



Environmental Consulting & Technology, Inc.

HYDROGEOLOGICAL INVESTIGATION

**WHITEWATER 9 CPF
O.I.L. Energy Corporation**

44° 60' 16.7" - 85° 24' 48.0"

**Whitewater Township, T28N-R09W
Grand Traverse County, Michigan**

**PREPARED FOR:
O.I.L. Energy Corporation
954 Business Park Drive, Suite 5
Traverse City, Michigan 49686**

**PREPARED BY:
Environmental Consulting & Technology, Inc.
Project #070903-1700**

August 21, 2008

3622 Veterans
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Traverse City, Michigan
49684

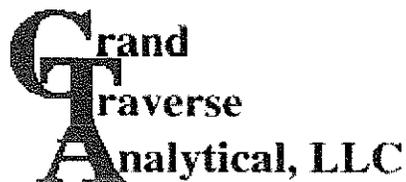
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ENVIRONMENTAL QUALITY
OFFICE OF GEOLOGICAL SURVEY



INDEPENDENT TESTING LAB

2785 NORTH GARFIELD ROAD, TRAVERSE CITY, MI 49686

TEL: 231-929-0905

FAX: 231-929-0894

www.gtanalytical.com

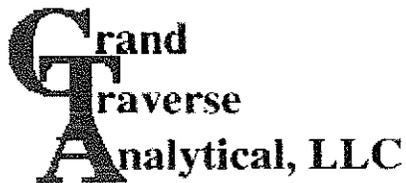
COMPANY:	OIL ENERGY	GTA PROJECT NO:	073108-3 - 1
PROJECT NO:		DATE SAMPLED:	7/31/2008
LOCATION:	HUBBELL CPF	TIME SAMPLED:	11:30 AM
		DATE RECEIVED:	7/31/2008
		TIME RECEIVED:	1:00 PM
SAMPLED	MI JEREMY LOWENDOWSKI/ECT	SAMPLE ID:	MW-1
SAMPLE	WATER		

EPA 8260B VOLATILE ORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date</u> <u>Extracted</u>	<u>Date</u> <u>Completed</u>	<u>Prep Method</u>
Benzene	ND	1	ug/L (PPB)	MR		8/2/2008	EPA 5030B
Toluene	ND	1					
Ethylbenzene	ND	1					
Xylene(Total)	ND	3					

SOIL/SOLIDS CONCENTRATIONS ARE DETERMINED ON A DRY WEIGHT BASIS
 ND = NOT DETECTED
 LOD = LIMIT OF DETECTION

APPROVED BY: _____
 KIRK L CHASE
 CHEMIST



INDEPENDENT TESTING LAB

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COMPANY: OIL ENERGY
 PROJECT NO:
 LOCATION: HUBBELL CPF
 MI
 SAMPLED JEREMY LOWENDOWSKI/ECT
 SAMPLE ID: MW-1

GTA PROJECT NO: 073108-3 - 1
 DATE RECEIVED: 7/31/2008
 TIME RECEIVED: 1:00 PM
 DATE SAMPLED: 7/31/2008
 TIME SAMPLED: 11:30 AM
 SAMPLE WATER

INORGANICS/METALS/WET CHEMISTRY

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>
ALKALINITY SM2320-B(BICARBONATE)	253	5	mg/L (PPM)	KC	8/4/2008
CALCIUM EPA 215.1	118	1	mg/L (PPM)	MR	8/5/2008
CHLORIDE EPA 9253	34	6	mg/L (PPM)	KC	8/2/2008
MAGNESIUM EPA 242.1	34	1	mg/L (PPM)	MR	8/5/2008
POTASSIUM EPA 258.1	3.7	0.5	mg/L (PPM)	MR	8/5/2008
SODIUM EPA 273.1	13.6	0.5	mg/L (PPM)	MR	8/5/2008
SULFATE EPA 375.4	ND	5	mg/L (PPM)	KC	8/11/2008

ND = NOT DETECTED
 LOD = LIMIT OF DETECTION
 s.u. = STANDARD pH UNITS REPORTED AT 25 C
 DISS = DISSOLVED

APPROVED BY: _____
 KIRK L. CHASE/CHEMIST

BORING/CONSTRUCTION LOG



ECT

ENVIRONMENTAL
CONSULTING &
TECHNOLOGY



3622 Veterans Dr Ste 2 Traverse City MI 49684

PH # 231-946-8200

PROJECT: <u>WHIEWAIR 9 CPF</u>	BORING I D: <u>MW-1</u>
CLIENT: <u>O.I.L. ENERGY CORP.</u> <u>945 BUSINESS PARK DRIVE, STE. 5</u> <u>TRAVERSE CITY, MI 49684</u>	ECT PROJECT#: <u>070903-1700</u>
WELL DRILLER: <u>NORM JONES</u>	CASING ELEVATION: <u>96 18 (ARBITRARY DATUM)</u>
DATE: <u>07/30/08</u>	STATIC WATER LEVEL: <u>59.75 (ARBITRARY DATUM)</u>
AUGER TYPE: <u>4.25" I.D. HOLLOW STEM</u>	TOTAL DEPTH: <u>50' - bore hole</u>
PROJECT MANAGER: <u>WAYNE COCKRUM</u>	TOP OF SCREEN: <u>38' (below ground surface)</u>
	LENGTH OF SCREEN: <u>5'</u>
	SCREEN SLOT: <u>0.010 INCH</u>
	TYPE OF CASING/SCREEN: <u>SCHEDULE 40 PVC/PVC</u>

DEPTH	LITHOLOGY	CONSTRUCTION	SAMPLE INFORMATION						
			SOIL			GROUNDWATER			
			DEPTH	TYPE	CL	DEPTH	TYPE	CL	
00	SAND, medium w/silt & trace clay brown, moist								
05	CLAY, w/some m sand </@PL. brown, moist CLAY f-m sandy, silty lt brown								
10	CLAY trace gravel, firm reddish brown moist								
15	CLAY trace f-m sand very hard plated structure								
20	CLAY very hard brown								
25	CLAY, trace f sand brownish gray very hard								
30	CLAY, less hard gray								
35	SAND, fine, silty w/some clay wet-sat lt brown-tan								
40	SAND fine, silty, lt brown-tan sat								
45	SAND, fine, lt brown-tan, sat								
50	E.O.B @ 50								

GRAB *

NOTE: * SUBMITTED FOR LABORATORY ANALYSIS
** FIELD ANALYSIS

BORING/CONSTRUCTION LOG



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TECHNOLOGY



3622 Veterans Dr Ste 2 Traverse City MI 49684

PH # 231-946-8200

PROJECT: WHITEWATER 9 CPF
 CLIENT: O.I.L. ENERGY CORP.
945 BUSINESS PARK DRIVE, STE. 5
TRAVERSE CITY, MI 49684
 WELL DRILLER: NORM JONES
 DATE: 07/30/08
 AUGER TYPE: 4 25" I.D. HOLLOW STEM
 PROJECT MANAGER: WAYNE COCKRUM

BORING I.D.: MW-2
 ECT PROJECT#: 070903-1700
 CASING ELEVATION: 95.38 (ARBITRARY DATUM)
 STATIC WATER LEVEL: 59.91 (ARBITRARY DATUM)
 TOTAL DEPTH: 44' - bore hole
 TOP OF SCREEN: 38' (below ground surface)
 LENGTH OF SCREEN: 5'
 SCREEN SLOT: 0.010 INCH
 TYPE OF CASING/SCREEN: SCHEDULE 40 PVC/PVC

DEPTH	LITHOLOGY	CONSTRUCTION	SAMPLE INFORMATION								
			SOIL			GROUNDWATER					
			DEPTH	TYPE	CL	DEPTH	TYPE	CL			
00	SAND, medium silt brown moist										
05	CLAY, w/f sand </@PI. ll brown moist										
10											
15	CLAY @PI reddish brown moist CLAY, trace f-m sand firm-hard CLAY trace f-m sand mottled										
20	CLAY, plated structure CLAY hard. <PI										
25											
30	SAND, fine to medium w/some silt. brown, moist SILT, w/some fine sand & clay pale brown, moist SAND fine, trace silt moist-wet pale brown-tan										
35	wet-sat sat										
40											
45	E.O.B @ 44										
50											

NOTE: * SUBMITTED FOR LABORATORY ANALYSIS
 ** FIELD ANALYSIS

BORING/CONSTRUCTION LOG



ECT

ENVIRONMENTAL
CONSULTING &
TECHNOLOGY



3622 Veterans Dr Ste. 2 Traverse City MI 49684

PH # 231-946-8200

PROJECT: <i>WHITEWATER 9 CPF</i>	BORING I D.: <i>MW-3</i>
CLIENT: <i>O.I.L. ENERGY CORP.</i> <i>945 BUSINESS PARK DRIVE, STE. 5</i> <i>TRAVERSE CITY, MI 49684</i>	ECT PROJECT#: <i>070903-1700</i>
WELL DRILLER: <i>NORM JONES</i>	CASING ELEVATION: <i>95.38 (ARBITRARY DATUM)</i>
DATE: <i>07/31/08</i>	STATIC WATER LEVEL: <i>59.91 (ARBITRARY DATUM)</i>
AUGER TYPE: <i>4.25" I.D. HOLLOW STEM</i>	TOTAL DEPTH: <i>44' - bore hole</i>
PROJECT MANAGER: <i>WAYNE COCKRUM</i>	TOP OF SCREEN: <i>38' (below ground surface)</i>
	LENGTH OF SCREEN: <i>5'</i>
	SCREEN SLOT: <i>0.010 INCH</i>
	TYPE OF CASING/SCREEN: <i>SCHEDULE 40 PVC/PVC</i>

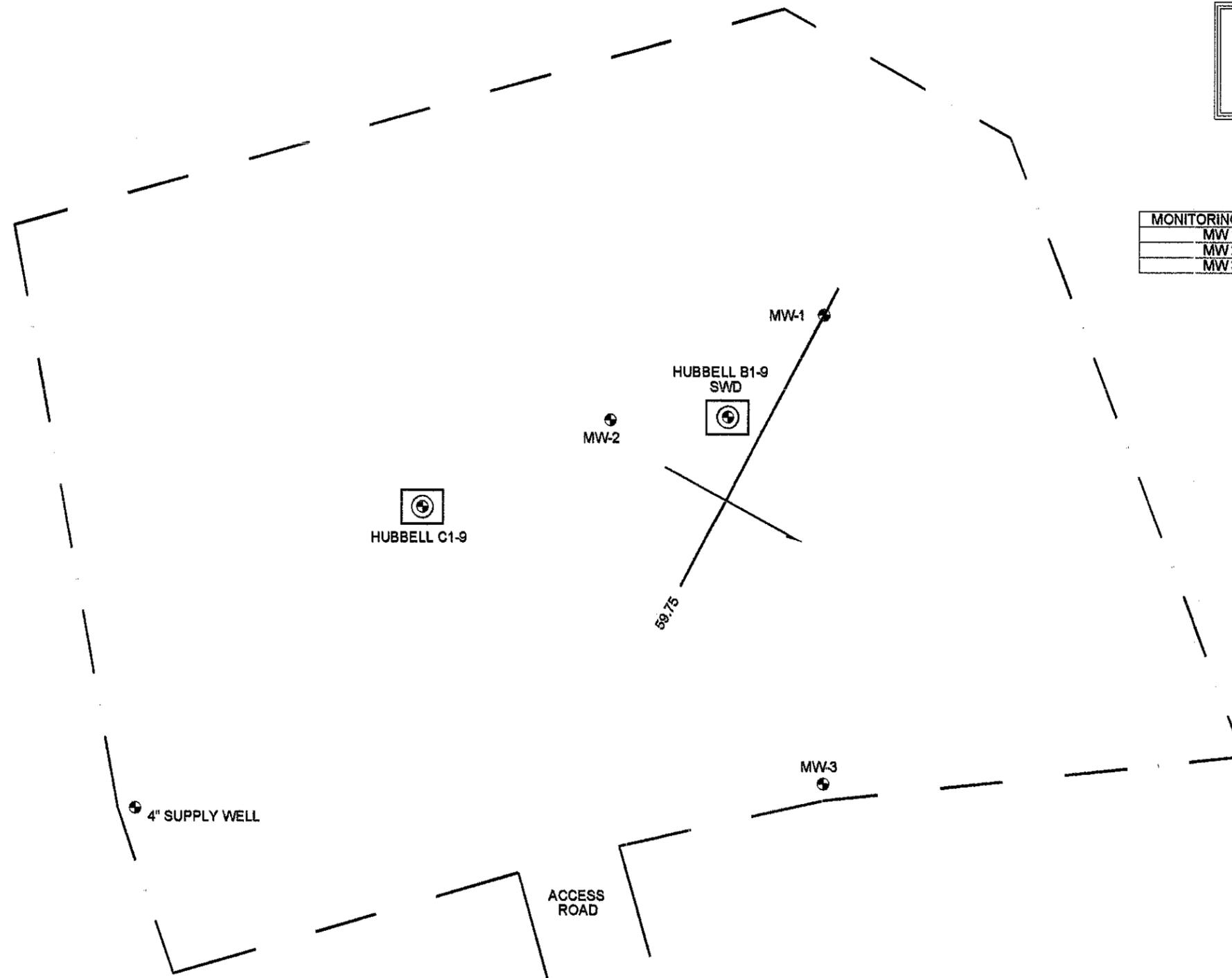
DEPTH	LITHOLOGY	CONSTRUCTION	SAMPLE INFORMATION						
			SOIL			GROUNDWATER			
			DEPTH	TYPE	CL	DEPTH	TYPE	CL	
00	<i>SAND, medium w/silt & clay brown moist</i>								
05									
10	<i>SAND, fine to medium w/some silt brown. moist</i>								
15	<i>SAND fine silty lt brown moist</i>								
20									
25	<i>CLAY harder w/depth. reddish brown</i>								
30									
35	<i>CLAY f sandy lt brown @PI</i>								
40	<i>SAND, fine, w/trace silt lt brown. @ PL, wet-sat sat</i>								
45	<i>E.O.B @ 44</i>								
50									

NOTE: * SUBMITTED FOR LABORATORY ANALYSIS
** FIELD ANALYSIS



O I L. ENERGY CORP
 WHITEWATER 9 CPF
 SW, SW, NW, SECTION 9
 WHITEWATER TOWNSHIP
 GRAND TRAVERSE COUNTY, MI

MONITORING WELL	TOC ELEVATION	GWELEVATION
MW 1	96.18	59.75
MW 2	95.38	59.91
MW 3	96.26	59.50



LEGEND

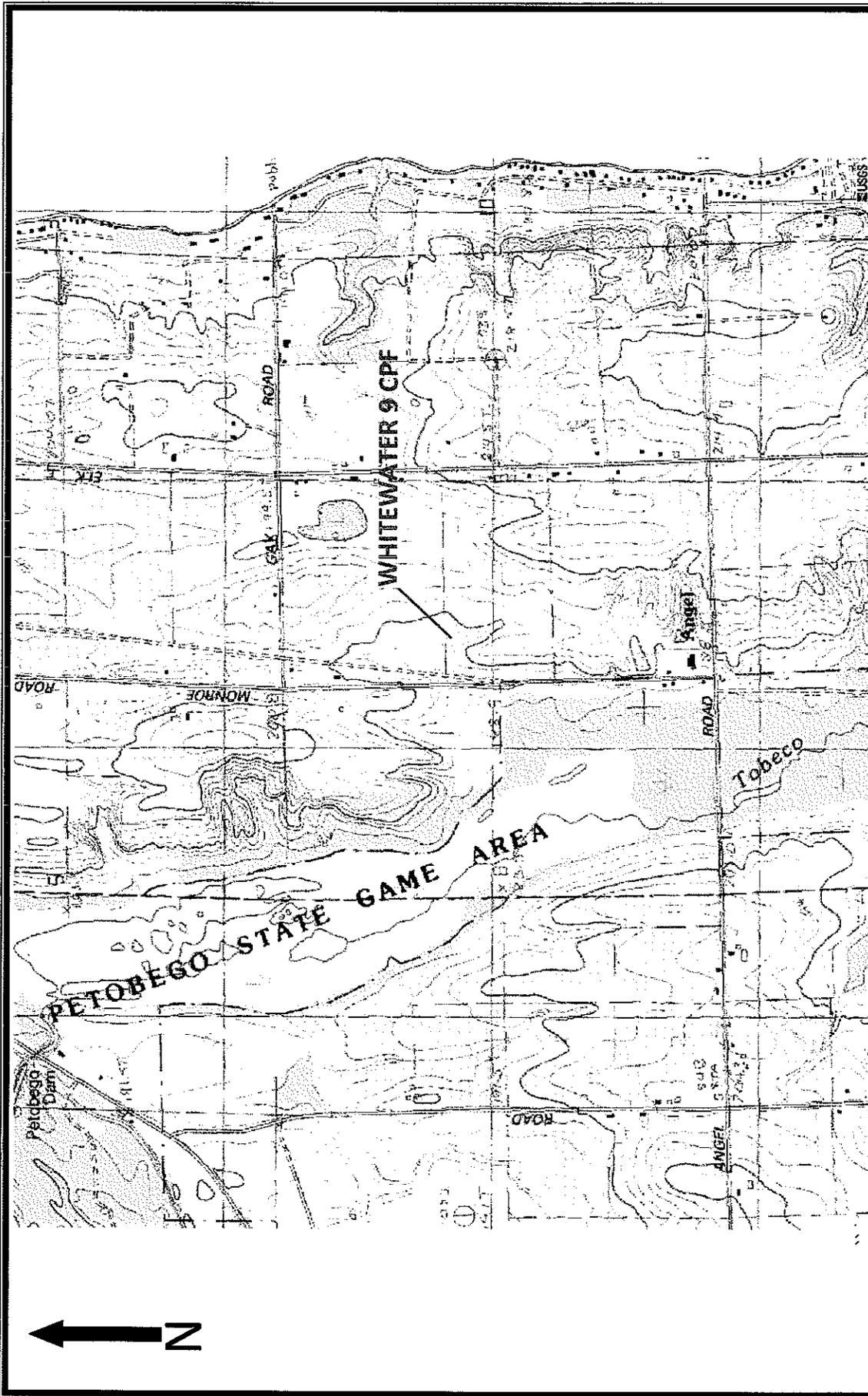
- ⊕ PRODUCTION/DISPOSAL WELL
- ⊙ MONITOR WELL
- - - - EXTENT OF WELL PAD
- 59.75 — GROUNDWATER ELEVATION ISOPLETH (FT)
- HYDRAULIC GRADIENT: 4.79'/1,000' & GROUNDWATER FLOW DIRECTION

FIGURE 3

SITE PLAN & GROUNDWATER FLOW

ECT ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.		
DEPARTMENT: ENVIRONMENTAL	TITLE: SITE PLAN & GROUNDWATER FLOW	DATE: 08/05/08
PROJECT MGR/#: 070903-1700	CLIENT: O.I.L. ENERGY CORP.	CAD OPER: JSL

SCALE: 1" = 30'

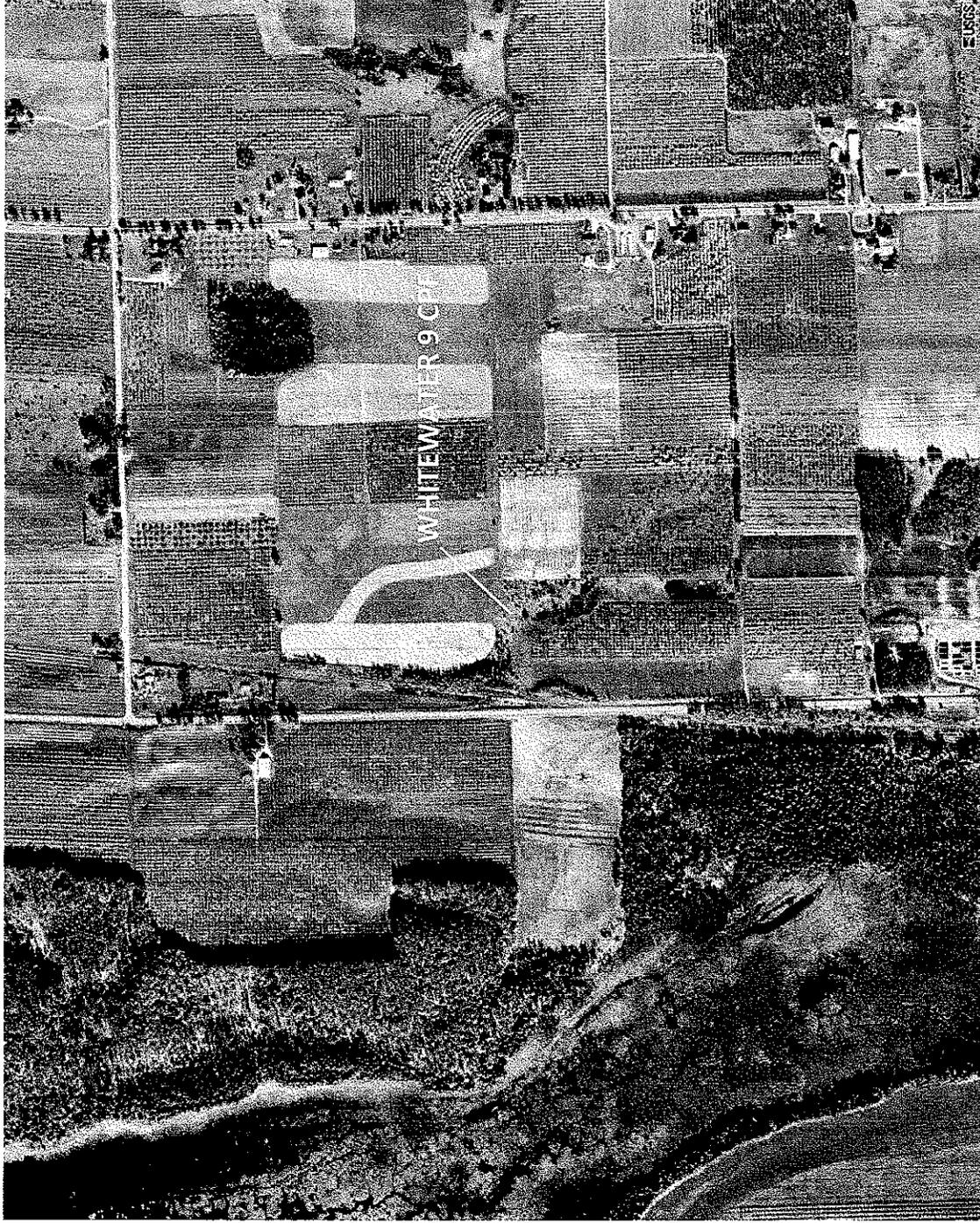


SITE LOCATON DIAGRAM

FIGURE 1
PROJECT #070903-1700
DATE: 08/05/08

WHITEWATER 9 CPF
SW/SW/NW SECTION 9, WHITEWATER TOWNSHIP
GRAND TRAVERSE COUNTY, MICHIGAN

ECT
 Environmental Consulting & Technology, Inc.



AERIAL PHOTOGRAPH - 27 APR 98

FIGURE 2

PROJECT #070903-1700

DATE: 08/05/08

WHITEWATER 9 CPF
SW/SW/NW SECTION 9, WHITEWATER TOWNSHIP
GRAND TRAVERSE COUNTY, MICHIGAN



Environmental Consulting & Technology, Inc.

TABLE 1

GROUNDWATER ANALYTICAL DATA

Whitewater 9 Central Production Facility

Section 9, Whitewater Township
Grand Traverse County, Michigan

Sample Location and (Depth)	MW-1
Sampled By:	ECT
Sample Date:	7/31/08
Sample Collection Methodology:	GRAB
Benzene (µg/L)	<1
Toluene(µg/L)	<1
Ethylbenzene (µg/L)	<1
Total Xylenes (µg/L)	<3
Calcium (mg/L)	118
Sodium (mg/L)	13.6
Magnesium (mg/L)	34
Potassium (mg/L)	3.7
Chloride (mg/L)	34
Sulfate (mg/L)	<5
Bicarbonate (mg/L)	253

TABLE 2
MDEQ PART 201 COMPARISON TABLE FOR
GROUNDWATER

Whitewater 9 Central Production Facility
 Section 9, Whitewater Township
 Grand Traverse County, Michigan

Criteria: Residential & Commercial I
 Exposure Code: Drinking Water

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (µg/L)	Drinking water Criterion with Exposure Codes (µg/L)	Criterion Exceeded? (Yes or No)
Benzene	MW-1	7/31/08	<1	5.0	NO
Toluene	MW-1	7/31/08	<1	790	NO
Ethylbenzene	MW-1	7/31/08	<1	74	NO
Total Xylenes	MW-1	7/31/08	<3	280	NO
Calcium	MW-1	7/31/08	118	NA	NO
Sodium	MW-1	7/31/08	13.6	120	NO
Magnesium	MW-1	7/31/08	34	400	NO
Potassium	MW-1	7/31/08	3.7	NA	NO
Chloride	MW-1	7/31/08	34	250	NO
Sulfate	MW-1	7/31/08	<5	250	NO
Bicarbonate	MW-1	7/31/08	253	NA	NO

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF GEOLOGICAL SURVEY
OIL AND GAS PRODUCTION OPERATIONS

BACKGROUND HYDROGEOLOGICAL INVESTIGATION

O.I.L. ENERGY CORPORATION

WHITEWATER 9 CENTRAL PRODUCTION FACILITY

Table of Contents

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2.0	Groundwater flow Conditions	1
3.0	Groundwater Quality	2
4.0	Geological Description	2
5.0	Conclusions	2

Appendices	Description
Tables	Analytical/Comparison Tables
A	Site Location/Aerial Photograph
B	Site Plan with Groundwater Flow
C	Temporary Well Logs
D	Analytical Report

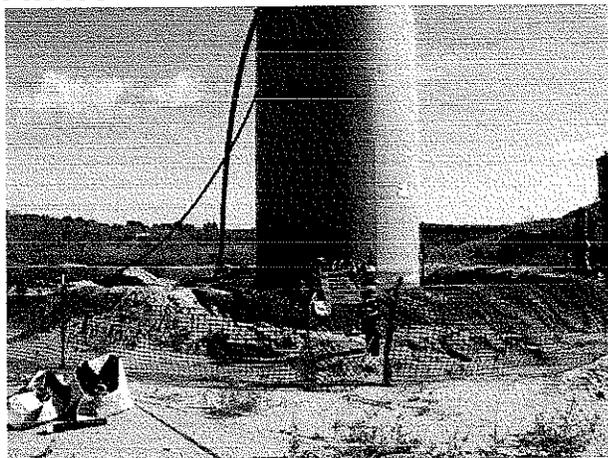
BACKGROUND HYDROGEOLOGICAL INVESTIGATION
Whitewater 9
Central Production Facility

1.0 LOCATION

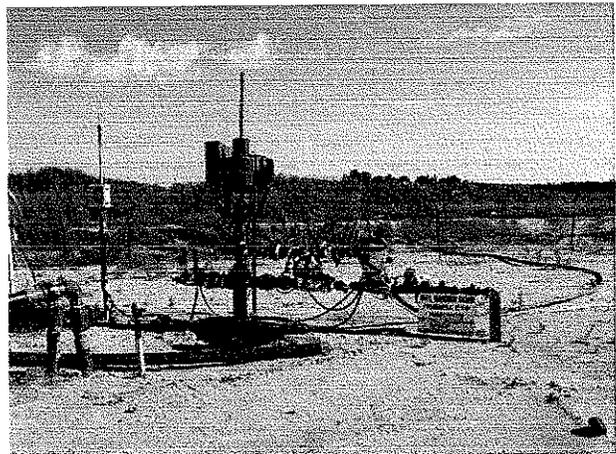
Environmental Consulting & Technology, Inc. (ECT) provided supervision for a background hydrogeological investigation at the Whitewater 9 facility. Subject site is located in the SW, SW, NW of Section 9, Whitewater Township, Grand Traverse County, Michigan. Site maps are included in Appendix A.

1.1 Site Photos

Photos



Hubbell B1-9 SWD



Hubbell C1-9 Production Well

2.0 GROUNDWATER FLOW CONDITIONS

Groundwater flow direction and gradient were determined on site, by surveying groundwater elevations at three (3) temporary monitor well locations drilled July 30-31, 2008. Water table elevations were computed as follows, from static water levels collected on August 5, 2008:

Well	Top of Casing Elev.	Depth to Water BTOC	Groundwater Elev.
MW-1	96.18'	36.43'	59.75'
MW-2	95.38'	35.47'	59.91'
MW-3	96.26'	36.76'	59.50'

The hydraulic gradient was calculated to be approximately 4.79'/1,000' and the direction of groundwater flow was determined to trend to the southeast.

The water table is approximately 35 feet below grade at subject site. Temporary monitor well locations and groundwater flow direction are illustrated on Figure 3 in Appendix B. Well logs are provided in Appendix C.

3.0 GROUNDWATER QUALITY

Following well construction, groundwater samples were collected from temporary monitor well MW- 1 for background analysis in accordance with instructions provided by the Supervisor of Wells, Part 615 of Act 451, R342.1002(3)(a) and R324.201(2)(j)(vi). All samples were immediately placed in a chilled cooler for transit to Grand Traverse Analytical. Resultant analytical data are provided in Appendix D.

4.0 GEOLOGICAL DESCRIPTION

The Whitewater 9 facility is located in an area of glacial till and moraines. The deposits are typified by inter-bedded sands and clay; deposition occurred over an extensive, undulating area.

Soils encountered at the Whitewater 9 facility generally consisted of fine to medium grained, unconsolidated sand, silt, and clay. The clay encountered at subject site could potentially minimize impact to groundwater that could result from a surface release/spill. It should be noted that groundwater saturated soils were generally comprised of fine to medium grained sand.

5.0 CONCLUSION

An additional permanent monitoring well, located down gradient and in close proximity to the proposed tank battery, will be constructed for continued semi-annual sampling. Groundwater samples must be collected and analyzed for chlorides every six (6) months to remain in compliance with state regulations. Resultant analytical data from groundwater samples collected at subject site (MW-1) indicate all inorganics and BTEX are below MDEQ Part 201 Residential/Commercial I Generic Cleanup Criteria and Screening Levels (See Tables).

Completed by: Environmental Consulting & Technology, Inc.

Jeremy S. Lewandowski
Senior Engineer