Second Quarter 2006 Groundwater Monitoring Report

City of Arcata Corporation Yard
Arcata, California
Case No. 1NHU767

Prepared for:

The City of Arcata

SHN Consulting Engineers & Geologists, Inc.

812 W. Wabash Avenue
Eureka, CA 95501-2138
707/441-8855

June 2006
000108.100

CONSULTING ENGINEERS & GEOLOGISTS, INC.
812 W. Wabash • Eureka, CA 95501-2138 • 707-441-8855 • Fax 707-441-8877 • info@shn-eureka.com

Reference: 000108.100

June 15, 2006

Mr. Kim Watson, Superintendent of Public Works
City of Arcata
736 F Street
Arcata, CA 95521

Subject: Second Quarter 2006 Groundwater Monitoring Report, City of Arcata Corporation Yard, 600 South G Street, Arcata, California; Case No. 1NHU767

Dear Mr. Watson:

This report presents the results of the quarterly groundwater-monitoring event at the City of Arcata, Department of Public Works corporation yard for the second quarter of 2006. This work was performed by SHN Consulting Engineers & Geologists, Inc. in accordance with our service agreement with the City of Arcata. City of Arcata employees conducted the second quarter monitoring activities on April 19, 2006.

If you have any questions, please call me at 707/441-8855.

Sincerely,

SHN Consulting Engineers & Geologists, Inc.

Mike Foget, P.E.
Project Engineer

MKF/PJD:lms
Attachment: Report
copy w/attach: Karen Diemer, City of Arcata
Ron Allen, RWQCB
Melissa Martel, HCDEH

Reference: 000108.100

Second Quarter 2006
Groundwater Monitoring Report

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600 South G Street
Arcata, California

Prepared for:

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Prepared by:

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707/441-8855

June 2006

QA/QC:MKF___

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Abbreviations and Acronyms

<	Denotes a value that is "less than" the method detection limit
ug/L	micrograms per Liter
BTEX	Benzene, Toluene, Ethylbenzene, and total Xylenes
DIPE	Diisopropyl Ether
EPA	(U. S.) Environmental Protection Agency
ETBE	Ethyl Tertiary-Butyl Ether
MSL	Mean Sea Level
MTBE	Methyl Tertiary-Butyl Ether
MW-#	Monitoring Well-number
RWQCB	Regional Water Quality Control Board, North Coast Region
SHN	SHN Consulting Engineers & Geologists, Inc.
SW-#	excavation pit-number
TAME	Tertiary-Amyl Butyl Ether
TBA	Tertiary-Butyl Alcohol
TPHD	Total Petroleum Hydrocarbons as Diesel
TPHG	Total Petroleum Hydrocarbons as Gasoline

1.0 Introduction

This report presents the results of groundwater monitoring activities for the second quarter of 2006, conducted at the City of Arcata corporation yard. Under the direction of SHN Consulting Engineers & Geologists, Inc. (SHN), the City of Arcata conducted the quarterly monitoring of six groundwater wells located at their corporation yard. The site is located on South G Street adjacent to Butcher's Slough and Arcata Bay. The corporation yard houses the City of Arcata's wastewater treatment plant and the Department of Public Works' vehicle maintenance and equipment storage facilities. The site lies within Section 32 of Township 5 North, Range 1 East, Humboldt Base and Meridian (Figure 1).

Second quarter 2006 monitoring activities are presented in five sections. This section serves as an introduction for the report. Section 2.0 describes the field program for the work conducted during this monitoring event. Section 3.0 includes a discussion of the results of the monitoring activities. Section 4.0 presents our conclusions and site recommendations. Section 5.0 includes references cited in this report.

The objective of this work was to assess groundwater conditions beneath the site over time.

2.0 Field Activities

2.1 Monitoring Well Sampling

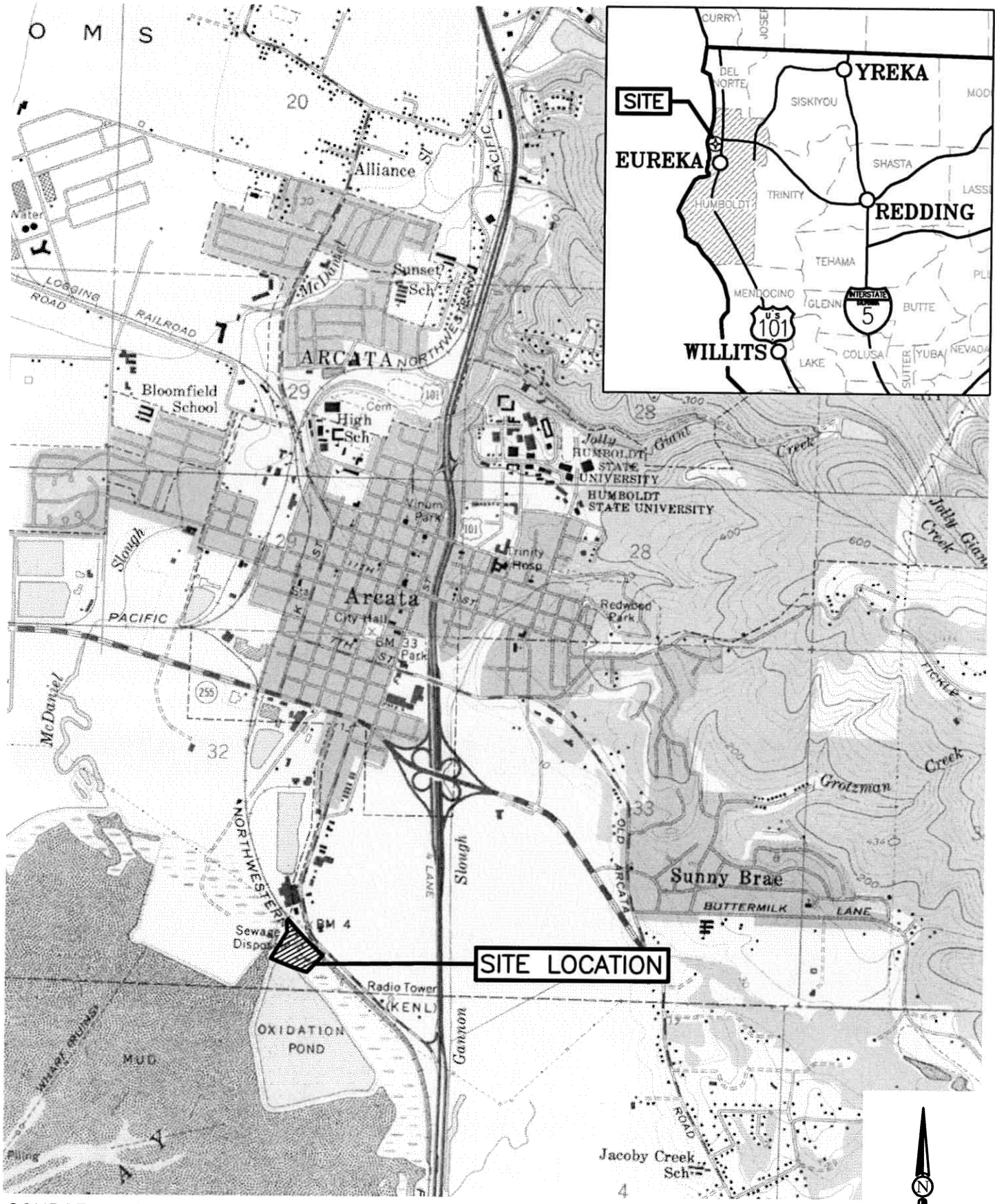
On April 19, 2006, City of Arcata personnel performed groundwater monitoring in wells MW-1 through MW-6, to aid in assessing current groundwater conditions beneath the site, including the direction of groundwater flow. Figure 2 presents a site map showing the locations of the existing monitoring wells. As part of the groundwater-monitoring program, each well was measured for depth-to-groundwater and sampled for water quality. During purging, each well was monitored for electrical conductivity, pH, and temperature using portable instrumentation.

Upon completion of the well purging activities, a groundwater sample was collected from each well using a disposable polyethylene bailer, and transferred into laboratory-supplied containers. The water samples were then labeled, stored in an iced cooler, and transported to the laboratory under proper chain-of-custody documentation. Field notes from the April 19, 2006, groundwater-monitoring event are included in Appendix A.

2.2 Laboratory Analytical Methods

Each of the groundwater samples was analyzed for:

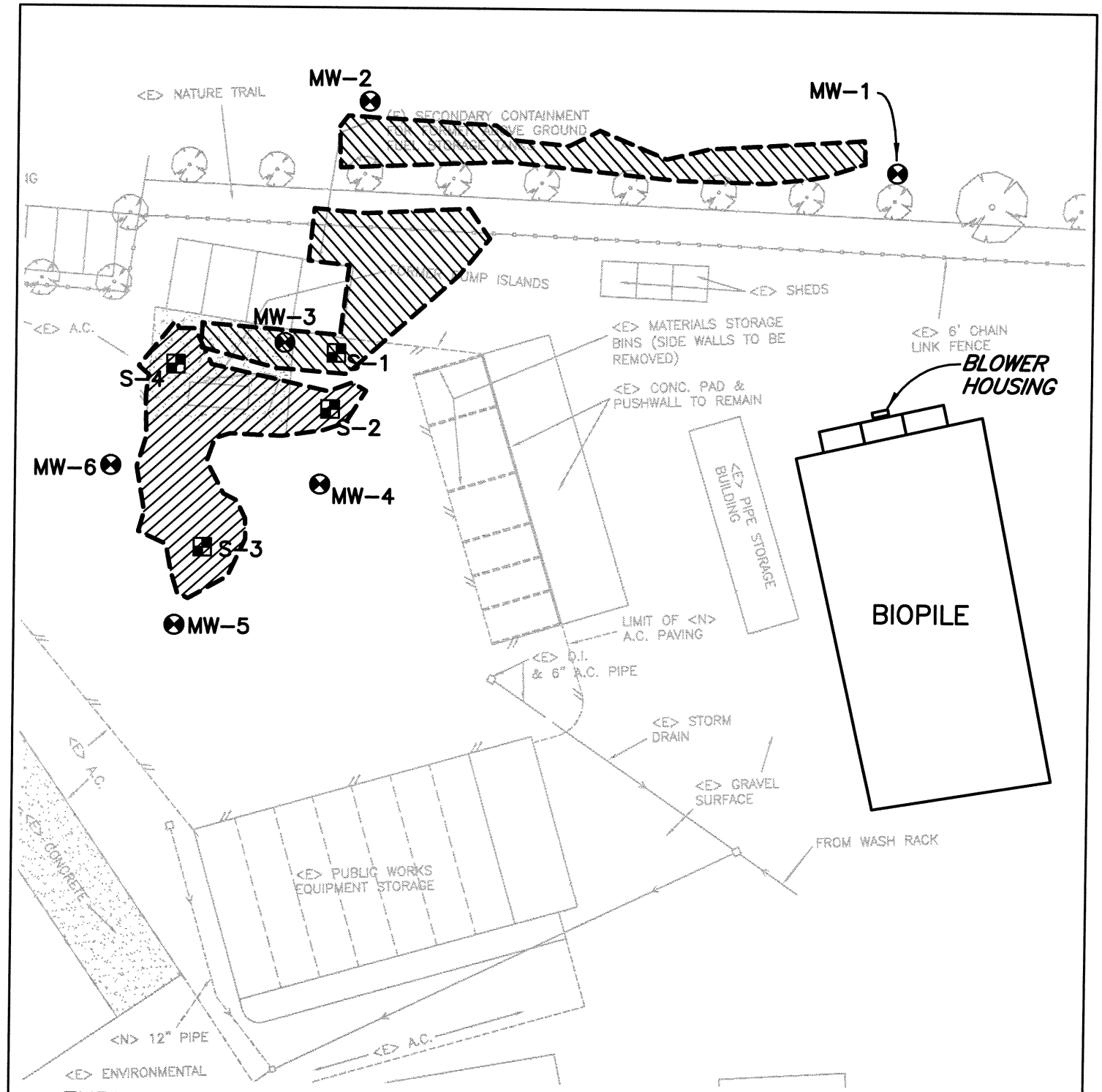
- Total Petroleum Hydrocarbons as Diesel (TPHD) with silica gel clean up in general accordance with U.S. Environmental Protection Agency (EPA) Method No. 3510/3630/GCFID/8015B.
- Total Petroleum Hydrocarbons as Gasoline (TPHG) and Benzene, Toluene, Ethylbenzene, and total Xylenes (BTEX) in general accordance with EPA Method No. 8260B Modified.
- Fuel Oxygenates in general accordance with EPA Method No. 8260B Modified.



SOURCE: ARCATA NORTH & SOUTH USGS 7.5 MINUTE QUADRANGLE

1"=2000'±

SHN Consulting Engineers & Geologists, Inc.	City of Arcata Corp. Yard 600 South G Street Arcata, California		Site Location Map SHN 000108.100
	December 2005	000108.100-VIC-MAP	Figure 1



EXPLANATION

MW-5 *MONITORING WELL LOCATION AND DESIGNATION*

S-1 *AIR SPARGE RISER LOCATION AND DESIGNATION*

LIMIT OF EXCAVATION NOVEMBER 2000

LIMIT OF EXCAVATION OCTOBER 2001

1"=40'±

0 40

SHN Consulting Engineers & Geologists, Inc.	City of Arcata Corp. Yard 600 South G Street Arcata, California		Site Plan SHN 000108.100
	December, 2005	000108.100-SI1	Figure 2

North Coast Laboratories Ltd., a state-certified analytical laboratory located in Arcata, California, performed all of the sample analyses.

2.3 Equipment Decontamination Procedures

All well purging and sampling equipment was cleaned prior to being transported to the corporation yard site. All small equipment that required on-site cleaning was decontaminated using the triple wash system. The equipment was first washed in a water solution containing Liquinox® cleaner, followed by a water rinse, then by a distilled water rinse. All of the groundwater samples were collected using pre-cleaned, disposable bailers, and transferred into laboratory-supplied containers.

2.4 Investigation-Derived Wastewater Management

Water used for decontaminating field equipment from the groundwater-monitoring event and all well purge water was placed into 5-gallon buckets, and subsequently transported to, and disposed of at, the City of Arcata wastewater treatment facility. A discharge receipt for the 8 gallons of decontaminated water generated during the previous quarter's final biopile sampling event is included in Appendix A.

3.0 Groundwater Monitoring Results

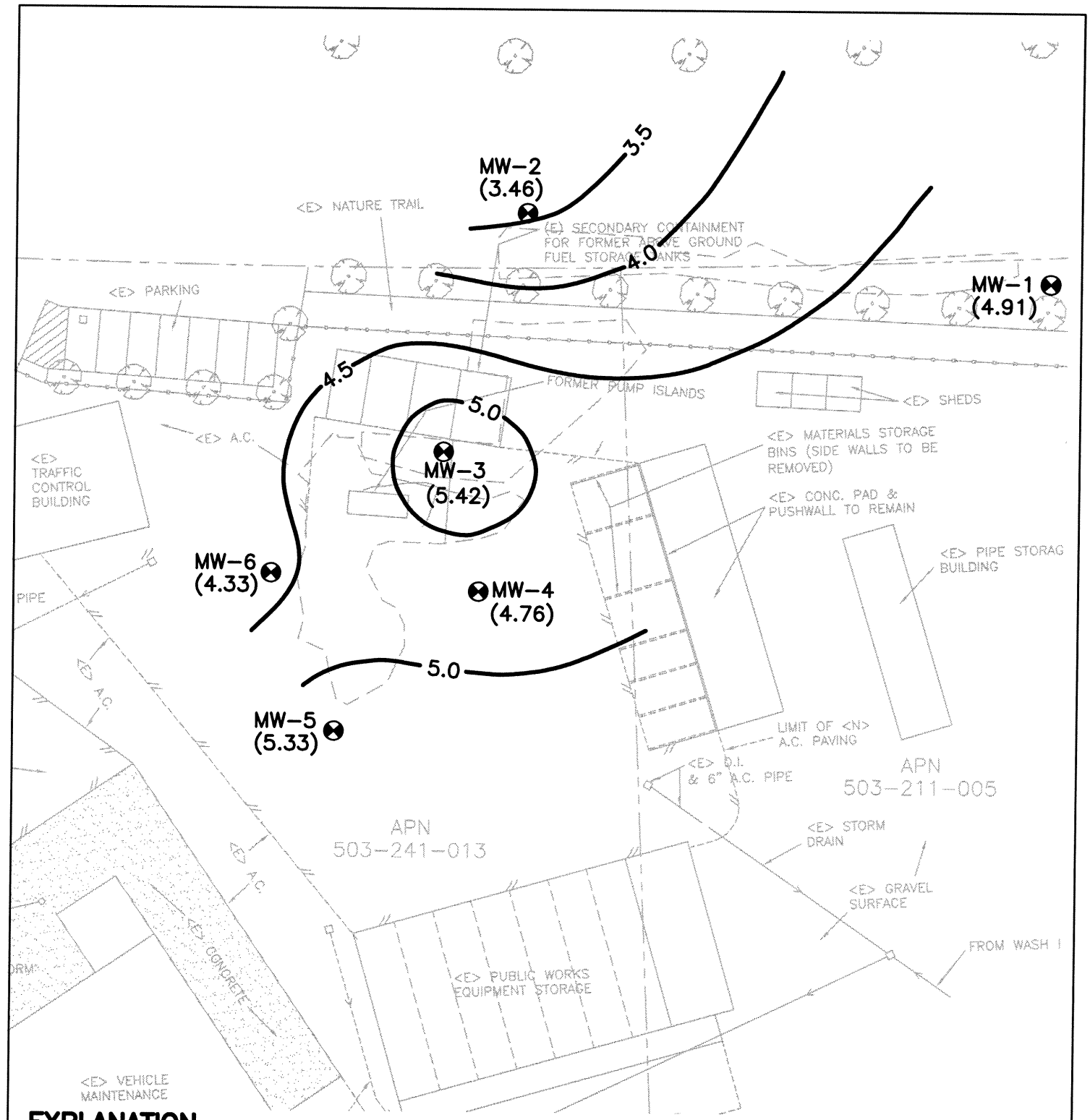
3.1 Hydrogeology

Depth-to-groundwater measurements were collected from each monitoring well prior to sampling, and are shown in Table 1. On April 19, 2006, the direction of groundwater flow beneath the site varied (Figure 3). Historic groundwater elevation data are included in Appendix B, Table B-1.

Table 1
Groundwater Elevations, April 19, 2006
City of Arcata Corporation Yard, Arcata, California

Sample Location	Top of Casing Elevation[1] (feet MSL)[2]	Depth To Water (feet)[3]	Water Surface Elevation[1] (feet MSL)
MW-1	8.73	3.82	4.91
MW-2	9.86	6.40	3.46
MW-3	6.97	1.55	5.42
MW-4	6.96	2.20	4.76
MW-5	6.83	1.50	5.33
MW-6	6.73	2.40	4.33

1. Top of casing elevation referenced to City of Arcata Bench Mark #4, elevation.
2. Mean Sea Level (MSL).
3. Depth to water in feet below top of casing.



EXPLANATION

MW-5 *MONITORING WELL LOCATION AND DESIGNATION*

(5.33) *GROUNDWATER ELEVATION (FEET MSL)*

—4.0— *GROUNDWATER CONTOUR (FEET MSL)*

N

1"=40'± 0 40

SHN Consulting Engineers & Geologists, Inc.	City of Arcata Corp. Yard 600 South G Street Arcata, California	Groundwater Elevations April 19, 2006 SHN 000108.100
	June 2006	000108-100-GWC-APR-2006	Figure 3

3.2 Groundwater Analytical Results

The laboratory analytical results from the April 19, 2006, groundwater-monitoring event are summarized in Table 2, and shown on Figure 4.

Table 2
Groundwater Analytical Results, April 19, 2006
City of Arcata Corporation Yard, Arcata, California
(in ug/L)[1]

Sample Location	TPHD[2]	TPHG[3]	B[3]	T[3]	E[3]	X[3]	MTBE[3]	TBA[3]	DIPE[3]	ETBE[3]	TAME[3]
MW-1	<50[4]	<50	<0.50	**0.85**	<0.50	**0.84**	**9.9**	<10	<1.0	<1.0	<1.0
MW-2	<50	**50[5]**	<0.50	**0.70**	<0.50	**0.73**	**21**	<10	<1.0	<1.0	**1.7**
MW-3	<50	<50	<0.50	**0.54**	<0.50	**0.65**	**4.7**	<10	<1.0	<1.0	<1.0
MW-4	<50	**250[5]**	<0.50	<0.50	<0.50	**0.58**	**220**	<110[6]	<1.0	<1.0	**8.5**
MW-5	**270[7]**	**440[5]**	<0.50	<0.50	<0.50	**0.58**	**140**	<50[6]	<1.0	<1.0	**4.7**
MW-6	<50	**140[5]**	**8.1**	<0.50	<0.50	**0.68**	**94**	<36[6]	<1.0	<1.0	**3.3**

1. ug/L: micrograms per Liter.
2. TPHD: Total Petroleum Hydrocarbons as Diesel analyzed in general accordance with EPA Method 3510/GCFID.
3. TPHG: Total Petroleum Hydrocarbons as Gasoline; Benzene, Toluene, Ethylbenzene and total Xylenes (BTEX); Methyl Tertiary-Butyl Ether (MTBE), Tertiary-Butyl Alcohol (TBA), Diisopropyl Ether (DIPE), Ethyl Tertiary-Butyl Ether (ETBE), and Tertiary-Amyl Butyl Ether (TAME), analyzed in general accordance with EPA Method 8260B.
4. <: Denotes a value that is " less than" the method detection limit.
5. Results are primarily from the reported gasoline additives.
6. Reporting limits were raised due to matrix interference.
7. Sample contains material in the diesel range of molecular weights, but the material does not exhibit the peak pattern typical of diesel oil.

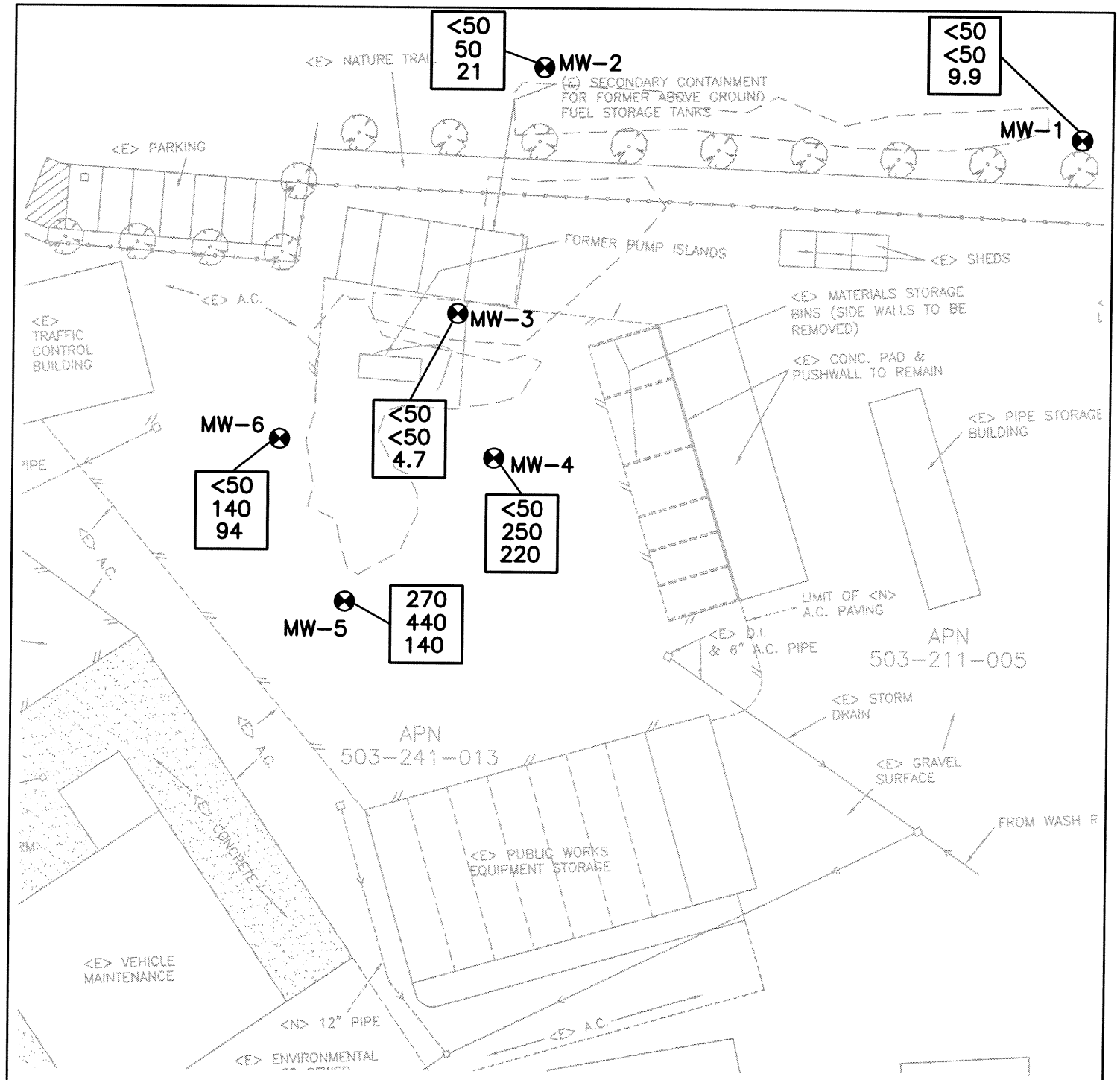
Historic groundwater analytical results are presented in Appendix B, Table B-2. The complete laboratory analytical report and corresponding chain-of-custody documentation are included in Appendix C.

3.3 Groundwater Extraction and Treatment System

The groundwater extraction and treatment system was operated from May 2004 to April 2005. The system extracted and treated approximately 96,000 gallons of groundwater.

3.4 Air Sparge Treatment System

On April 12, 2006, an air sparge treatment system was implemented at the site to enhance bioremediation of the dissolved-phase contaminants. The system injects compressed air into four sparge wells located within the contamination plume (Figure 2). SHN will perform monthly operation and maintenance of the sparge system. Appendix A includes system monitoring field notes; Appendix B, Table B-3 presents historic monitoring data.



EXPLANATION

MW-5 — *MONITORING WELL LOCATION AND DESIGNATION*

410	*TPHD*
490	*TPHG*
160	*MTBE*

RESULTS IN ug/l

1"=40'± 0 40

SHN Consulting Engineers & Geologists, Inc.	City of Arcata Corp. Yard 600 South G Street Arcata, California		Groundwater Contaminant Concentrations, April 19, 2006 SHN 000108.100
	June 2006	000108.100-CONTAM-CONC-APR-06	Figure 4

3.5 Biopile Monitoring

In a letter dated April 13, 2006, Ron Allen, Environmental Scientist for the California Regional Water Quality Board, North Coast Region (RWQCB), indicated that plans for relocation of the material contained in the biopile to an area located west of Marsh #3 could proceed forward. The City plans on relocating these soils this summer. Accordingly, biopile sampling and monitoring have been discontinued.

4.0 Discussion and Recommendations

The results of this quarterly monitoring program indicate that groundwater at the corporation yard site has been impacted by petroleum hydrocarbons and fuel oxygenates. The groundwater extraction and treatment system was taken off line in April 2005. SHN conducted an air sparge pilot test on April 29, 2005, using the existing groundwater extraction piping located at the base of the October 2001 excavation pit (SW-1). Results of the pilot test were presented in a report of findings (SHN, May 2005). On April 13, 2006, SHN replaced the extraction and treatment system with an air sparging system that is currently operational.

In a letter dated April 13, 2006, Ron Allen, Environmental Scientist for the RWQCB, indicated that plans for relocation of the material contained in the biopile to an area located west of Marsh #3 could proceed forward. Mr. Allen also indicated that the RWQCB requires latitudes and longitudes (within one meter resolution) to define the exact location where the biopile will be spread, and that the soil should be mulched, seeded, and fertilized to promote final treatment by phytoremediation. Details regarding the relocation of the soil and coordinates of the location will be provided in a future report.

5.0 References Cited

SHN Consulting Engineers & Geologists, Inc. (May 2005). *Remedial Action Pilot Study, Report of Findings, City of Arcata Corporation Yard, 600 South G Street, Arcata, California.* Eureka: SHN

Appendix A

Field Notes

04/19/06

WELL NO. MW-1
TOTAL DEPTH 17.80
DEPTH TO WATER 3.82

ELEVATION
WATER ELEVATION

HT OF WATER COLUMN 13.98 X(0.16) CASING VOL 2.24 X3 = 6.75 gal

DEPTH	TIME	TIME	WATER REMOVED	EC PPm	TEMP C	pH
	9:45		0	~~650~~	~~15.3~~	
	9:55		2.5 gal	650	15.3	6.24
	9:58		5.50	754	13.4	6.21
	10:02		6.75	661	13.0	6.27

TOTAL INITIAL WATER VOLUME

SAMPLING EQUIPMENT DISPOSABLE BAILER
SAMPLE TIME
SAMPLE ANALYSIS 8260 LIST 1; TPHO
LABORATORY N.C.L.
REMARKS

04/19/06

WELL NO. MW-2
TOTAL DEPTH 18.35
DEPTH TO WATER 6.40

ELEVATION
WATER ELEVATION

HT OF WATER COLUMN 11.95 X(0.16) CASING VOL 1.91 X3 = 5.75 gal

DEPTH	TIME	TIME	WATER REMOVED	EC ppm	TEMP C	pH
		10:05	0			
		10:10	2.75 gal	1283	15.1	6.37
		10:15	3.50 gal	1348	14.1	6.40
		10:20	5.75 gal	1810	14.2	6.56

TOTAL INITIAL WATER VOLUME

SAMPLING EQUIPMENT DISPOSABLE BAILER
SAMPLE TIME
SAMPLE ANALYSIS 8260 LIST 1 ; TPHO
LABORATORY N.C.L.
REMARKS

04/16/06

WELL NO. MW-3
TOTAL DEPTH 14.70
DEPTH TO WATER 1.55

ELEVATION
WATER ELEVATION

HT OF WATER COLUMN 13.15 X (0.16) CASING VOL 2.104 X 3 = 6.25 gal

DEPTH	TIME	TIME	WATER REMOVED	EC ppm	TEMP C	pH
		12:35	0			
		12:40	2.25 gal	410	16.8	7.09
		12:45	4.25 gal	325	14.2	7.07
		12:50	6.25 gal	313	13.2	7.50

TOTAL INITIAL WATER VOLUME

SAMPLING EQUIPMENT DISPOSABLE BAILER
SAMPLE TIME
SAMPLE ANALYSIS 8260 LIST 1; TPHD
LABORATORY N.C.L.
REMARKS

04/19/06

WELL NO. MW-4
TOTAL DEPTH 14.70
DEPTH TO WATER 2.20

ELEVATION
WATER ELEVATION

HT OF WATER COLUMN 12.50 X(0.16) CASING VOL 12.5 X3 = 6gal

DEPTH	TIME	TIME	WATER REMOVED	EC ppm	TEMP C	pH
		11:00	0			
		11:05	2 gal	1980	16.0	6.27
		11:10	4 gal	2000+	15.5	6.30
		11:15	6 gal	2000+	15.4	6.29

TOTAL INITIAL WATER VOLUME

SAMPLING EQUIPMENT DISPOSABLE BAILER
SAMPLE TIME
SAMPLE ANALYSIS 8260 LIST 1; TPHD
LABORATORY N.C.L.
REMARKS

04/16/06

WELL NO. MW-5
TOTAL DEPTH 14.85
DEPTH TO WATER 1.50

ELEVATION
WATER ELEVATION

HT OF WATER COLUMN 13.35 X(0.16) CASING VOL 2.14 X3 = 6.5 gal

DEPTH	TIME	TIME	WATER REMOVED	EC PPm	TEMP C	pH
		1:10	0			
		1:15	2 gal	1009	17.5	6.14
		1:20	4 gal	1084	16.3	6.21
		1:25	6.25 gal	1053	14.8	6.15

TOTAL INITIAL WATER VOLUME

SAMPLING EQUIPMENT DISPOSABLE BAILER
SAMPLE TIME
SAMPLE ANALYSIS 8260 LIST 1; TPHD
LABORATORY N.C.L.
REMARKS

04/19/06

WELL NO. MW-6
TOTAL DEPTH 14.75
DEPTH TO WATER 2.40

ELEVATION
WATER ELEVATION

HT OF WATER COLUMN 12.35 X(0.16) CASING VOL .976 X3 = 6gal

DEPTH	TIME	TIME	WATER REMOVED	EC ppm	TEMP C	pH
		11:20	0			
		11:25	2 gal	1084	15.3	6.58
		11:30	4 gal	1027	14.3	6.45
		11:35	6 gal	1155	14.2	6.57

TOTAL INITIAL WATER VOLUME

SAMPLING EQUIPMENT DISPOSABLE BAILER
SAMPLE TIME
SAMPLE ANALYSIS 8260 LIST 1; TPHD
LABORATORY N.C.L.
REMARKS

Arcata Corp. Yard
Sparge System Monitoring Sheet
000108.100

Date: 4-13-06 Time: 4:00
Performed By: P. Dunn & C. Fisher Weather: Clear

Hour Meter: 012 hours

S-1	Initial	% Closed (final)	Final
Valve Position (% open)	flow veloc 5300	78	2400; 2400; 2400

S-2	Initial		Final
Valve Position (% open)	340	100	2800; 2700; 2700

S-3	Initial		Final
Valve Position (% open)	3000	70	2050; 2200; 2300

S-4	Initial		Final
Valve Position (% open)	500	60	2400; 2400

Manifold Readings	Initial	Final
Vacuum	-8" H_2O	-6" H_2O
Temperature (°F)		110
Pressure ~~(psig)~~ in H_2O	33"	44
Flow Rate (scfm)	7800	9300

Comments: Initial Start up - checked motor Rotation - OK
Wiring in control box needs Adjustment
monitoring well Response

well	Pressure (" H_2O)		
MW 3	0	-1.6	-1.6
MW 4	0	-0.12	-0.08
MW 5	0	0.18	0.24
MW 6	0	0.05	0.05

SHN ENGINEERS & GEOLOGISTS
812 W. Wabash Ave.
Eureka, CA 95501-2138
Tel. 707 / 441-8855
Fax: 707 / 441-8877

JOB UU108.100 - Arcata Loop Yard
SHEET NO. 1 OF 1
~~CALCULATED BY~~ date: 14th Apr '06 ~~DATE~~ by: C. Fisher
CHECKED BY _____ DATE _____
SCALE _____

Field Notes

- Pressure = 42 in H_2O
- Vacuum = 7 in H_2O
- Temp = 100 °F
- Main Flow = 8500 fpm
- Hours = 16.8 hours

- Flows
  - S1 = 2300 fpm
  - S2 = 2500 fpm
  - S3 = 2600 fpm
  - S4 = 2100 fpm

  } Valves Partially Closed

- Power Draw
  - 9.2 Amps @ 220 VAC

Independent Business Forms Inc.
(530) 221-0611, FAX (530) 221-6671, (800) 729-3700

Arcata Corp. Yard
Air Sparge System Monitoring Sheet
000108.100

Date: 4-25-06 Time: 8:00
Performed By: Peter Dunn Weather: Cloudy

Hour Meter: 2801 hours

S-1	Initial	Final
Valve Position (% open)	50	40
Flow Velocity (cfm)	2730	2100
S-2	**Initial**	**Final**
Valve Position (% open)	100	75
Flow Velocity (cfm)	2025	2200
S-3	**Initial**	**Final**
Valve Position (% open)	50	40
Flow Velocity (cfm)	2875	2150
S-4	**Initial**	**Final**
Valve Position (% open)	50	50
Flow Velocity (cfm)	1930	2200

Manifold Readings	Initial	Final
Vacuum	-6	-6
Temperature (°F)	102	102
Pressure (psig)	47	50
Flow ~~Rate (scfm)~~ Velocity (fpm)	7600	7950

Comments:

Arcata Corp. Yard
Air Sparge System Monitoring Sheet
000108.100

Date: 5-16-06 Time: 11:08

Performed By: Peter Dunn Weather: Clear

Hour Meter: 7871.0 hours

S-1	Initial	Final
Valve Position (% open)	50	30
Flow Velocity (~~cfm~~) FPM	3680	2400
S-2	**Initial**	**Final**
Valve Position (% open)	60	100
Flow Velocity (~~cfm~~) FPM	1280	2300
S-3	**Initial**	**Final**
Valve Position (% open)	40	30
Flow Velocity (~~cfm~~) FPM	3420	2380
S-4	**Initial**	**Final**
Valve Position (% open)	50	40
Flow Velocity (~~cfm~~) FPM	2760	2450

Manifold Readings	Initial	Final
Vacuum	-7	-7
Temperature (°F)	120	116
Pressure ~~(psig)~~ in-H_2O	40	44
Flow Rate ~~(scfm)~~ FPM	8620	8920

Comments:

Client Name: **ARCATA CORP YARD**

The water from your site: **SOUTH G STREET, ARCATA, CA**

SHN ref # **000108.100** Collected On: **4/4-4/5/2006**

Has been tested and certified as acceptable to be discharged into the City of Eureka municipal sewer system.

Amount Discharged: **8 GALLONS**

Date Discharged: **5/12/2006**

Certified by: **AARON MELODY**

SHN CONSULTING ENGINEERS & GEOLOGISTS, INC.

City of Eureka Wastewater Discharge Permit #65

Appendix B

Historic Monitoring Data

Table B-1 Historic Groundwater Elevations City of Arcata Corporation Yard, Arcata, CA				
Sample Location	Sample Date	Top of Casing Elevation[1] (feet MSL)[2]	Depth to Water (feet)[3]	Elevation (feet MSL)
MW-1	9/26/2002	8.73	7.73	1.00
	1/22/2003		5.79	2.94
	4/23/2003		5.33	3.40
	7/23/2003		6.60	2.13
	10/22/2003		7.34	1.39
	1/21/2004		3.90	4.83
	4/21/2004		3.81	4.92
	7/21/2004		5.72	3.01
	10/7/2004		7.33	1.40
	1/19/2005		5.80	2.93
	4/20/2005		4.73	4.00
	7/20/2005		5.35	3.38
	10/19/2005		6.94	1.79
	1/18/2006		3.41	5.32
	4/19/2006		3.82	4.91
MW-2	9/27/2002	9.86	8.82	1.04
	1/22/2003		6.44	3.42
	4/23/2003		9.38	0.48
	7/23/2003		8.90	0.96
	10/22/2003		8.70	1.16
	1/21/2004		7.38	2.48
	4/21/2004		9.53	0.33
	7/21/2004		8.10	1.76
	10/7/2004		8.76	1.10
	1/19/2005		9.00	0.86
	4/20/2005		8.72	1.14
	7/20/2005		8.70	1.16
	10/19/2005		8.26	1.60
	1/18/2006		6.50	3.36
	4/19/2006		6.40	3.46

Table B-1 Historic Groundwater Elevations City of Arcata Corporation Yard, Arcata, CA				
Sample Location	Sample Date	Top of Casing Elevation[1] (feet MSL)[2]	Depth to Water (feet)[3]	Elevation (feet MSL)
MW-3	9/26/2002	6.97	2.84	4.13
	1/22/2003		1.36	5.61
	4/23/2003		1.11	5.86
	7/23/2003		2.50	4.47
	10/22/2003		2.81	4.16
	1/21/2004		3.27	3.70
	4/21/2004		1.00	5.97
	7/21/2004		2.95	4.02
	10/7/2004		3.59	3.38
	1/19/2005		1.45	5.52
	4/20/2005		1.02	5.95
	7/20/2005		2.10	4.87
	10/19/2005		2.60	4.37
	1/18/2006		0.33	6.64
	4/19/2006		1.55	5.42
MW-4	9/27/2002	6.96	4.01	2.95
	1/22/2003		2.36	4.60
	4/23/2003		2.35	4.61
	7/23/2003		2.50	4.46
	10/22/2003		4.34	2.62
	1/21/2004		1.26	5.70
	4/21/2004		3.67	3.29
	7/21/2004		5.20	1.76
	10/7/2004		4.15	2.81
	1/19/2005		3.75	3.21
	4/20/2005		3.52	3.44
	7/20/2005		2.00	4.96
	10/19/2005		4.24	2.72
	1/18/2006		3.50	3.46
	4/19/2006		2.20	4.76

Table B-1
Historic Groundwater Elevations
City of Arcata Corporation Yard, Arcata, CA

Sample Location	Sample Date	Top of Casing Elevation[1] (feet MSL)[2]	Depth to Water (feet)[3]	Elevation (feet MSL)
MW-5	9/26/2002	6.83	2.70	4.13
	1/22/2003		1.24	5.59
	4/23/2003		1.05	5.78
	7/23/2003		2.30	4.53
	10/22/2003		2.68	4.15
	1/21/2004		1.18	5.65
	4/21/2004		0.50	6.33
	7/21/2004		3.80	3.03
	10/7/2004		2.95	3.88
	1/19/2005		1.41	5.42
	4/20/2005		1.05	5.78
	7/20/2005		1.90	4.93
	10/19/2005		2.45	4.38
	1/18/2006		0.50	6.33
	4/19/2006		1.50	5.33
MW-6	9/27/2002	6.73	5.11	1.62
	1/22/2003		3.23	3.50
	4/23/2003		1.91	4.82
	7/23/2003		5.60	1.13
	10/22/2003		3.75	2.98
	1/21/2004		1.71	5.02
	4/21/2004		5.65	1.08
	7/21/2004		2.70	4.03
	10/7/2004		3.16	3.57
	1/19/2005		1.80	4.93
	4/20/2005		1.00	5.73
	7/20/2005		1.70	5.03
	10/19/2005		2.96	3.77
	1/18/2006		1.20	5.53
	4/19/2006		2.40	4.33

1. Top of casing elevation referenced to City of Arcata Bench Mark #4, elevation
2. Mean Sea Level (MSL).
3. Below Top of Casing

Table B-2
Historic Groundwater Analytical Results
City of Arcata Corporation Yard, Arcata, CA
(in ug/L)[1]

Sample Location	Date	TPHD[2]	TPHG[3]	B[3]	T[3]	E[3]	X[3]	MTBE[3]	TBA[3]	DIPE[3]	ETBE[3]	TAME[3]
MW-1	9/26/2002	<50[4]	<50	<0.50	<0.50	<0.50	<0.50	**4.3**	<20	<1.0	<1.0	<1.0
	1/22/2003	<50	<50	<0.50	<0.50	<0.50	<0.50	**34**	<20	<1.0	<1.0	**1.3**
	4/23/2003	<50	<50	<0.50	<0.50	<0.50	<0.50	**21**	<20	<1.0	<1.0	**1.1**
	7/23/2003	<50	**76**	<0.50	<0.50	<0.50	<0.50	**100**	<20	<1.0	<1.0	**4.4**
	10/22/2003	<50	**75**	<0.50	<0.50	<0.50	<0.50	**35**	<20	<1.0	<1.0	**1.6**
	1/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	**5**	<20	<1.0	<1.0	<1.0
	4/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	**9.1**	<10	<1.0	<1.0	<1.0
	7/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	**31**	<10	<1.0	<1.0	**1.1**
	10/7/2004	<50	<50	<0.50	<0.50	<0.50	<1.0	**20**	<10	<1.0	<1.0	<1.0
	1/19/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	**4.6**	<10	<1.0	<1.0	<1.0
	4/20/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	**5.9**	<10	<1.0	<1.0	<1.0
	7/20/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	**14**	<10	<1.0	<1.0	<1.0
	10/19/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	**15**	<10	<1.0	<1.0	<1.0
	1/18/2006	<50	<50	<0.50	<0.50	<0.50	<1.0	**6.3**	<10	<1.0	<1.0	<1.0
	4/19/2006	<50	<50	<0.50	**0.85**	<0.50	**0.84**	**9.9**	<10	<1.0	<1.0	<1.0
MW-2	9/27/2002	**820**	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<1.0	<1.0	<1.0
	1/22/2003	<50	**72**	<0.50	<0.50	<0.50	<0.50	**130**	<20	<1.0	<1.0	**9.8**
	4/23/2003	<50	<50	<0.50	<0.50	<0.50	<0.50	**57**	<20	<1.0	<1.0	**3.5**
	7/23/2003	<50	**52**	<0.50	<0.50	<0.50	<0.50	**59**	<20	<1.0	<1.0	**3.4**
	10/22/2003	<50	**64**	<0.50	<0.50	<0.50	<0.50	**37**	<20	<1.0	<1.0	**2.2**
	1/21/2004	<50	**83**	<0.50	<0.50	<0.50	<0.50	**61**	<20	<1.0	<1.0	**3.8**
	4/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	**22**	<10	<1.0	<1.0	**1.5**
	7/21/2004	<50	<50	<0.50	<0.50	<0.50	<0.50	**24**	<10	<1.0	<1.0	**1.5**
	10/7/2004	<50	<50	<0.50	<0.50	<0.50	<1.0	**26**	<10	<1.0	<1.0	**1.5**
	1/19/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	**33**	<10	<1.0	<1.0	**1.7**
	4/20/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	**31**	<10	<1.0	<1.0	**1.8**
	7/20/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	**22**	<10	<1.0	<1.0	**1.3**
	10/19/2005	<50	<50	<0.50	<0.50	<0.50	<1.0	**16**	<10	<1.0	<1.0	**1.1**
	1/18/2006	<50	**50**	<0.50	<0.50	<0.50	<1.0	**28**	<10	<1.0	<1.0	**1.6**
	4/19/2006	<50	**50**	<0.50	**0.70**	<0.50	**0.73**	**21**	<10	<1.0	<1.0	**1.7**
MW-3	9/26/2002	<50	**990**	**63**	<0.50	<0.50	<0.50	**860**	**58**	<1.0	<1.0	**55**
	1/22/2003	**220**	**1,600**	**110**	**13**	**41**	**50.9**	**990**	**250**	<1.0	<1.0	**75**
	4/23/2003	**150**	**660**	**55**	**1.1**	**3**	**1.5**	**720**	**82**	<1.0	<1.0	**48**
	7/23/2003	**83**	**210**	**120**	<0.50	<0.50	<0.50	**530**	**94**	<1.0	<1.0	**11**
	10/22/2003	**330**	**720**	**26**	<0.50	<0.50	<0.50	**570**	**32**	<1.0	<1.0	**32**
	1/21/2004	**78**	**740**	**58**	**5.7**	**17**	**8.2**	**310**	<90	<1.0	<1.0	**25**
	4/21/2004	<50	**360**	**77**	**1.4**	**1.7**	**0.88**	**120**	<28	<1.0	<1.0	**7.2**
	7/21/2004	**130**	**260**	<0.50	<0.50	<0.50	<0.50	**280**	**43**	<1.0	<1.0	**9.7**
	10/7/2004	**57**	**640**	1.6	<0.50	<0.50	<1.0	**450**	**64**	<1.0	<1.0	**28**
	1/19/2005	<50	**120**	1.5	<0.50	<0.50	<1.0	**110**	<45	<1.0	<1.0	**4.0**
	4/20/2005	<50	**67**	**0.59**	<0.50	<0.50	<1.0	**65**	<15	<1.0	<1.0	**2.0**
	7/20/2005	<50	**200**	<0.50	<0.50	<0.50	<1.0	**220**	<50	<1.0	<1.0	**7.6**
	10/19/2005	<50	**190**	1.1	<0.50	<0.50	<1.0	**85**	<30	<1.0	<1.0	**6.2**
	1/18/2006	<50	**140**	<0.50	<0.50	<0.50	<1.0	**100**	<30	<1.0	<1.0	**3.3**
	4/19/2006	<50	<50	<0.50	**0.54**	<0.50	**0.65**	**4.7**	<10	<1.0	<1.0	<1.0

Table B-2
Historic Groundwater Analytical Results
City of Arcata Corporation Yard, Arcata, CA
(in ug/L)[1]

Sample Location	Date	TPHD[2]	TPHG[3]	B[3]	T[3]	E[3]	X[3]	MTBE[3]	TBA[3]	DIPE[3]	ETBE[3]	TAME[3]
MW-4	9/27/2002	<50	270	<0.50	<0.50	<0.50	<0.50	270	32	<1.0	<1.0	6.2
	1/22/2003	150	250	<0.50	<0.50	<0.50	<0.50	340	170	<1.0	<1.0	13
	4/23/2003	110	520	<0.50	<0.50	<0.50	<0.50	350	160	<1.0	<1.0	11
	7/23/2003	<50	1,000	160	3	0.78	4.1	330	66	<1.0	<1.0	41
	10/22/2003	130	290	<0.50	<0.50	<0.50	<0.50	260	62	<1.0	<1.0	6.5
	1/21/2004	97	550	<0.50	<0.50	<0.50	<0.50	580	190	<1.0	<1.0	16
	4/21/2004	<50	480	<0.50	<0.50	<0.50	<0.50	490	130	<1.0	<1.0	15
	7/21/2004	140	380	25	<0.50	<0.50	<0.50	500	29	<1.0	<1.0	22
	10/7/2004	<50	440	<0.50	<0.50	<0.50	<1.0	380	110	<1.0	<1.0	8.5
	1/19/2005	<50	410	<0.50	<0.50	<0.50	<1.0	380	<10	<1.0	<1.0	12
	4/20/2005	<50	320	<0.50	<0.50	<0.50	<1.0	370	<100	<1.0	<1.0	12
	7/20/2005	<50	370	<0.50	<0.50	<0.50	<1.0	380	95	<1.0	<1.0	11
	10/19/2005	<50	350	<0.50	<0.50	<0.50	<1.0	230	86	<1.0	<1.0	7.9
	1/18/2006	<50	300	<0.50	<0.50	<0.50	<1.0	270	56	<1.0	<1.0	7.6
	4/19/2006	<50	250	<0.50	<0.50	<0.50	0.58	220	<110	<1.0	<1.0	8.5
MW-5	9/26/2002	160	750	<0.50	<0.50	<0.50	<0.50	490	66	<1.0	<1.0	12
	1/22/2003	1,300	590	<0.50	0.87	<0.50	<0.50	330	160	<1.0	<1.0	13
	4/23/2003	1,100	520	<0.50	<0.50	<0.50	<0.50	280	56	<1.0	<1.0	8.1
	7/23/2003	930	150	<0.50	<0.50	<0.50	<0.50	300	35	<1.0	<1.0	6.2
	10/22/2003	3,400	780	<0.50	<0.50	<0.50	<0.50	320	41	<1.0	<1.0	7.7
	1/21/2004	810	610	<0.50	<0.50	<0.50	<0.50	300	<120	<1.0	<1.0	8.2
	4/21/2004	180	430	<0.50	<0.50	<0.50	<0.50	200	<60	<1.0	<1.0	6.2
	7/21/2004	50	320	<0.50	<0.50	<0.50	<0.50	420	110	<1.0	<1.0	12
	10/7/2004	610	780	<0.50	<0.50	<0.50	<1.0	290	57	<1.0	<1.0	7.2
	1/19/2005	440	530	<0.50	<0.50	<0.50	<1.0	240	<90	<1.0	<1.0	6
	4/20/2005	120	210	<0.50	<0.50	<0.50	<1.0	160	<30	<1.0	<1.0	5.3
	7/20/2005	880	550	<0.50	<0.50	<0.50	<1.0	230	39	<1.0	<1.0	5.3
	10/19/2005	410	490	<0.50	<0.50	<0.50	<1.0	160	<60	<1.0	<1.0	4.4
	1/18/2006	280	390	<0.50	<0.50	<0.50	<1.0	150	<40	<1.0	<1.0	3.9
	4/19/2006	270	440	<0.50	<0.50	<0.50	0.58	140	<50	<1.0	<1.0	4.7
MW-6	9/27/2002	78	<50	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<1.0	<1.0	<1.0
	1/22/2003	280	170	<0.50	<0.50	<0.50	<0.50	250	55	<1.0	<1.0	5.5
	4/23/2003	320	250	<0.50	<0.50	<0.50	<0.50	290	45	<1.0	<1.0	7.9
	7/23/2003	<50	510	<0.50	<0.50	<0.50	0.55	190	38	<1.0	<1.0	7.7
	10/22/2003	290	340	0.83	<0.50	<0.50	<0.50	290	36	<1.0	<1.0	7
	1/21/2004	290	310	<0.50	<0.50	<0.50	<0.50	270	<120	<1.0	<1.0	7.6
	4/21/2004	<50	290	0.67	<0.50	<0.50	<0.50	260	43	<1.0	<1.0	7.7
	7/21/2004	1,000	470	<0.50	<0.50	<0.50	<0.50	350	39	<1.0	<1.0	7.0
	10/7/2004	110	260	<0.50	<0.50	<0.50	<1.0	210	<80	<1.0	<1.0	5.7
	1/19/2005	81	170	<0.50	<0.50	<0.50	<1.0	130	46	<1.0	<1.0	4.1
	4/20/2005	440	500	<0.50	<0.50	<0.50	<1.0	180	<50	<1.0	<1.0	5.5
	7/20/2005	410	210	<0.50	<0.50	<0.50	<1.0	180	<60	<1.0	<1.0	5.6
	10/19/2005	420	150	<0.50	<0.50	<0.50	<1.0	89	<40	<1.0	<1.0	3.4
	1/18/2006	140	130	<0.50	<0.50	<0.50	<1.0	100	<30	<1.0	<1.0	2.8
	4/19/2006	<50	140	8.1	<0.50	<0.50	0.68	94	<36	<1.0	<1.0	3.3

1. ug/L: micrograms per Liter
2. TPHD: Total Petroleum Hydrocarbons as Diesel, analyzed in general accordance with EPA Method 3510/GCFID.
3. TPHG: Total Petroleum Hydrocarbons as Gasoline, Benzene (B), Toluene (T), Ethylbenzene (E), and total Xylenes (X), Methyl Tertiary-ButylEther (MTBE), Tertiary-Butyl Alcohol (TBA), Diisopropyl Ether (DIPE), Ethyl Tertiary-Butyl Ether (ETBE), Tertiary-Amyl Butyl Ether (TAME), analyzed in general accordance with EPA Method 8260B.
4. <: Denotes a laboratory values less than the method detection limit.

Appendix C

Laboratory Analytical Report

NORTH COAST LABORATORIES LTD.

May 03, 2006

City of Arcata
Dept. of Public Works
736 F Street
Arcata, CA 95521
Attn: Kim Watson

Order No.: 0604372
Invoice No.: 57909
PO No.:
ELAP No. 1247-Expires July 2006

RE: 000108100 ARCATA CORP YARD

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	MW-1
01D	MW-1
02A	MW-2
02D	MW-2
03A	MW-3
03D	MW-3
04A	MW-4
04D	MW-4
05A	MW-5
05D	MW-5
06A	MW-6
06D	MW-6

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

All solid results are expressed on a wet-weight basis unless otherwise noted.

REPORT CERTIFIED BY

Collin Blackstone
Laboratory Supervisor(s)

QA Unit

Jesse G. Chaney, Jr.
Laboratory Director

5680 West End Road • Arcata California 95521-9202 • 707-822-4649 • FAX 707-822-6831

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CLIENT: City of Arcata
Project: 000108100 ARCATA CORP YARD
Lab Order: 0604372

CASE NARRATIVE

Gasoline Components/Additives:
The reporting limit for tert-butyl alcohol was raised for samples MW-4, MW-5 and MW-6 due to matrix interference.

The laboratory control sample duplicate (LCSD) recovery was above the upper acceptance limit for o-xylene. The laboratory control sample (LCS) recovery was within the acceptance limits; therefore, the data were accepted.

The gasoline values for samples MW-2, MW-4, MW-5 and MW-6 are primarily from the reported gasoline additives.

TPH as Diesel w/ Silica Gel Cleanup:
Sample MW-5 contains material in the diesel range of molecular weights, but the material does not exhibit the peak pattern typical of diesel oil.

Due to laboratory error sample MW-6 was not spiked with the surrogate, n-tricosane.

The relative percent difference (RPD) for the laboratory control samples was above the acceptance limit for diesel. This indicates that the results could be variable.

NORTH COAST LABORATORIES
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Date: 03-May-06
WorkOrder: 0604372

ANALYTICAL REPORT

Client Sample ID: MW-1 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-01A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	9.9	1.0	µg/L	1.0		4/25/06
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		4/25/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		4/25/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		4/25/06
Benzene	ND	0.50	µg/L	1.0		4/25/06
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		4/25/06
Toluene	0.85	0.50	µg/L	1.0		4/25/06
Ethylbenzene	ND	0.50	µg/L	1.0		4/25/06
m,p-Xylene	0.84	0.50	µg/L	1.0		4/25/06
o-Xylene	ND	0.50	µg/L	1.0		4/25/06
Surrogate: 1,4-Dichlorobenzene-d4	94.7	80.8-139	% Rec	1.0		4/25/06

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		4/25/06

Client Sample ID: MW-1 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-01D

Test Name: TPH as Diesel **Reference:** EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	4/21/06	4/21/06
Surrogate: N-Tricosane	91.1	70-130	% Rec	1.0	4/21/06	4/21/06

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Date: 03-May-06
WorkOrder: 0604372

ANALYTICAL REPORT

Client Sample ID: MW-2 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-02A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	21	1.0	µg/L	1.0		4/25/06
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		4/25/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		4/25/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		4/25/06
Benzene	ND	0.50	µg/L	1.0		4/25/06
Tert-amyl methyl ether (TAME)	1.7	1.0	µg/L	1.0		4/25/06
Toluene	0.70	0.50	µg/L	1.0		4/25/06
Ethylbenzene	ND	0.50	µg/L	1.0		4/25/06
m,p-Xylene	0.73	0.50	µg/L	1.0		4/25/06
o-Xylene	ND	0.50	µg/L	1.0		4/25/06
Surrogate: 1,4-Dichlorobenzene-d4	95.1	80.8-139	% Rec	1.0		4/25/06

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	50	50	µg/L	1.0		4/25/06

Client Sample ID: MW-2 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-02D

Test Name: TPH as Diesel **Reference:** EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	4/21/06	4/21/06
Surrogate: N-Tricosane	78.7	70-130	% Rec	1.0	4/21/06	4/21/06

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Date: 03-May-06
WorkOrder: 0604372

ANALYTICAL REPORT

Client Sample ID: MW-3 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-03A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	4.7	1.0	µg/L	1.0		4/25/06
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		4/25/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		4/25/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		4/25/06
Benzene	ND	0.50	µg/L	1.0		4/25/06
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		4/25/06
Toluene	0.54	0.50	µg/L	1.0		4/25/06
Ethylbenzene	ND	0.50	µg/L	1.0		4/25/06
m,p-Xylene	0.65	0.50	µg/L	1.0		4/25/06
o-Xylene	ND	0.50	µg/L	1.0		4/25/06
Surrogate: 1,4-Dichlorobenzene-d4	94.7	80.8-139	% Rec	1.0		4/25/06

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		4/25/06

Client Sample ID: MW-3 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-03D

Test Name: TPH as Diesel with Silica Gel Cleanup **Reference:** EPA 3510/3630/GCFID(LUFT)/8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	4/26/06	5/1/06
Surrogate: N-Tricosane	85.6	38-129	% Rec	1.0	4/26/06	5/1/06

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Date: 03-May-06
WorkOrder: 0604372

ANALYTICAL REPORT

Client Sample ID: MW-4 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-04A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	220	10	µg/L	10		4/26/06
Tert-butyl alcohol (TBA)	ND	110	µg/L	1.0		4/26/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		4/26/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		4/26/06
Benzene	ND	0.50	µg/L	1.0		4/26/06
Tert-amyl methyl ether (TAME)	8.5	1.0	µg/L	1.0		4/26/06
Toluene	ND	0.50	µg/L	1.0		4/26/06
Ethylbenzene	ND	0.50	µg/L	1.0		4/26/06
m,p-Xylene	0.58	0.50	µg/L	1.0		4/26/06
o-Xylene	ND	0.50	µg/L	1.0		4/26/06
Surrogate: 1,4-Dichlorobenzene-d4	95.6	80.8-139	% Rec	1.0		4/26/06

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	250	50	µg/L	1.0		4/26/06

Client Sample ID: MW-4 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-04D

Test Name: TPH as Diesel with Silica Gel Cleanup **Reference:** EPA 3510/3630/GCFID(LUFT)/8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	4/26/06	5/1/06
Surrogate: N-Tricosane	74.1	38-129	% Rec	1.0	4/26/06	5/1/06

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Date: 03-May-06
WorkOrder: 0604372

ANALYTICAL REPORT

Client Sample ID: MW-5 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-05A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	140	10	µg/L	10		4/26/06
Tert-butyl alcohol (TBA)	ND	50	µg/L	1.0		4/26/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		4/26/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		4/26/06
Benzene	ND	0.50	µg/L	1.0		4/26/06
Tert-amyl methyl ether (TAME)	4.7	1.0	µg/L	1.0		4/26/06
Toluene	ND	0.50	µg/L	1.0		4/26/06
Ethylbenzene	ND	0.50	µg/L	1.0		4/26/06
m,p-Xylene	0.58	0.50	µg/L	1.0		4/26/06
o-Xylene	ND	0.50	µg/L	1.0		4/26/06
Surrogate: 1,4-Dichlorobenzene-d4	96.0	80.8-139	% Rec	1.0		4/26/06

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	440	50	µg/L	1.0		4/26/06

Client Sample ID: MW-5 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-05D

Test Name: TPH as Diesel with Silica Gel Cleanup **Reference:** EPA 3510/3630/GCFID(LUFT)/8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	270	50	µg/L	1.0	4/26/06	5/1/06
Surrogate: N-Tricosane	65.7	38-129	% Rec	1.0	4/26/06	5/1/06

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Date: 03-May-06
WorkOrder: 0604372

ANALYTICAL REPORT

Client Sample ID: MW-6 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-06A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	94	1.0	µg/L	1.0		4/26/06
Tert-butyl alcohol (TBA)	ND	36	µg/L	1.0		4/26/06
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		4/26/06
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		4/26/06
Benzene	8.1	0.50	µg/L	1.0		4/26/06
Tert-amyl methyl ether (TAME)	3.3	1.0	µg/L	1.0		4/26/06
Toluene	ND	0.50	µg/L	1.0		4/26/06
Ethylbenzene	ND	0.50	µg/L	1.0		4/26/06
m,p-Xylene	0.68	0.50	µg/L	1.0		4/26/06
o-Xylene	ND	0.50	µg/L	1.0		4/26/06
Surrogate: 1,4-Dichlorobenzene-d4	94.9	80.8-139	% Rec	1.0		4/26/06

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	140	50	µg/L	1.0		4/26/06

Client Sample ID: MW-6 **Received:** 4/19/06 **Collected:** 4/19/06 0:00
Lab ID: 0604372-06D

Test Name: TPH as Diesel with Silica Gel Cleanup **Reference:** EPA 3510/3630/GCFID(LUFT)/8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	4/26/06	5/1/06
Surrogate: N-Tricosane	0	38-129	% Rec	1.0	4/26/06	5/1/06

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North Coast Laboratories, Ltd.

Date: 03-May-06

CLIENT: City of Arcata
Work Order: 0604372
Project: 000108100 ARCATA CORP YARD

QC SUMMARY REPORT

Method Blank

Sample ID **MB 042506** Batch ID: **R40974** Test Code: **8260OXYW** Units: **µg/L** Analysis Date **4/25/06 4:20:00 AM** Prep Date
Client ID: Run ID: **ORGCMS3_060425C** SeqNo: **588647**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	1.0									
Tert-butyl alcohol (TBA)	ND	10									
Di-isopropyl ether (DIPE)	ND	1.0									
Ethyl tert-butyl ether (ETBE)	ND	1.0									
Benzene	ND	0.50									
Tert-amyl methyl ether (TAME)	ND	1.0									
Toluene	ND	0.50									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	0.50									
o-Xylene	ND	0.50									
1,4-Dichlorobenzene-d4	0.958	0.10	1.00	0	95.8%	81	139	0			

Sample ID **MB 042506** Batch ID: **R40963** Test Code: **GASW-MS** Units: **µg/L** Analysis Date **4/25/06 4:20:00 AM** Prep Date
Client ID: Run ID: **ORGCMS3_060425A** SeqNo: **588526**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline	27.45	50									J

Sample ID **MB-15596** Batch ID: **15596** Test Code: **SGTPHDW** Units: **µg/L** Analysis Date **5/1/06 1:26:17 PM** Prep Date **4/26/06**
Client ID: Run ID: **ORGC5_060501B** SeqNo: **589835**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	ND	50									
N-Tricosane	51.1	0.10	50.0	0	102%	38	129	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: City of Arcata
Work Order: 0604372
Project: 000108100 ARCATA CORP YARD

QC SUMMARY REPORT

Method Blank

Sample ID **MB-15572** Batch ID: **15572** Test Code: **TPHDIW** Units: **µg/L** Analysis Date **4/21/06 10:22:54 PM** Prep Date **4/21/06**

Client ID: Run ID: **ORGC7_060421B** SeqNo: **587966**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	ND	50									
N-Tricosane	53.4	0.10	50.0	0	107%	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 03-May-06

CLIENT: City of Arcata
Work Order: 0604372
Project: 000108100 ARCATA CORP YARD

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **LCS-06248** Batch ID: **R40974** Test Code: **8260OXYW** Units: **µg/L** Analysis Date **4/25/06 1:47:00 AM** Prep Date

Client ID: Run ID: **ORGCMS3_060425C** SeqNo: **588645**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	19.45	1.0	20.0	0	97.2%	80	120	0			
Tert-butyl alcohol (TBA)	411.8	10	400	0	103%	25	162	0			
Di-isopropyl ether (DIPE)	19.81	1.0	20.0	0	99.1%	80	120	0			
Ethyl tert-butyl ether (ETBE)	19.10	1.0	20.0	0	95.5%	77	120	0			
Benzene	20.67	0.50	20.0	0	103%	78	117	0			
Tert-amyl methyl ether (TAME)	21.14	1.0	20.0	0	106%	64	136	0			
Toluene	21.00	0.50	20.0	0	105%	80	120	0			
Ethylbenzene	20.10	0.50	20.0	0	101%	80	120	0			
m,p-Xylene	41.62	0.50	40.0	0	104%	80	120	0			
o-Xylene	22.30	0.50	20.0	0	112%	80	120	0			
1,4-Dichlorobenzene-d4	1.01	0.10	1.00	0	101%	81	139	0			

Sample ID **LCSD-06248** Batch ID: **R40974** Test Code: **8260OXYW** Units: **µg/L** Analysis Date **4/25/06 9:51:00 AM** Prep Date

Client ID: Run ID: **ORGCMS3_060425C** SeqNo: **588655**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	20.94	1.0	20.0	0	105%	80	120	19.4	7.38%	20	
Tert-butyl alcohol (TBA)	452.5	10	400	0	113%	25	162	412	9.41%	20	
Di-isopropyl ether (DIPE)	21.42	1.0	20.0	0	107%	80	120	19.8	7.80%	20	
Ethyl tert-butyl ether (ETBE)	21.57	1.0	20.0	0	108%	77	120	19.1	12.2%	20	
Benzene	20.72	0.50	20.0	0	104%	78	117	20.7	0.279%	20	
Tert-amyl methyl ether (TAME)	23.63	1.0	20.0	0	118%	64	136	21.1	11.1%	20	
Toluene	22.69	0.50	20.0	0	113%	80	120	21.0	7.73%	20	
Ethylbenzene	20.45	0.50	20.0	0	102%	80	120	20.1	1.69%	20	
m,p-Xylene	42.64	0.50	40.0	0	107%	80	120	41.6	2.43%	20	
o-Xylene	24.97	0.50	20.0	0	125%	80	120	22.3	11.3%	20	S
1,4-Dichlorobenzene-d4	0.970	0.10	1.00	0	97.0%	81	139	1.01	4.12%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: City of Arcata
Work Order: 0604372
Project: 000108100 ARCATA CORP YARD

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **LCS-06249** Batch ID: **R40963** Test Code: **GASW-MS** Units: **µg/L** Analysis Date **4/25/06 3:03:00 AM** Prep Date
Client ID: Run ID: **ORGCMS3_060425A** SeqNo: **588524**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline	964.8	50	1,000	0	96.5%	80	120	0			

Sample ID **LCSD-06249** Batch ID: **R40963** Test Code: **GASW-MS** Units: **µg/L** Analysis Date **4/25/06 10:17:00 AM** Prep Date
Client ID: Run ID: **ORGCMS3_060425A** SeqNo: **588532**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline	944.5	50	1,000	0	94.4%	80	120	965	2.13%	20	

Sample ID **LCS-15596** Batch ID: **15596** Test Code: **SGTPHDW** Units: **µg/L** Analysis Date **5/1/06 11:32:51 AM** Prep Date **4/26/06**
Client ID: Run ID: **ORGC5_060501B** SeqNo: **589833**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	225.3	50	500	0	45.1%	41	96	0			
N-Tricosane	48.8	0.10	50.0	0	97.6%	38	129	0			

Sample ID **LCSD-15596** Batch ID: **15596** Test Code: **SGTPHDW** Units: **µg/L** Analysis Date **5/1/06 11:55:40 AM** Prep Date **4/26/06**
Client ID: Run ID: **ORGC5_060501B** SeqNo: **589834**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	288.9	50	500	0	57.8%	41	96	225	24.8%	15	R
N-Tricosane	55.6	0.10	50.0	0	111%	38	129	48.8	13.1%	15	

Sample ID **LCS-15572** Batch ID: **15572** Test Code: **TPHDIW** Units: **µg/L** Analysis Date **4/21/06 8:20:57 PM** Prep Date **4/21/06**
Client ID: Run ID: **ORGC7_060421B** SeqNo: **587963**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	413.6	50	500	0	82.7%	67	120	0			
N-Tricosane	60.0	0.10	50.0	0	120%	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: City of Arcata
Work Order: 0604372
Project: 000108100 ARCATA CORP YARD

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID **LCSD-15572** Batch ID: **15572** Test Code: **TPHDIW** Units: **µg/L** Analysis Date **4/21/06 8:41:00 PM** Prep Date **4/21/06**

Client ID: Run ID: **ORGC7_060421B** SeqNo: **587964**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	408.3	50	500	0	81.7%	67	120	414	1.27%	15	
N-Tricosane	62.6	0.10	50.0	0	125%	70	130	60.0	4.30%	15	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

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Chain of Custody

P. _____ of _____

Attention: Kim Watson
Results & Invoice to: [illegible]
Address: [illegible]
[illegible]
Phone: [illegible]
Copies of Report to: [illegible]
[illegible]
Sampler (Sign & Print): [illegible]

PROJECT INFORMATION

Project Number: [illegible]
Project Name: [illegible]
Purchase Order Number: _____

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*
	MW-1	4/[illegible]		G.W.
	MW-2			
	MW-4			
	MW-[illegible]			
	MW-3			
	MW-5			

PRESERVATIVE
CONTAINER
ANALYSIS

LABORATORY NUMBER: _____

TAT: ☐ 24 Hr ☐ 48 Hr ☐ 5 Day ☐ 5–7 Day
☐ STD (2–3 Wk) ☐ Other: _____
PRIOR AUTHORIZATION IS REQUIRED FOR RUSHES

REPORTING REQUIREMENTS: State Forms ☐
Preliminary: FAX ☐ Verbal ☐ By:___/___/___
Final Report: FAX ☐ Verbal ☐ By:___/___/___

CONTAINER CODES: 1—½ gal. pl; 2—250 ml pl; 3—500 ml pl; 4—1 L Nalgene; 5—250 ml BG; 6—500 ml BG; 7—1 L BG; 8—1 L cg; 9—40 ml VOA; 10—125 ml VOA; 11—4 oz glass jar; 12—8 oz glass jar; 13—brass tube; 14—other

PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_3$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

SAMPLE CONDITION/SPECIAL INSTRUCTIONS

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME
[illegible]	[illegible]	[illegible]	
	[illegible]		

SAMPLE DISPOSAL
☐ NCL Disposal of Non-Contaminated
☐ Return ☐ Pickup

CHAIN OF CUSTODY SEALS Y/N/NA _____
SHIPPED VIA: UPS Air-Ex Fed-Ex Bus Hand

***MATRIX:** DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT