:

¹ Horizontal Datum: NAD83 ASP Zone 4, Hor. Datum Source: KENS CORS Epoch 2003;

Vert. Datum: NGVD29, Vert. Datum Source BM B-79 Reset

BTOC = Below top of casing

Table 2: Groundwater Laboratory Analytical Results
Coastal Drilling Site
Soldotna, Alaska

Sample Name	EPA Method 8260B	Alaska Method AK 101	Alaska Method AK 102	EPA Method 6010B		
	VOC in mg/L	GRO in mg/L	DRO in mg/L	Dissolved Barium in mg/L	Dissolved Chromium in mg/L	Dissolved Lead ² in mg/L
GW-2	ND	ND (0.50)	ND (0.40)	0.022	ND (0.008)	ND (0.0.015)
GW-3	ND	ND (0.50)	ND (0.40)	0.020	ND (0.008)	ND (0.0.015)
GW-4 Duplicate 1	ND	ND (0.50)	ND (0.40)	0.087	ND (0.008)	ND (0.0.015)
	ND	ND (0.50)	ND (0.40)	0.088	ND (0.008)	ND (0.0.015)
GW-5	ND	ND (0.50)	ND (0.40)	0.102	ND (0.008)	ND (0.0.015)
GW-6	ND	ND (0.50)	ND (0.40)	0.010	ND (0.008)	ND (0.0.015)
GW-7	ND	ND (0.50)	ND (0.40)	0.056	ND (0.008)	ND (0.0.015)
B-2MW	ND	ND (0.50)	ND (0.40)	0.022	ND (0.008)	ND (0.0.015)
B-3MW	ND	ND (0.50)	ND (0.40)	0.016	ND (0.008)	ND (0.0.015)
B-4MW	Not Sampled, No Water in Well					
Trip Blank	ND	ND (0.50)	----	----	----	----
ADEC Cleanup Level¹ in mg/L	Various	2.2	1.5	2.0	0.1	0.015

Notes:

Results may be rounded.

¹18 AAC 75.345, Table C (October 9, 2008).

² Detection limit shown is method detection limit (MDL) not method reporting limit (MRL).

ADEC - Alaska Department of Environmental Conservation

DRO - diesel range organics

EPA - US Environmental Protection Agency

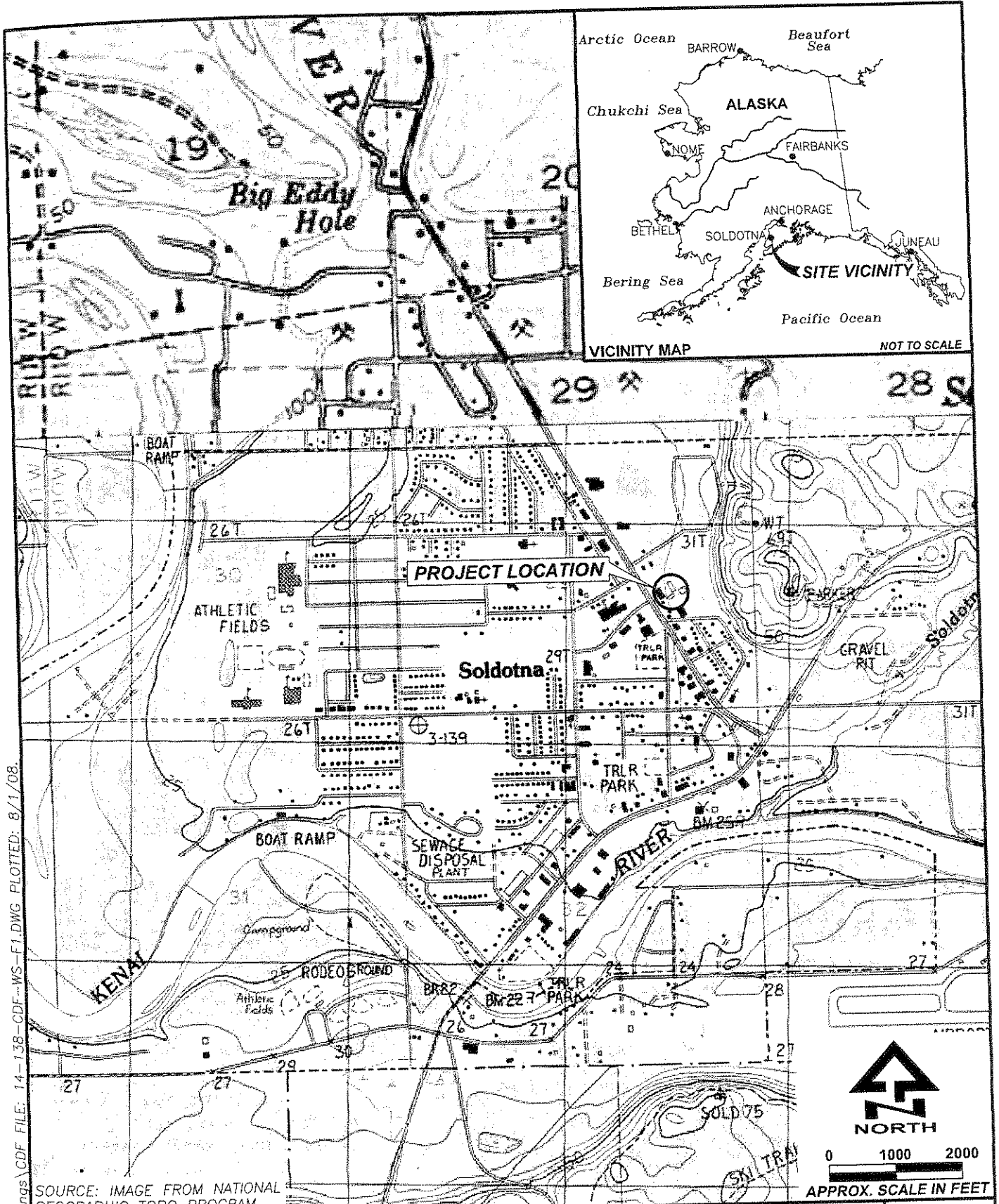
GRO - gasoline range organics

mg/L - milligrams per liter

ND (0.001) - none detected at concentration shown.

ND - No VOC analytes detected; analyte detection limits listed in laboratory report.

FIGURES



PATH: V:\Project Drawings\CDF FILE: 14-138-CDF-WS-F1.DWG PLOTTED: 8/1/08.

SOURCE: IMAGE FROM NATIONAL GEOGRAPHIC TOPO PROGRAM.



DATE: AUG. 2008
 CHKD: N.R.M.
 DRAWN: K.J.S.
 PROJ. No.: 14-138
 825 W. 8th Ave., Anchorage,
 AK 99501, (907) 258-4880

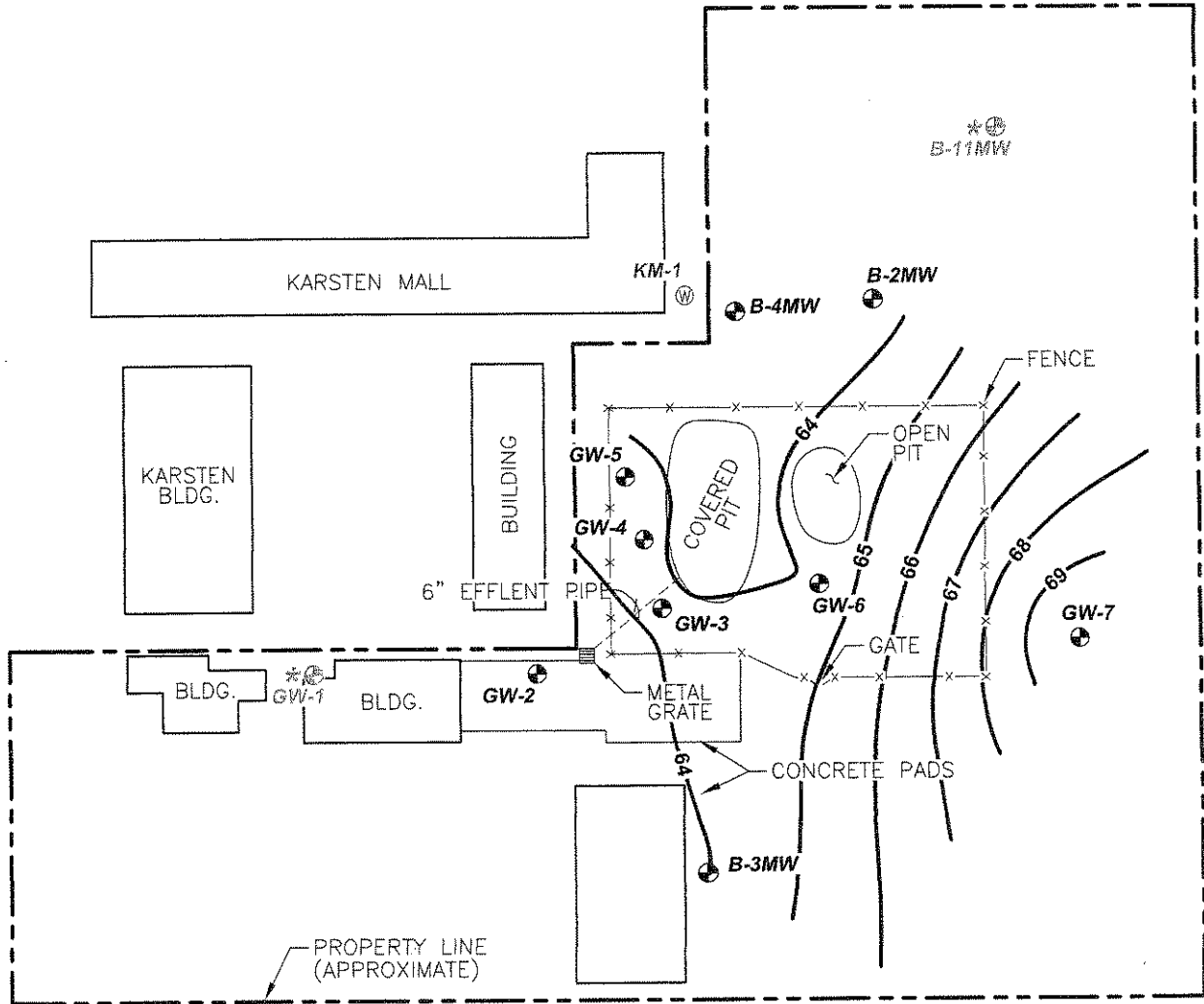
SITE LOCATION MAP

COASTAL DRILLING
 MONITORING WELL SAMPLING
 Soldotna, Alaska

FIGURE
 1

PATH: V:\Project Drawings\CDF FILE: 14-138-CDF-WS-F2.DWG PLOTTED: 12/1/08.

KENAI SPUR ROAD



EXPLANATION

- GW-2 ● MONITORING WELL LOCATION
- GW-1* ⊕ DECOMMISSIONED MONITORING WELL
- ⊕ KARSTEN MALL WELL (NOT IN USE)
- 65— GROUNDWATER ELEVATION CONTOUR (AMSL)



0 60 120
APPROX. SCALE IN FEET



DATE: DEC. 2008
 CHKD: N.R.M.
 DRAWN: C.E.H.
 PROJ. No.: 14-138
 825 W. 8th Ave., Anchorage,
 AK 99501, (907) 258-4880

SITE PLAN

COASTAL DRILLING
 MONITORING WELL SAMPLING
 Soldotna, Alaska

FIGURE

2

APPENDIX A
Photographs



Photograph 1: GW-1 with broken casing piece.



Photograph 2: Broken casing in ground, GW-1.



Photograph 3: Pumping volclay into GW-1.



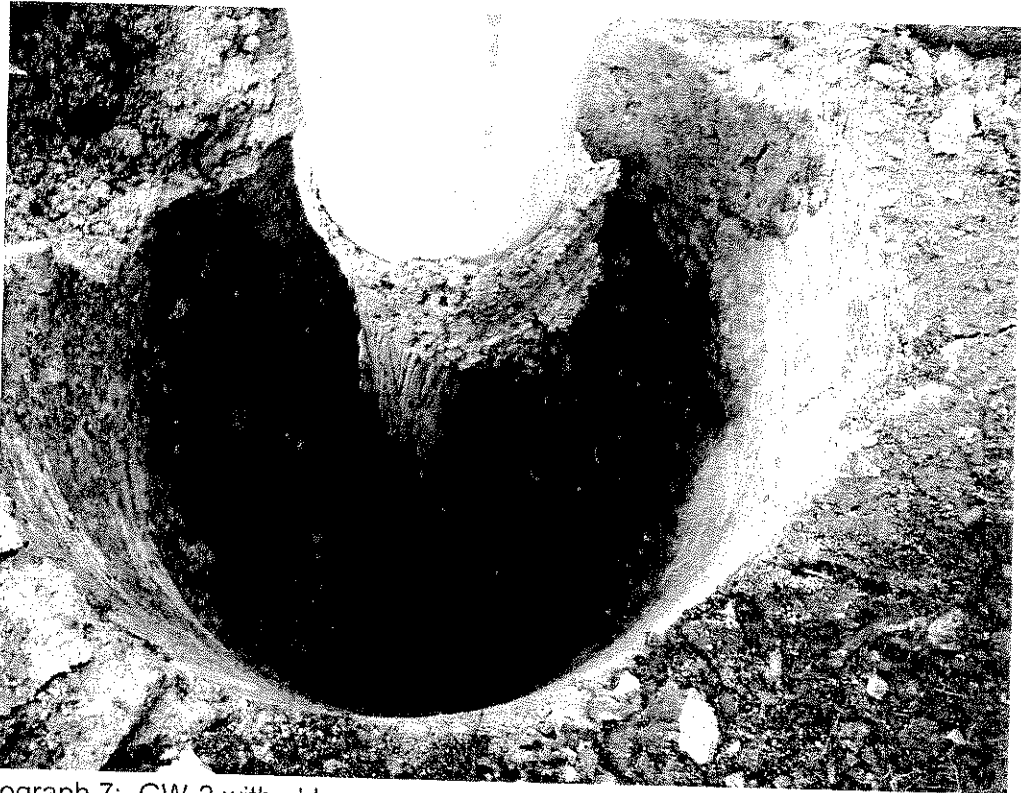
Photograph 4: Removing well casing from B-11 MW.



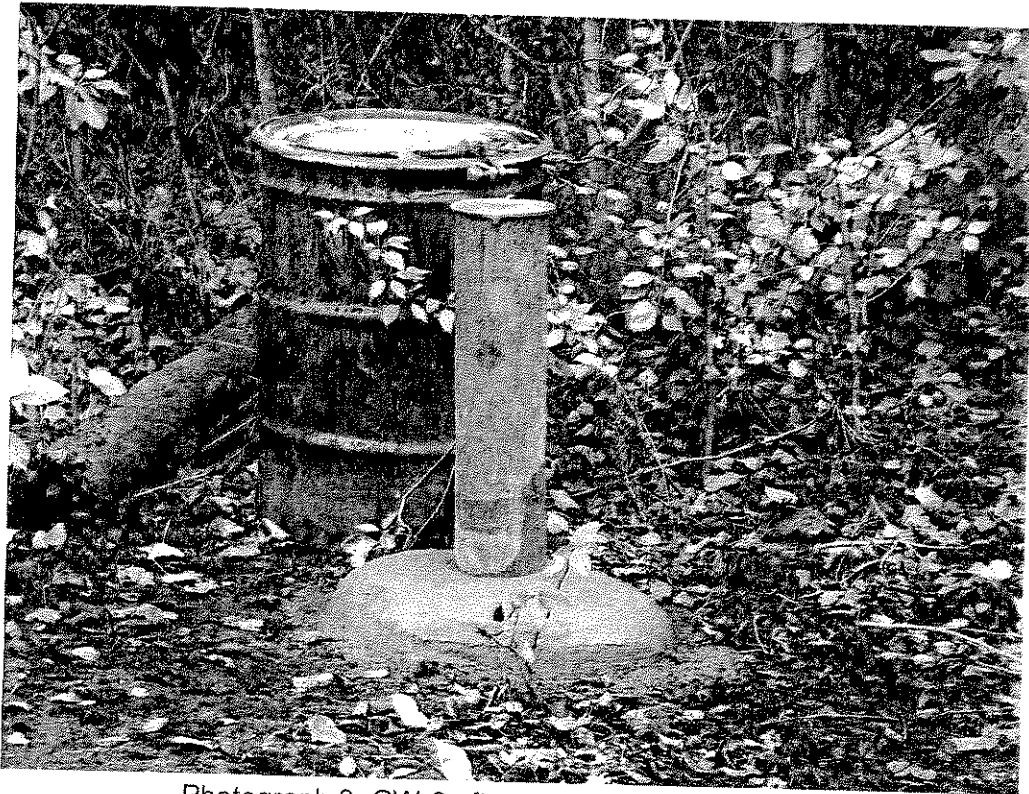
Photograph 5: Remaining hole in B-11MW after with casing removal..



Photograph 6: B-11MW decommissioning completed.

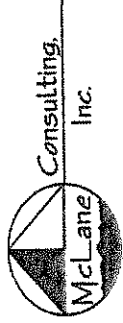


Photograph 7: GW-2 with old monument removed and new casing extension attached.



Photograph 8: GW-2 after rehabilitation completed.

APPENDIX B
Survey Information

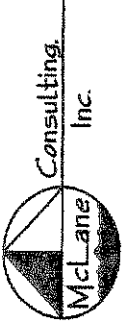


Oasis Job No. 14-138
 Coastal Drilling Site
 Soldotna, AK

1 of 2
 10/21/2008
 083087_Oasis_Coastal_Drilling.xls
 HORIZONTAL DATUM: NAD83 ASP ZONE 4
 HOR. DATUM SOURCE: KEN5 CORS EPOCH 2003
 VERT. DATUM: NGVD29
 VERT. DATUM SOURCE BM B-79 RESET

PT NO.	ASP NORTHING	ASP EASTING	ELEV. PVC	ELEV. CASING	ELEV. GROUND	DESCRIPTOR
16	2373462.15	1448571.82	101.81	101.97	101.97	99.39 GW2 WELL MONITOR
21	2373652.72	1448871.91	102.99	103.13	103.13	100.47 GW7 WELL MONITOR
22	2373402.83	1448732.09	102.03	102.45	102.45	99.43 B3 WELL MONITOR
23	2373601.66	1448705.76	100.70	101.00	101.00	99.49 GW6 WELL MONITOR
24	2373538.82	1448624.08	101.61	101.99	101.99	99.14 GW3 WELL MONITOR
25	2373572.23	1448592.42	100.80	100.98	100.98	98.89 GW4 WELL MONITOR
26	2373602.10	1448562.52	99.85	100.26	100.26	98.49 GW5 WELL MONITOR
29	2373730.262	1448574.342	101.90	102.54	102.54	100.14 B4 WELL MONITOR
30	2373780.30	1448649.17	103.02	103.24	103.24	100.14 B2 WELL MONITOR
34	2373724.23	1448541.752				100.56 KM1 WELL CASE
17	2373496.24	1448607.19				99.18 FENCE COR
18	2373538.04	1448682.32				99.58 FENCE COR
19	2373538.89	1448714.85				98.49 FENCE COR
20	2373601.08	1448830.07				99.29 FENCE COR
27	2373637.19	1448532.57				98.04 FENCE COR
28	2373754.70	1448744.97				100.67 FENCE COR
13	2373399.91	1448549.95				99.93 BLDG COR
14	2373445.92	1448524.64				99.69 BLDG COR
31	2373350.27	1448460.77				99.80 BLDG COR
32	2373797.75	1448485.48				98.00 BLDG COR
33	2373707.90	1448535.23				98.00 BLDG COR
13	2373399.91	1448549.95				99.93 BLDG COR
14	2373445.92	1448524.64				99.69 BLDG COR
31	2373350.27	1448460.77				99.80 BLDG COR
32	2373797.75	1448485.48				98.00 BLDG COR
33	2373707.90	1448535.23				98.00 BLDG COR

Oasis Job No. 14-138
 Coastal Drilling Site
 Soldotna, AK



083087_Oasis_Coastal_Drilling.xls
 HORIZONTAL DATUM: NAD83 ASP ZONE 4
 HOR. DATUM SOURCE: KEN5 CORS EPOCH 2003
 VERT. DATUM: NGVD29
 VERT. DATUM SOURCE BM B-79 RESET

PT NO.	ASP NORTHING	ASP EASTING	ELEV. PVC	ELEV. CASING	ELEV. GROUND	DESCRIPTOR
10	2373445.16	1448691.20				99.57 PAD CONCRETE
11	2373410.25	1448628.18				99.56 PAD CONCRETE
12	2373487.03	1448709.41				99.65 PAD CONCRETE