Barr
Engineering Company

0003

142922

June 30, 1998

Mr. Michael Bellot
EPA Remedial Project Manager
SR-6J
United States Environmental Protection Agency
Region 5
77 West Jackson Blvd.
Chicago, IL 60604-3590

Re: Waukegan Manufactured Gas & Coke Plant Site

Dear Mr. Bellot:

On behalf of North Shore Gas and General Motors, we are submitting two sets of field sampling reports and related documentation for groundwater and surface water sampling completed in 1996 and 1997 at the Waukegan Manufactured Gas and Coke Plant site. The results of these sampling efforts are documented in the June 30, 1998 Feasibility Study report.

Please call if you have questions.

Yours truly,

James R. Langseth

JSL/dsd
Enclosure
c: Sean Mulroney
Jerry Willman (3 copies)
William Andrae
Steve Matuszak
Jerry Picha
Stephen Armstrong
Jerry Maynard
James Campbell
Edward Peterson
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1349003\59500-1

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☐ 229 Quail Run Drive, St. Louis, MO 63341, Phone: (314) 398-8055, Fax: (314) 398-8054

FIELD SAMPLING REPORT

Date: August 9, 1996

Project: Waukegan

Contact: Jim Langseth, Karlene French, Sherry K. VanDuyn
Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437

Field Sampling

Special sampling was conducted per your request.

Field Report

Attachments:

- Field Log Cover Sheet
- Field Data Summary
- Field Log Data Sheets (listed numerically)
- Meter Calibration Summary
- Parameter List
- Chain-of-Custody
- Lab Correspondence
- Additional Correspondence

Laboratory Analysis Status

Samples were shipped via Fed Ex to the QAL–Montgomery, Alabama laboratory.

J. Eric Gabrielson
Sampling Team Member

1349003\40450-1/TMN

Waukegan Sampling Notes:

- The treated purged water developed a sheen when placed in the tank delivered by clean harbors. Prior to treatment none of the purged water had indications of a sheen. All purged water was contained in a tank trailer for on-site treatment using a carbon drum. After the treatment, the water was transferred into the tank.

- While we were sampling L3 a life guard informed us that the City of Chicago had discharged raw sewage during a 15" rain storm the previous day.

- Two field duplicate samples were collected. M-1 (VOC's only) was collected at MW8D. M-2 (Phenolics and arsenic) was collected at MW13D.

- Additional water was collected from MW7D and MW13S for a feasibility study. Two 2.5-gallon containers from MW7D and three 2.5-gallon containers from MW13S were shipped to the Fluor Daniel/Ground Water Technology Inc. Lab in California.

- A soil sample was acquired 200' East of well nest 13. The sample was taken after shoveling down ~2.5' to the water table. Six 8 oz. containers were filled with saturated soil and sent to Ground Water Technology in California.

- As the photographs will confirm, many of the on-site barrels have been affected by sea gull dropping.

- Field ferrous iron tests conducted on the samples from wells MW9D, MW9S, MW3D, MW6D, MW13S, MW13D, and MW12D were considered suspect because the test results were identical and at the instruments maximum readings. QAL was instructed to analyze these samples for additional parameters: filtered and total iron. Discoloration of the water due to its chemistry is probably the cause of the faulty readings.

- All wells were purged and sampled with a peristaltic pump. Fresh dedicated tubing was used at each well.

FIELD LOG COVER SHEET

F1

WATER SAMPLING

Client: Waukegan/North Shore Gas

Project No.: 13/49-003 JSL 268

Technician: SDI, JEG

Sampling Period: 7/15–7/19/96

Date	Temperature	Wind Speed	Wind Direction	Cloud Cover
7/15/96	75	5–10	SE	Partly Cloudy
7/16/96	80	0–5	W	Partly Cloudy
7/17/96	75	5–15	E	Cloudy
7/18/96	80	5–15	SE	Cloudy
7/19/96	70	5–15	NE	Cloudy

Summary of Field Activities

- Heavy rain occurred off and on from the 16th of July through the 18th. On July 18 up to 15" of rain was recorded in some parts of the city. The inclement weather caused several sampling delays.
- See additional comments attached.

WATER LEVEL SUMMARY

Project: Waykegan Coke Plant

Project Number: 1349003JSL

Date:

Environmental Technician: JEG and SDI

Monitoring Location	Measuring point elevation	Water level depth	Static water elevation	Comments
P-102	588.52	6.12	582.40	
P-103	589.44	7.07	582.37	
P-104	589.07	6.52	582.55	
P-105	583.96	1.36	582.60	
P-107	548.41	2.25	546.16	
P-108	589.52	7.04	582.48	
P-106	589.60	7.19	582.41	
W-2A	586.22	4.34	581.88	
W-2B	586.74	5.00	581.74	
W-2C	586.80	5.10	581.70	
W-4A	586.45	4.46	581.99	
W-4B	586.39	4.40	581.99	
W-4C	586.41	4.40	582.01	
W-5	589.66	3.86	585.80	
W-6	589.80	7.01	582.79	
W-12	585.81	3.10	582.71	
W-13	587.63	4.82	582.81	
L-2B	585.40	4.82	580.58	
SG-1	582.36	0.40	581.96	
SG-2	582.27			Measuring gauge above wa
SG-3	582.19	0.92	581.27	
SW-1	584.56	3.25	581.31	
SW-2	585.52			removed

FIELD DATA SUMMARY

Project: North Shore Gas

Project number 1349003JSL268

Environmental Technician: JEG and SDI

Monitoring location	Date	Temp	Conductivi @ 25 oC	pH	Static	Elevation	Eh	DO mg/L	Ferrou Iron mg/l
MW3D	07/16/96	11.3	11690	8.42	5.60	582.63	-295	0.02	5.10
MW6D	"	11.1	20300	7.79	6.80	581.71	-272	0.05	5.10
MW10D	"	11.4	11860	8.59	5.00	582.14	-245	0.05	0.31
MW10S	"	13.8	672	6.95	6.36	582.22	-44	2.27	1.97
MW5S	"	13.1	839	7.19	6.06	581.83	-116	0.24	1.93
MW5D	"	10.6	4840	8.30	6.69	581.78	-186	0.12	0.39
MW3S	"	14.0	803	6.61	5.62	582.62	-4	0.13	0.93
MW6S	"	12.3	1150	7.42	6.66	581.79	-130	0.16	0.24
MW9D	07/17/96	12.1	7900	7.05	6.00	582.65	-170	0.13	5.10
MW7S	"	15.1	658	6.08	5.04	582.74	-60	0.26	5.10
MW7D	"	11.2	20100	8.82	5.47	582.67	-354	0.05	0.10
MW1D	"	11.1	9430	8.82	5.44	582.18	-277	0.08	0.04
MW1S	"	11.0	1289	6.95	5.46	582.30	-144	0.17	0.22
MW4S	"	12.5	1098	6.98	3.46	582.70	-49	0.12	0.69
MW4D	"	11.6	1740	8.49	3.26	582.67	-280	0.02	0.50
MW13S	07/18/96	14.1	427	7.21	4.35	582.60	-82	0.76	5.10
MW13D	"	10.9	1664	8.61	4.21	582.58	-268	0.02	*
MW14S	"	18.1	488	6.90	1.65	582.27	-58	0.69	2.29
MW14D	"	11.4	1588	7.56	1.76	582.29	-112	0.13	1.96
MW8S	"	14.2	1173	7.09	3.93	582.50	-44	0.17	0.09
MW8D	"	13.4	1273	8.87	3.41	582.68	-328	0.02	0.16
MW12D	07/19/96	10.9	2420	7.29	3.42	582.59	-127	0.14	5.10
MW12S	"	15.8	446	7.07	3.50	582.53	154	1.20	0.11
L-3	"	11.5	300	8.01	---	---	128	11.11	---
L-2	"	11.7	290	8.04	---	---	131	11.80	---
L-1	"	11.5	228	7.80	---	---	111	11.50	---
Harbor	"	8.2	286	7.97	---	---	143	11.30	---

WATER LEVEL SUMMARY

Project: Waykegan Coke Plant

Project Number: 1349003JSL

Date:

Environmental Technician: JEG and SDI

Monitoring Location	Measuring point elevation	Water level depth	Total well depth	Static water elevation	Comments
MW14S	583.92	1.65	11.5	582.27	
MW14D	584.05	1.76	30.6	582.29	
MW13S	586.95	4.35	12.9	582.60	
MW13D	586.90	4.32	33.1	582.58	Water inside outer casing
MW12S	586.03	3.50	12.0	582.53	
MW12D	586.01	3.42	33.4	582.59	
MW11S	587.83	5.43	14.2	582.40	
MW11D	587.98	5.48	30.7	582.50	
MW15S	585.33	2.26	11.8	583.07	
MW15D	585.39	2.37	29.0	583.02	
MW8S	586.43	3.93	12.5	582.50	
MW8D	586.09	3.41	29.9	582.68	inner cap broke
MW10S	588.58	6.36	16.2	582.22	
MW10D	588.60	6.46	32.6	582.14	
MW5S	587.89	6.06	16.0	581.83	
MW5D	588.47	6.69	28.5	581.78	
MW6S	588.45	6.66	16.7	581.79	
MW6D	588.51	6.80	19.3	581.71	
MW3S	588.24	5.62	15.0	582.62	
MW3D	588.23	5.60	30.8	582.63	
MW1S	587.76	5.46	19.6	582.30	
MW1D	587.62	5.44	29.7	582.18	
MW4S	586.16	3.46	12.2	582.70	
MW4D	585.93	3.26	32.2	582.67	
MW7S	587.78	5.04	14.4	582.74	
MW7D	588.14	5.47	34.4	582.67	
MW9S	588.49	5.93	15.0	582.56	
MW9D	588.65	6.00	34.2	582.65	
PW1	589.00	6.56	36.0		

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 1S
Location:	IL	Date:	7/17/96
Project # :	13/49003JSL	Sample time:	1140

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	19.60	1125	10.9	0.18	1290.00	6.65	-143.0
Static water level:*	5.46	1130	11.0	0.17	1290.00	6.95	-144.0
Water depth:*	14.14	1134	11.0	0.17	1289.00	6.95	-144.0
Well volume: (gal)	2.3						
Purge method:	peris						
Sample method:	ded						

Start time:	1109	Dissolved Oxygen:	Odor: yes
Stop time:	1134	Purge Appearance:	clear
Duration: (minutes)	23	Sample Appearance:	clear
Rate, gpm:	0.5	Comments:	Ferrous Iron .22 mg/l
Volume purged:	11.5	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 1D
Location:	IL	Date:	7/17/96
Project # :	13/49003JSL	Sample time:	1200

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	29.65	1125	11.0	0.08	9450.00	8.84	-283.0
Static water level:*	5.44	1130	11.0	0.08	9330.00	8.82	-247.0
Water depth:*	24.21	1134	11.1	0.08	9430.00	8.82	-277.0
Well volume: (gal)	4.0						
Purge method:	peris						
Sample method:	ded						

Start time:	1134	Dissolved Oxygen:	Odor: yes
Stop time:	1154	Purge Appearance:	amber
Duration: (minutes)	20	Sample Appearance:	amber
Rate, gpm:	1	Comments:	Ferrous Iron .04 mg/l
Volume purged:	20	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 3S
Location:	IL	Date:	7/16/96
Project # :	13/49003JSL	Sample time:	915

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	15.00	904	14.1	0.15	806.00	6.55	12.0
Static water level:*	5.62	907	14.0	0.14	804.00	6.57	6.0
Water depth:*	9.38	910	14.0	0.13	803.00	6.61	-4.0
Well volume: (gal)	1.5						
Purge method:	peris						
Sample method:	ded						

Start time:	855	Dissolved Oxygen:	Odor: yes
Stop time:	910	Purge Appearance:	clear
Duration: (minutes)	15	Sample Appearance:	clear
Rate, gpm:	0.5	Comments: Ferrous Iron .93 mg/l	
Volume purged:	7.5	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 3D
Location:	IL	Date:	7/16/96
Project # :		Sample time:	950

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	30.7	937	11.3	0.03	11690	8.42	-275.0
Static water level:*	5.60	941	11.2	0.03	11940	8.41	-283.0
Water depth:*	25.1	945	11.2	0.02	11780	8.41	-290.0
Well volume: (gal)	4.1	949	11.2	0.02	11640	8.41	-295.0
Purge method:	peris						
Sample method:	ded						

Start time:	925	Dissolved Oxygen:	Odor: strong
Stop time:	953	Purge Appearance:	lt. green
Duration: (minutes)	28	Sample Appearance:	lt. green
Rate, gpm:	1	Comments:	5.1 mg/l ferrous iron, this is a suspected
Volume purged:	20	false reading and the lab will also analize for this compound	
Duplicate collected?	no	Purged water was contained for treatment	
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 4S
Location:	IL	Date:	7/17/96
Project # :	13/49003JSL	Sample time:	1600

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	12.00	1554	12.6	0.15	1096.00	7.00	-53.0
Static water level:*	3.46	1557	12.5	0.14	1097.00	6.98	-47.0
Water depth:*	8.54	1600	12.5	0.12	1098.00	6.98	-49.0
Well volume: (gal)	1.4						
Purge method:	peris						
Sample method:	ded						

Start time:	1546	Dissolved Oxygen:	Odor: yes
Stop time:	1600	Purge Appearance:	clear
Duration: (minutes)	14	Sample Appearance:	clear
Rate, gpm:	0.5	Comments: Ferrous Iron .69 mg/l	
Volume purged:	7	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 4D
Location:	IL	Date:	7/17/96
Project # :	13/49003JSL	Sample time:	1630

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	32.00	1620	11.6	0.02	1750.00	8.49	-236.0
Static water level:*	3.26	1625	11.6	0.02	1744.00	8.49	-264.0
Water depth:*	28.74	1630	11.6	0.02	1740.00	8.49	-280.0
Well volume: (gal)	4.7						
Purge method:	peris						
Sample method:	ded						

Start time:	1606	Dissolved Oxygen:	Odor: yes
Stop time:	1630	Purge Appearance:	grey
Duration: (minutes)	24	Sample Appearance:	grey
Rate, gpm:	1	Comments:	Ferrous Iron .5 mg/l
Volume purged:	23.5	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 5S
Location:	IL	Date:	7/16/96
Project # :	13/49003JSL	Sample time:	1520

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	16.00	1510	13.1	0.31	833.00	7.22	-122.0
Static water level:*	6.06	1513	13.2	0.25	840.00	7.19	-116.0
Water depth:*	6.46	1516	13.1	0.24	839.00	7.19	-116.0
Well volume: (gal)	1.6						
Purge method:	peris						
Sample method:	ded						

Start time:	1500	Dissolved Oxygen:	Odor: yes
Stop time:	1516	Purge Appearance:	clear
Duration: (minutes)	16	Sample Appearance:	clear
Rate, gpm:	0.5	Comments: Ferrous Iron 1.93 mg/l	
Volume purged:	8	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 5D
Location:	IL	Date:	7/16/96
Project # :	13/49003JSL	Sample time:	1550

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	28.50	1539	10.6	0.11	5150.00	8.32	-182.0
Static water level:*	6.69	1543	10.6	0.12	4900.00	8.31	-185.0
Water depth:*	21.81	1546	10.6	0.12	4840.00	8.30	-186.0
Well volume: (gal)	3.6						
Purge method:	peris						
Sample method:	ded						

Start time:	1528	Dissolved Oxygen:	Odor: yes
Stop time:	1546	Purge Appearance:	lt yellow
Duration: (minutes)	18	Sample Appearance:	lt. yellow
Rate, gpm:	1	Comments: Ferrous Iron .39 mg/l	
Volume purged:	17.5	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 6S
Location:	IL	Date:	7/16/96
Project # :	13/49003JSL	Sample time:	1630

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	16.70	1620	12.3	0.16	1146.00	7.41	-133.0
Static water level:*	6.66	1623	12.3	0.16	1150.00	7.41	-135.0
Water depth:*	10.04	1626	12.3	0.16	1150.00	7.42	-130.0
Well volume: (gal)	1.6						
Purge method:	peris						
Sample method:	ded						

Start time:	1610	Dissolved Oxygen:	Odor: yes
Stop time:	1626	Purge Appearance:	clear
Duration: (minutes)	16	Sample Appearance:	clear
Rate, gpm:	0.5	Comments: Ferrous Iron .24 mg/l	
Volume purged:	8	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 6D
Location:	IL	Date:	7/16/96
Project # :	13/49003JSL	Sample time:	1715

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	29.3	1652	11.2	0.05	20100	7.69	-242.0
Static water level:*	6.80	1655	11.1	0.05	20200	7.74	-257.0
Water depth:*	22.5	1657	11.1	0.05	20300	7.79	-272.0
Well volume: (gal)	3.7						
Purge method:	peris						
Sample method:	ded						

Start time:	1645	Dissolved Oxygen:	Odor: strong
Stop time:	1657	Purge Appearance:	Amber green
Duration: (minutes)	12	Sample Appearance:	Amber green
Rate, gpm:	1.5	Comments:	5.1 mg/l ferrous iron, this is a suspected
Volume purged:	18	false reading and the lab will also analize for this compound	
Duplicate collected?	no	Purged water was contained for treatment	
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* *Measurements are referenced from top of riser pipe, unless otherwise indicated.*

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 7S
Location:	IL	Date:	7/17/96
Project # :	13/49003JSL	Sample time:	1240

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	14.44	1226	15.2	0.26	662.00	6.08	-67.0
Static water level:*	5.04	1231	15.3	0.25	661.00	6.08	-62.0
Water depth:*	9.40	1234	15.1	0.26	658.00	6.08	-60.0
Well volume: (gal)	1.5						
Purge method:	peris						
Sample method:	ded						

Start time:	1219	Dissolved Oxygen:	Odor: yes
Stop time:	1234	Purge Appearance:	clear
Duration: (minutes)	15	Sample Appearance:	clear
Rate, gpm:	0.5	Comments:	Ferrous Iron 5.10 mg/l, this is a suspected
Volume purged:	7.5	false reading and the lab will also analize for this compound	
Duplicate collected?	no	purged water was contained for treatment	
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 7D
Location:	IL	Date:	7/17/96
Project # :	13/49003JSL	Sample time:	1300

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	34.35	1038	11.2	0.05	20200.00	8.83	-350.0
Static water level:*	5.47	1041	11.2	0.05	20100.00	8.83	-352.0
Water depth:*	28.88	1044	11.2	0.05	20100.00	8.82	-354.0
Well volume: (gal)	4.7						
Purge method:	peris						
Sample method:	ded						

Start time:	1235	Dissolved Oxygen:	Odor: yes
Stop time:	1259	Purge Appearance:	Dark
Duration: (minutes)	24	Sample Appearance:	Dark
Rate, gpm:	1	Comments:	Ferrous Iron .1 mg/l
Volume purged:	23.5	Purged water was contained for treatment	
Duplicate collected?	no	2 2.5 gallon containers filled for feasibility study	
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 8S
Location:	IL	Date:	7/18/96
Project # :	13/49003JSL	Sample time:	1045

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	12.45	1038	14.0	0.16	1217.00	7.08	-48.0
Static water level:*	3.93	1041	14.2	0.17	1192.00	7.08	-46.0
Water depth:*	8.52	1044	14.2	0.17	1173.00	7.09	-44.0
Well volume: (gal)	1.4						
Purge method:	peris						
Sample method:	ded						

Start time:	1030	Dissolved Oxygen:	Odor: yes
Stop time:	1044	Purge Appearance:	brown
Duration: (minutes)	14	Sample Appearance:	brown
Rate, gpm:	0.5	Comments: Ferrous Iron .09 mg/l	
Volume purged:	7	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 8D
Location:	IL	Date:	7/18/96
Project # :	13/49003JSL	Sample time:	1110

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	29.91	1100	13.2	0.02	1274.00	8.87	-335.0
Static water level:*	3.41	1104	13.2	0.02	1274.00	8.87	-335.0
Water depth:*	26.50	1107	13.4	0.02	1273.00	8.87	-328.0
Well volume: (gal)	4.3						
Purge method:	peris						
Sample method:	ded						

Start time:	1045	Dissolved Oxygen:	Odor: yes
Stop time:	1107	Purge Appearance:	brown
Duration: (minutes)	22	Sample Appearance:	brown
Rate, gpm:	1	Comments: Ferrous Iron .16 mg/l	
Volume purged:	21.5	Purged water was contained for treatment	
Duplicate collected?	yes	M-1 voc only	
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 9S
Location:	IL	Date:	7/17/96
Project # :	13/49003JSL	Sample time:	1400

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	15.00	1354	11.9	0.27	2440.00	4.44	280.0
Static water level:*	5.93	1357	11.9	0.23	2480.00	4.76	250.0
Water depth:*	9.07	1400	11.9	0.21	2510.00	4.98	222.0
Well volume: (gal)	1.5						
Purge method:	peris						
Sample method:	ded						

Start time:	1345	Dissolved Oxygen:	Odor: no
Stop time:	1400	Purge Appearance:	Dark Brown
Duration: (minutes)	15	Sample Appearance:	clear
Rate, gpm:	0.5	Comments:	Ferrous Iron 5.10 mg/l, this a suspected
Volume purged:	7.5	false reading and the lab will also analize for this compound	
Duplicate collected?	no	Purged water was contained for treatment	
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 9D
Location:	IL	Date:	7/17/96
Project # :	13/49003JSL	Sample time:	1430

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	34.3	1421	12.1	0.13	7930.00	7.05	-170.0
Static water level:*	6.00	1426	12.1	0.13	7900.00	7.05	-170.0
Water depth:*	28.3	1430	12.1	0.13	7900.00	7.05	-170.0
Well volume: (gal)	4.6						
Purge method:	peris						
Sample method:	ded						

Start time:	1407	Dissolved Oxygen:	Odor: strong
Stop time:	1430	Purge Appearance:	grey
Duration: (minutes)	23	Sample Appearance:	grey
Rate, gpm:	1	Comments:	Ferrous Iron 5.10 mg/l, this is a suspected
Volume purged:	23	false reading and the lab will also analize for this compound	
Duplicate collected?	no	Purged water was contained for treatment	
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 10S
Location:	IL	Date:	7/16/96
Project # :	13/49003JSL	Sample time:	1125

GENERAL DATA		STABILIZATION TEST					
Barr lock	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	16.00	1115	13.8	2.26	628.00	6.95	-45.0
Static water level:*	6.36	1118	13.8	2.32	624.00	6.94	-44.0
Water depth:*	9.64	1121	13.8	2.27	627.00	6.95	-44.0
Well volume: (gal)	1.6						
Purge method:	peris						
Sample method:	ded						

Start time:	1106	Dissolved Oxygen:	Odor: no
Stop time:	1121	Purge Appearance:	brown
Duration: (minutes)	15	Sample Appearance:	clear
Rate, gpm:	0.5	Comments:	Ferrous Iron 1.97 mg/l
Volume purged:	7.5	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 10D
Location:	IL	Date:	7/16/96
Project # :	13/49003JSL	Sample time:	1200

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	32.60	1148	11.5	0.05	12160.00	8.60	-231.0
Static water level:*	5.00	1152	11.4	0.05	12010.00	8.59	-242.0
Water depth:*	6.46	1156	11.4	0.05	11900.00	8.59	-246.0
Well volume: (gal)	4.5	1200	11.4	0.05	11860.00	8.59	-245.0
Purge method:	peris						
Sample method:	ded						

Start time:	1135	Dissolved Oxygen:	Odor: yes
Stop time:	1156	Purge Appearance:	brown
Duration: (minutes)	21	Sample Appearance:	brown
Rate, gpm:	1	Comments:	Ferrous Iron .31 mg/l
Volume purged:	21	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 12S
Location:	IL	Date:	7/19/96
Project # :	13/49003JSL	Sample time:	830

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	12.03	824	15.8	1.17	447.00	7.08	167.0
Static water level:*	3.50	827	15.8	1.25	445.00	7.07	150.0
Water depth:*	8.53	830	15.8	1.20	446.00	7.07	154.0
Well volume: (gal)	1.4						
Purge method:	peris						
Sample method:	.ded						
Start time:	816	Dissolved Oxygen:			Odor:		no
Stop time:	830	Purge Appearance:				clear	
Duration: (minutes)	14	Sample Appearance:				clear	
Rate, gpm:	0.5	Comments:	Ferrous Iron .11 mg/l				
Volume purged:	7	Purged water was contained for treatment					
Duplicate collected?	no						
Sample collection by:	SDI,JEG						

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 12D
Location:	IL	Date:	7/19/96
Project # :	13/49003JSL	Sample time:	900

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	14.44	850	11.5	0.29	2140.00	7.21	-102.0
Static water level:*	9.44	855	11.1	0.19	2360.00	7.27	-116.0
Water depth:*	5.00	900	11.0	0.15	2400.00	7.27	-123.0
Well volume: (gal)	0.8	905	10.9	0.14	2420.00	7.29	-127.0
Purge method:	peris						
Sample method:	ded						

Start time:	1219	Dissolved Oxygen:	Odor: yes
Stop time:	1234	Purge Appearance:	clear
Duration: (minutes)	15	Sample Appearance:	clear
Rate, gpm:	0.5	Comments:	Ferrous Iron 5.10 mg/l, this is a suspected
Volume purged:	7.5	false reading and the lab will also analize for this compound	
Duplicate collected?	no	Purged water was contained for treatment	
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 13S
Location:	IL	Date:	7/18/96
Project # :	13/49003JSL	Sample time:	1345

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	12.9	1340	14.0	0.79	425.00	7.20	-82.0
Static water level:*	4.35	1344	14.0	0.79	425.00	7.20	-82.0
Water depth:*	8.55	1347	14.1	0.76	427.00	7.21	-82.0
Well volume: (gal)	1.4						
Purge method:	peris						
Sample method:	ded						

Start time:	1333	Dissolved Oxygen:	Odor: strong
Stop time:	1347	Purge Appearance:	Amber green
Duration: (minutes)	14	Sample Appearance:	Amber green
Rate, gpm:	0.5	Comments:	5.1 mg/l ferrous iron, this is a suspected
Volume purged:	7	false reading and the lab will also analize for this compound	
Duplicate collected?	no	Purged water was contained for treatment	
Sample collection by:	SDI,JEG	3 2.5 gallon containers filled for feasibility study	

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 13D
Location:	IL	Date:	7/18/96
Project # :	13/49003JSL	Sample time:	1430

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	33.0	1419	11.2	0.02	1660.00	8.60	-255.0
Static water level:*	4.21	1423	10.9	0.02	1669.00	8.60	-268.0
Water depth:*	28.79	1427	10.9	0.02	1664.00	8.61	-268.0
Well volume: (gal)	4.7						
Purge method:	peris						
Sample method:	ded						

Start time:	1406	Dissolved Oxygen:	Odor: strong
Stop time:	1427	Purge Appearance:	Amber green
Duration: (minutes)	21	Sample Appearance:	Amber green
Rate, gpm:	1	Comments:	Iron test was not possible because of discolorization
Volume purged:	21	Purged water was contained for treatment	
Duplicate collected?	yes	M-2 Phenolics and Arsenic	
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 14S
Location:	IL	Date:	7/18/96
Project # :	13/49003JSL	Sample time:	1530

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	11.50	1524	17.7	0.65	485.00	6.90	-48.0
Static water level:*	1.65	1527	17.9	0.67	489.00	6.90	-54.0
Water depth:*	9.85	1531	18.1	0.69	488.00	6.90	-58.0
Well volume: (gal)	1.6						
Purge method:	peris						
Sample method:	ded						

Start time:	1515	Dissolved Oxygen:	Odor: yes
Stop time:	1531	Purge Appearance:	clear
Duration: (minutes)	16	Sample Appearance:	clear
Rate, gpm:	0.5	Comments:	Ferrous Iron 2.29 mg/l
Volume purged:	8	Purged water was contained for treatment	
Duplicate collected?	no		
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	MW 14D
Location:	IL	Date:	7/18/96
Project # :	13/49003JSL	Sample time:	1600

GENERAL DATA		STABILIZATION TEST					
Barr lock:	y	Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:	2	Volume	oC		@25		
Total well depth:*	30.60	1556	11.5	0.17	1561.00	7.56	-109.0
Static water level:*	1.76	1600	11.4	0.14	1584.00	7.56	-117.0
Water depth:*	28.84	1604	11.4	0.13	1588.00	7.56	-112.0
Well volume: (gal)	4.7						
Purge method:	peris						
Sample method:	ded						
Start time:	1540	Dissolved Oxygen:			Odor:		yes
Stop time:	1604	Purge Appearance:				amber	
Duration: (minutes)	24	Sample Appearance:				amber	
Rate, gpm:	1	Comments:	Ferrous Iron 1.96 mg/l				
Volume purged:	23.5	Purged water was contained for treatment					
Duplicate collected?	no						
Sample collection by:	SDI,JEG						

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	L-1
Location:	IL	Date:	7/19/96
Project # :	13/49003JSL	Sample time:	1030

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:		Volume	oC		@25		
Total well depth:*		1030	11.5	11.50	228.00	7.80	111.0
Static water level:*							
Water depth:*							
Well volume: (gal)							
Purge method:							
Sample method:	van dorn						
Start time:		Dissolved Oxygen:			Odor:		no
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance:					clear
Rate, gpm:		Comments:					
Volume purged:		100' out, 4' deep, sampled at 2'					
Duplicate collected?							
Sample collection by:	SDI,JEG						

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	L-2
Location:	IL	Date:	7/19/96
Project # :	13/49003JSL	Sample time:	

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:		Volume	oC		@25		
Total well depth:*			11.7	11.80	290.00	8.04	131.0
Static water level:*							
Water depth:*							
Well volume: (gal)							
Purge method:							
Sample method:	van dorn						
Start time:		Dissolved Oxygen:			Odor:		no
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance:					clear
Rate, gpm:		Comments:					
Volume purged:		100' out, 4' deep, sampled at 2'					
Duplicate collected?							
Sample collection by:	SDI,JEG						

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	L-3
Location:	IL	Date:	7/19/96
Project # :	13/49003JSL	Sample time:	

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:		Volume	oC		@25		
Total well depth:*			11.5	11.11	300.00	8.01	128.0
Static water level:*							
Water depth:*							
Well volume: (gal)							
Purge method:							
Sample method:	van dorn						

Start time:		Dissolved Oxygen:	Odor: no
Stop time:		Purge Appearance:	
Duration: (minutes)		Sample Appearance:	clear
Rate, gpm:		Comments:	
Volume purged:		100' out, 4' deep, sampled at 2'	
Duplicate collected?			
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan	Station:	Harbor
Location:	IL	Date:	7/19/96
Project # :	13/49003JSL	Sample time:	

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	D.O.	Conduct.	pH	Eh
Casing diameter:		Volume	oC		@25		
Total well depth:*			8.2	11.30	286.00	7.97	143.0
Static water level:*							
Water depth:*							
Well volume: (gal)							
Purge method:							
Sample method:	van dorn						

Start time:		Dissolved Oxygen:	Odor: no
Stop time:		Purge Appearance:	
Duration: (minutes)		Sample Appearance:	clear
Rate, gpm:		Comments:	
Volume purged:		end of pier, South side in 8' of water	
Duplicate collected?			
Sample collection by:	SDI,JEG		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

BARR ENGINEERING COMPANY
METER CALIBRATION SUMMARY

PROJECT W4K.

TECHNICIAN SDI JEG

Meter type and number	Date	Time	Temperature C	Standard Used	Meter Reading	Slope	Conductivity Redline
3500 #1	7/18/96	0800	21	7/10	6.95/9.99	—	—
YSI 55 D.O.		AUTO CAL	98%				
3500 #1	7/19/96	0800	22.5	7/10	6.97/10.07	—	—
YSI 55 D.O.		AUTO CAL.	98%				
Conductivity	Date	Solution Used	Cell Result				
Cell Check							
ORP Probe	Date	Temp.	ORP Reading	Calculation	Result		
Check							
231+.- 10mV @ 25C							

231mV = Display Value + [(Display Temp. - 25 C) x (1.3 mV)]

WEATHER CONDITIONS

Date	Wind Direction	Wind Speed	Temperature F	Cloud Cover	Comments
7/19/96	NE	5-15	70	Cloudy	Foggy

Comments:

BARR ENGINEERING COMPANY
METER CALIBRATION SUMMARY

PROJECT WAK

TECHNICIAN SDI JEG

Meter type and number	Date	Time	Temperature C	Standard Used	Meter Reading	Slope	Conductivity Redline
3500 #1	7-16-96	0730	20	7/10	6.97/10.11	—	—
451 55 D.O.	7-16-96	AUTO CAL	97%				
3500 #1	7-17-96	0900	21	7/10	7.00/10.03	-	—
451 55 D.O	7-17-96	AUTO.CAL	98%				
Conductivity	Date	Solution Used	Cell Result				
Cell Check	7-16-96	1000	977				
ORP Probe	Date	Temp.	ORP Reading	Calculation	Result		
Check	7-16-96	20	232	226			
231+.- 10mV @ 25C							

231mV = Display Value + [(Display Temp. - 25 C) x (1.3 mV)]

WEATHER CONDITIONS

Date	Wind Direction	Wind Speed	Temperature F	Cloud Cover	Comments
7-15-96	SE	5-10	75	PC	PASSING T. STORMS
7-16-96	W	0-5	80	PC	
7-17-96	E	5-15	75	CLOUDY	T. STORMS
7-18-96	SE	5-15	85	CLOUDY	T. STORMS

Comments:

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003 JSL 268

№ 20461

Project Manager: Jim Longseth

Project Contact: Karlene French

Laboratory: Ground Water Tech

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_xOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide ($Z_nAcetate$)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	2.5 GAL pl containers					Total No. Of Containers	Remarks/ Analysis Required:
1. 135	7/18/96	1345	Y			Y																	3				3		WAUKEGAN study
2.																													
3.																													
4.																													
5.																													
6.																													
7.																													
8.																													
9.																													
10.																													
11.																													
12.																													
13.																													
14.																													
15.																													
16.																													

Sampled By: Eric Gabrielson Steve Iverson

Remarks:

Relinquished By:	Date	Time	Received by Lab:	Date	Time
	7/18/96				
Relinquished By:	Date	Time	Received by Lab:	Date	Time
Samples Shipped VIA ☐ Air Freight ☐ Fed. Exp. ☐ Sampler ☐ Other			Air Bill Number:		

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/29-003 JSL268

№ 20460

Project Manager: Jim Langseth
Project Contact: Karlene French
Laboratory: QA1 A1
Remarks/ Analysis Required: See List

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_xOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Z_N Acetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	500 ml Amber H_2SO_4	250 ml pl H_2SO_4 Filtered	~~1 L pl~~ 250 ml pl H_2SO_4	1 L Plas H_2SO_4	500 ml pl NaOH 2N	Total No. Of Containers	Remarks/ Analysis Required
1. MW14D	7/18/96	1600	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15	See List
2. MW14S		1530	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15	
3. MW13D		1430	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15	
4. MW13S		1345	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15	
5. MW8S		1045	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15	
6. MW8D		1110	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15	
7. M-1			X			X				3																		3	BETX → M-1
8. M-2			X			X					1	1	1										1					4	Phenolics and arsenic → M-2
9. FB-1			X			X				3	1	1	1		1								1			1		9	Phenolics, BETX Ammonia, arsenic Cyanide FB-1 ANALYSIS
10.																													
11.																													
12.																													
13.																													
14.																													
15.																													
16.																													

Note: Due to Water Chemistry, pH of containers may need adjustment

Sampled By: Eric Gabrielson Steve Ivrosan

Relinquished By: 7/18/96 Date Time

Relinquished By: Date Time

Received by Lab: Date Time

Received by Lab: Date Time

Remarks:

Samples Shipped VIA ☐ Air Freight ☐ Fed. Exp. ☐ Sampler ☐ Other

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003JSL268

No. 20526

Project Manager: Jim Langseth

Project Contact: Karlene French

Laboratory: QAI

Remarks/ Analysis Required: See Attached List

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_aOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Z_nAcetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	500 ml Amber (H_2SO_4)	250 ml Pl H_2SO_4 Filtered	250 ml Pl H_2SO_4 Filtered	1L Plastic H_2SO_4	500 ml Plastic NaOH + ZN_A		Total No. Of Containers
1. MW 3S	7/14/96	0915	X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
2. MW 3D		0950	X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
3. MW 10S		1125	X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
4. MW 10D		1200	X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
5. MW 5S		1520	X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
6. MW 5D		1550	X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
7. MW 6S		1630	X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
8. MW6D		1715	X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
9.																													
10.																													
11. TRIP Blank			X					X		3																			3
12.																													
13.																													
14.																													
15.																													
16.																													

See List

Note: Due to water chemistry, pH of containers may need adjustment

Sampled By: Eric Gabrielson + Steve Iverson

Remarks:

Relinquished By: [signature] Date 7/16/96 Time 1830

Relinquished By: Date Time

Received by Lab: Date Time

Received by Lab: Date Time

Samples Shipped VIA ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003JSL2.68

№ 20459

Project Manager: Jim Longseth
Project Contact: Karlene French
Laboratory: GWT
Remarks/ Analysis Required:

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_xOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Z_N Acetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)		2.5 Gallon plastic					Total No. Of Containers	Remarks/ Analysis Required
1. MW7D	7/17/96	1300	X			X																		2					2	Waukegan Study
2.																														
3.																														
4.																														Note: time indicated
5.																														is CDT
6.																														
7.																														
8.																														
9.																														
10.																														
11.																														
12.																														
13.																														
14.																														
15.																														
16.																														

Sampled By: Eric Gabrielson Steve Iverson

Remarks:

Relinquished By:	Date	Time	Received by Lab:	Date	Time
Relinquished By:	Date	Time	Received by Lab:	Date	Time
Samples Shipped VIA ☐ Air Freight ☐ Fed. Exp. ☐ Sampler ☐ Other			Air Bill Number:		

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003 TSL 268

№ 20458

Project Manager: Jim Langseth
Project Contact: Karleen French
Laboratory: QAL A1
Remarks/ Analysis Required: See List

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_xOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide ($Z_nAcetate$)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	500 ml Amber H_2SO_4	250 ml Pl Filtered	250 ml Pl H_2SO_4 Filtered	1L Plastic H_2SO_4	500 ml Plastic NaOH	Total No. Of Containers
1. MW1S	7/17/96	1140	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15
2. MW1D		1200	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15
3. MW7S		1240	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15
4. MW7D		1300	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15
5. MW9S		1400	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15
6. MW9D		1430	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15
7. MW4S		1600	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15
8. MW4D		1630	X			X				3	1	1	1	2	1			1					1	1	1	1	1	15
9.																												
10.																												
11. TB			X					X		3																		3
12.																												
13.																												
14.																												
15.																												
16.																												

See List

Note: Due to Water Chemistry, PH of Containers May Need Adjustment

Sampled By: Eric Gabrielson + Steve Iverson

Remarks:

Relinquished By: [signature] Date: 7/17/96 Time:

Relinquished By: Date: Time:

Samples Shipped VIA: ☐ Air Freight ☐ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: Date: Time:

Received by Lab: Date: Time:

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003 JS 4268

№ 20463

Project Manager: Jim Langseth

Project Contact: Karlene French

Laboratory: QAI A1

Remarks/ Analysis Required: See List

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_AOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide ($Z_nAcetate$)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	500 ml Amber H_2SO_4						Total No. Of Containers	Remarks/ Analysis Required
1. Harbor	7/19/96		X			X				3		1		1	2	1							1						9	See List
2. L1			X			X				3		1		1	2	1							1						9	
3. L2			X			X				3		1		1	2	1							1						9	
4. L3			X			X				3		1		1	2	1							1						9	
5. FB-2			X			X				3		1		1	2	1							1						9	
6.																														
7.																														
8.																														
9.																														
10.																														
11.																														
12.																														
13.																														
14.																														
15.																														
16.																														

Number of Containers/Preservative

Sampled By: Eric Gabrielson, Steve Iverson

Remarks:

Relinquished By: [signature] Date 7/19/96 Time

Relinquished By: Date Time

Samples Shipped VIA ☐ Air Freight ☐ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: Date Time

Received by Lab: Date Time

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003JS/L268

№ 20462

Project Manager: Jim Longzeth
Project Contact: Karlene French
Laboratory: QAI A1
Remarks/ Analysis Required: See List

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_aOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Z_nAcetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	500ml Amber w/ H_2SO_4	250ml Filtered	250ml H_2SO_4 Filtered	1L Pl w/ H_2SO_4	500ml Pl $NaOH/ZnAc$		Total No. Of Containers
1. MW12S	7/19/96		X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
2. MW12D			X			X				3	1	1	1	2	1			1					1	1	1	1	1		15
3.																													
4.																													
5. Trip Blan			X					X		3																			3
6.																													
7.																													
8.																													
9.																													
10.																													
11.																													
12.																													
13.																													
14.																													
15.																													
16.																													

Number of Containers/Preservative

See List

Note Due to water chemistry, pH of containers may need adjustment

Sampled By: Eric Gabrielson, Steve Iverson

Relinquished By: [signature] Date: 7/19/96 Time:

Relinquished By: Date: Time:

Samples Shipped VIA: ☐ Air Freight ☐ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: Date: Time:

Received by Lab: Date: Time:

Air Bill Number:

Remarks:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr
Engineering Company

8300 Norman Center Drive
Minneapolis, MN 55437-1026
Phone: (612) 832-2600
Fax: (612) 832-2601

555 West 27th Street
Hibbing, MN 55746
Phone: (218) 262-3465
Fax: (218) 262-3460

MEMORANDUM

To: Waukegan Manufactured Gas and Coke Plant File

From: James Langseth
Karlene French

Subject: Groundwater and Surface Water Sampling Plan—Remediation Parameters

Date: June 26, 1996

Project: 13/49-003 JSL 267

This memorandum outlines the groundwater sampling plan for remediation studies at the Waukegan Manufactured Gas and Coke Plant (WCP) site.

Schedule

July 15–19, 1996

Groundwater Sampling and Methods

All site monitoring wells except MW-15S/D and MW-11S/D will be sampled. These well nests are located upgradient of the site or out of the area of interest. The wells to be sampled are as follows:

MW-1S/D	MW-9S/D
MW-3S/D	MW-10S/D
MW-4S/D	MW-12S/D
MW-5S/D	MW-13S/D
MW-6S/D	MW-14S/D
MW-7S/D	
MW-8S/D	

Groundwater sampling will be conducted in accordance with the methods and procedures described in the October 1991 Final Sampling and Analysis Plan and its addenda. Samples will be collected using a peristaltic pump. Fresh tubing will be used at each location.

Surface Water Sampling and Methods

Harbor: One sample will be collected from the upper 2 feet of the surface water at the harbor mouth. The sampling location is illustrated on the attached figure. Samples will be collected from the pier at the harbor mouth.

Lake: Weather permitting, samples will be collected 100 to 150 feet offshore, halfway between the surface and lake bottom, at the three locations shown on the attached figure.

Surface water sampling will be conducted with the methods and procedures described in the approved July 1993 Phase I Technical Memorandum.

Investigation-Derived Wastes

Management of the purge water from the monitoring wells is being discussed with the IEPA. Based on past sampling results, the purge water from the shallow monitoring wells and from deep wells MW-12D and MW-14D may be suitable for discharge to the ground surface.

Proposed Parameters and Quality Control Samples

One sample from each well will be analyzed for the attached list of groundwater parameters. The following quality control samples will be collected:

Masked Duplicate Samples:	MW-8D—BETX analysis
	MW-13D—Phenolics, arsenic
Field Blank Sample:	Rinsate from fresh sampling gear, using organic-free water test for phenolics, BETX, ammonia, arsenic (total and filterable), cyanide

One trip blank for each cooler containing BETX samples will also be analyzed for BETX compounds.

The surface water samples will be kept segregated, in a separate cooler from the groundwater samples. Surface water samples will be analyzed for the attached list of surface water parameters. One field blank sample will also be analyzed for those parameters.

Data Quality Objectives and Data Validation

The data quality objective for field parameters will be Level I (Field Screening). The data quality objective for analytical parameters will be Level III—the level which provides laboratory analyses using standard EPA-approved procedures, but which does not include all the parameters and extensive quality control documentation of CLP. As stated in Section 3.5.2 of the 1991 Quality Assurance Project Plan, Level III provides data for site characterization, environmental monitoring, confirmation of field data, and engineering studies. Routine data validation will be performed, which consists of:

- Holding times and units check
- Completeness check (comparison with requested analysis)
- Precision check (masked duplicate comparison)
- Accuracy check (lab blank review)

Reporting

The field and analytical data, following data validation, will be submitted to the EPA with the monthly progress report, in accordance with the Administrative Order.

Parameter List—Groundwater Samples

Contaminant Concentration Monitoring

Phenolics
- Phenol
- o-cresol
- p-cresol
- 2,4-dimethylphenol
- 4AAP Phenolics

BTEX
- Benzene
- Ethyl Benzene
- Toluene
- Xylenes

Other
- Ammonia Nitrogen
- Arsenic (total and filterable)
- Cyanide

General Remediation

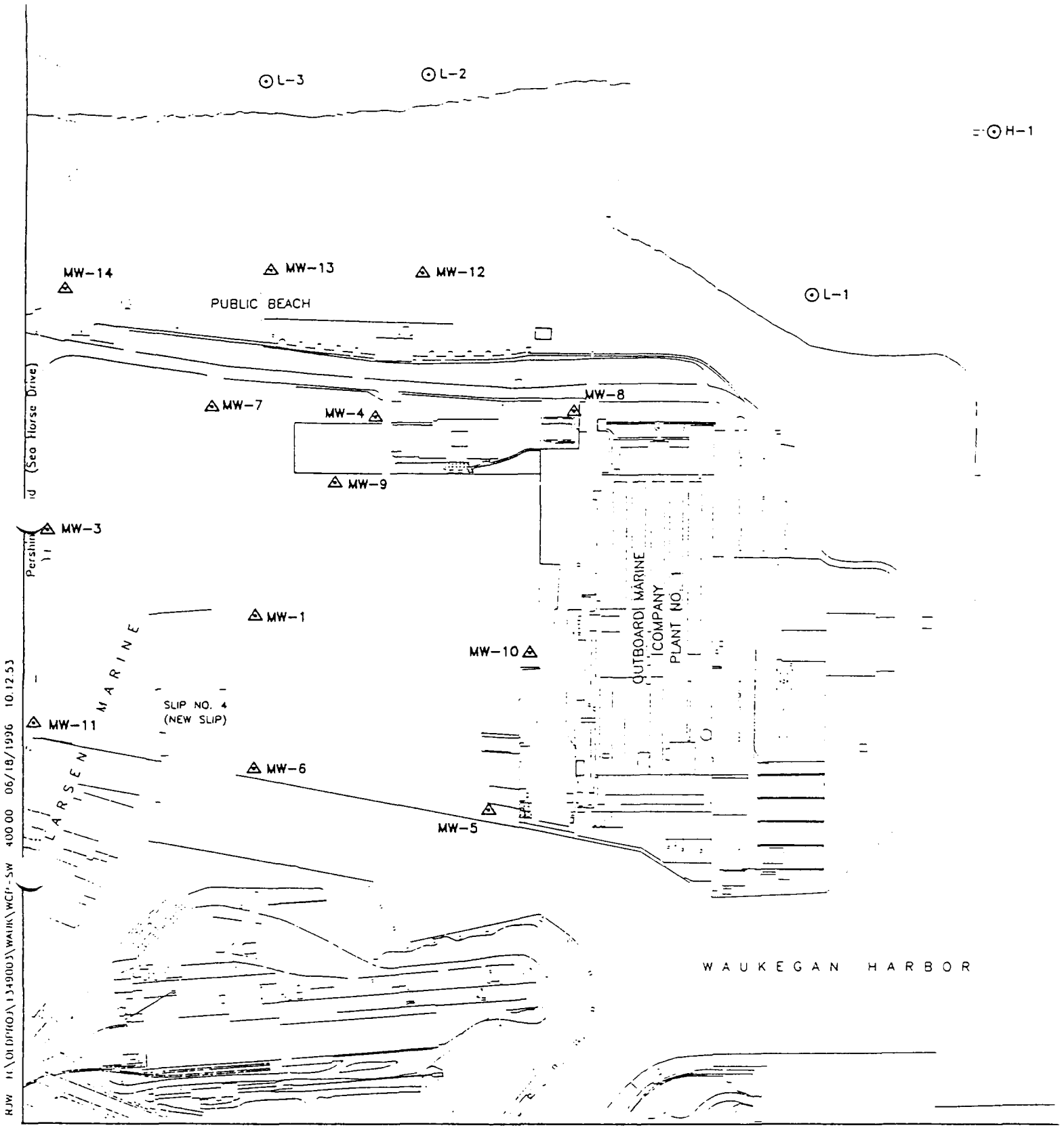
- BOD
- COD
- Total Organic Carbon
- Dissolved Carbon
- Dissolved Organic Carbon (Dissolved Inorganic Carbon by computation)
- Alkalinity
- Chloride
- Specific Gravity
- Iron
- Kjeldahl Nitrogen
- Nitrate
- Nitrite
- Phosphorus
- Sulfate
- Sulfide
- Thiocyanate

Field Parameters
- pH
- E_h
- Specific Conductance
- Dissolved Oxygen
- Temperature
- Ferrous Iron

Parameter List—Surface Water Samples

Surface Water Concentrations

4AAP Phenolics
Benzene
Ammonia Nitrogen
Arsenic
Cyanide, Weak and Dissociable
Specific Gravity



0 400
SCALE IN FEET

MW-7 Sand Aquifer Monitoring Well

L-1 Proposed Lake Surface Water Sample Location

H-1 Proposed Harbor Surface Water Sample Location

1996 PROPOSED SURFACE WATER SAMPLING LOCATIONS
Waukegan Manufactured Gas & Coke P

FIELD SAMPLING REPORT

Date: September 11, 1996

Project: Waukegan RI/FS

Contact: Karlene French
Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437

Field Sampling

Four surface water samples were collected on August 21, 1996. They are L3, L2, Harbor, and L1. Mask sample M-1 was collected at Harbor and M-2 at L1. The field blank was poured at L2. Sampling was consistent with the previous event.

Field Report

Attachments:
- Field data summary
- Field log data sheets
- Meter calibration summary
- Chain of custody
- Sample request

Laboratory Analysis Status

Seven samples were sent to Quality Analytical Lab for analysis. See the chain of custody for exact items.

Steve Iverson
Sampling Team Member

Questions or problems? Call Mary Mackey, Field Services Coordinator, at 612/832-2695.

1349003/41840_1/TMN

FIELD DATA SUMMARY

Project: WAUKEGAN RI/FS

Project number: 13/49-003 JSL 269

Environmental Technician: SD I

Monitoring location	Date	Temp (oC)	Conductivity @ 25 oC	pH	Eh (mV)	Dissolved Oxygen (mg/L)
L3	8-21-96	17.0	290	8.20	90	10.05
L2	8-21-96	16.0	288	8.16	88	11.0
HARBOR	8-21-96	13.9	292	7.72	79	9.75
L1	8-21-96	16.0	287	8.14	91	10.15

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN RI/FS	Station: L3
Location: LAKE	Date: 8-21-96
Project # : 13/49-003JSL269	Sample time: 1200

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		1200	17.0	290	8.20	90	10.05
Static water level:*							
Water depth:*							
Well volume: (gal)							
Purge method:							
Sample method:	KEMMERER						
Start time:		Odor: NONE					
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: CLEAR					
Rate, gpm:		Comments:					
Volume purged:							
Duplicate collected?							
Sample collection by: SDI							

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well (SW) surface water SE: sediment other:

VOC- semi-volatile- 1 general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others: 1- T. Phenol

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN RI/FS	Station: L2
Location: LAKE	Date: 8-21-96
Project # : 23/49-003 JSL269	Sample time: 1230

GENERAL DATA		STABILIZATION TEST					
Barr lock		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		1230	16.0	288	8.16	88	11.0
Static water level:*							
Water depth:*							
Well volume: (gal)							
Purge method:							
Sample method:	KEMMERER						
Start time:		Odor: NONE					
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: CLEAR					
Rate, gpm:		Comments: FB-1 POURED.					
Volume purged:							
Duplicate collected?							
Sample collection by: SDI							

Others present: MAGGIE SKINNER	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- 1 general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others: T. Phenol - 1

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN RI/FS	Station: HARBOR
Location: LAKE	Date: 8/21/96
Project # : 2 13/49-003JSL 269	Sample time: 1300

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		1300	13.9	292	7.72	79	9.75
Static water level:*							
Water depth:*							
Well volume: (gal)							
Purge method:							
Sample method:	KEMMERER						
Start time:		Odor: NONE					
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: CLEAR					
Rate, gpm:		Comments:					
Volume purged:							
Duplicate collected?	M-1						
Sample collection by:	SDI						

Others present: MAGGIE SKINNER	Well condition:

MW: groundwater monitoring well WS: water supply well (SW:) surface water SE: sediment other:

VOC-	semi-volatile- 2	general-	COD-	TOC-	nutrient-	cyanide-
oil,grease-	whirl pak-	total metal-	filtered metal-	500 ml filter-	in-line filter-	
others: 2- T. Phenol						

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN RI/FS	Station: L-1
Location: LAKE	Date: 8-21-96
Project # : 13/49-003SSL269	Sample time: 1330

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		1330	16.0	287	8.14	91	10.15
Static water level:*							
Water depth:*							
Well volume: (gal)							
Purge method:							
Sample method:	KOMMOR						

Start time:		Odor: NONE
Stop time:		Purge Appearance:
Duration: (minutes)		Sample Appearance: CLEAR
Rate, gpm:		Comments: COLLECTED ~200' N. OF LAST SAMPLING, DUE TO AMOUNT OF SWIMMERS AT BEACH.
Volume purged:		
Duplicate collected?	M-2	
Sample collection by:	SDI	

Others present: MAGGIE SKINNER	Well condition:

MW: groundwater monitoring well WS: water supply well (SW:) surface water SE: sediment other:

VOC- semi-volatile- 2 general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others: 2- T. Phenol

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

BARR ENGINEERING COMPANY
METER CALIBRATION SUMMARY

PROJECT WAUKEGAN

TECHNICIAN SDI

Meter type and number	Date	Time	Temperature C	Standard Used	Meter Reading	Slope	Conductivity Redline
3500 #1	8-21-96	1100	25	7/10	7.03/10.08		
YSI 55 DO	AUTO CAL.	99.4%					
Conductivity	Date	Solution Used	Cell Result				
Cell Check	8-21-96	1000	987				
ORP Probe	Date	Temp.	ORP Reading	Calculation	Result		
Check	8-21-96	26	221	~~289~~	222		
231+,- 10mV @ 25C							

231mV = Display Value + [(Display Temp. - 25 C) x (1.3 mV)]

WEATHER CONDITIONS

Date	Wind Direction	Wind Speed	Temperature F	Cloud Cover	Comments
8-21-96	SE	0-5	85	P.C.	FOGGY, HUMID

Comments:

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003 JSL 269

№ 21049

Project Manager: JSL

Project Contact: MTM

Laboratory: QAL - AL

Remarks/ Analysis Required:

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_xOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide ($Z_nAcetate$)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	Total No. Of Containers	Remarks/ Analysis Required
1. L3	8/21/96		X			X					/											/	2	GLASS ACID EXTR. 4AAP PHE...
2. L2											/											/	2	
3. L1											/											/	2	
4. Harbor											/											/	2	
5. M-1											/											/	2	
6. M-2											/											/	2	
7. FB-1								X			/											/	2	
8.																								
9.																								
10.																								*RUSH TAT*
11.																								
12.																								
13.																								
14.																								
15.																								
16.																								

Number of Containers/Preservative

Sampled By: SDI

Remarks:

Relinquished By	Date	Time	Received by Lab	Date	Time
SDI	8-21-96	1630			

Samples Shipped VIA: ☐ Air Freight ☐ Fed. Exp. ☐ Sampler ☐ Other

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Sample Receipt Exceptions Report

Batch Number: MB392

Origination date: 7/17/96

Client/Project: Barr

SUMMARY OF EXCEPTION (check one if it applies)

√	Description of exception	Comments (write number of exception description and the impacted sample numbers)
	1. No custody seal as required by the project.	DID NOT RECEIVE
	2. No chain-of-custody provided.	Sample I.D. MW3S 3 voa containers, 1 cyanide container
	3. Chain-of-custody provided but incomplete.	Sample I.D. MW3D 3 voa containers, ~~1 1-liter soil~~ 8S, 1 cyanide
	4. Samples broken or leaking on receipt.	Sample I.D. MW10S 3 voa containers, 1 2-liter soil, 1 cyanide
	5. Temperature of samples inappropriate for analysis requested.	Sample I.D. MW10D 3 voa containers, 1 2-liter soil, 1 cyanide
	6. Container inappropriate for analysis requested.	Sample I.D MW5S 3 voa containers
	7. Inadequate sample volume for analysis requested.	Sample I.D. MW5D 3 voa containers
	8. Preservation inappropriate for analysis requested.	Sample I.D. MW6S 3 voa containers
	9. Samples received out of holding time for analysis requested.	Sample I.D MW6D 3 voa containers
	10. Samples received more than 72 hours after sampling.	Sample ID. Trip Blank 3 voa containers
✓	11. Discrepancies between chain-of-custody and container labels.	
	12. Other (describe on right)	

FRACTION(S) AFFECTED (specify which fraction was affected by the exceptions detailed above by writing the number of the exception next to it)

Unpreserved		Nutrients		Metals		Volatiles	✓
Cyanide		Extractables	✓	Extractables		Other (specify)	Lost chain

CTION TAKEN:

Originator: Kelly Scott

Supervisor: [illegible]

Client was notified on (DATE/TIME) 7/17

Client contact: Karlem French

Client's comments: Missing ice chest - will see on 7/18
Received 7/18 [illegible]

Client Services: [illegible]

QA officer:

QAL Montgomery

000005

RECT_CAR.DOC (3/21/96)

Sample Receipt Exceptions Report

Batch Number: MB 392 Origination date: 7/18/96

Client/Project: Barr

SUMMARY OF EXCEPTION (check one if it applies)

√	Description of exception	Comments (write number of exception description and the impacted sample numbers)
	1. No custody seal as required by the project.	Sample ID MW10D and Sample ID MW6D volatile containers have a pH greater than two.
	2. No chain-of-custody provided.	
	3. Chain-of-custody provided but incomplete.	
	4. Samples broken or leaking on receipt.	
	5. Temperature of samples inappropriate for analysis requested.	
	6. Container inappropriate for analysis requested.	
	7. Inadequate sample volume for analysis requested.	
✓	8. Preservation inappropriate for analysis requested.	
	9. Samples received out of holding time for analysis requested.	
	10. Samples received more than 72 hours after sampling.	
	11. Discrepancies between chain-of-custody and container labels.	
	12. Other (describe on right)	

FRACTION(S) AFFECTED (specify which fraction was affected by the exceptions detailed above by writing the number of the exception next to it)

Unpreserved		Nutrients		Metals		Volatiles	✓
Cyanide		Extractables		Extractables		Other (specify)	

ACTION TAKEN:

Originator: David Shine Supervisor: RK

Client was notified on: (DATE/TIME) 7/18 Client contact: Karlen Friend

Client's comments: Proceed w/ analyses

Client Services: RK QA officer:

000066

QAL Montgomery

RECT_CAR.DOC (2/21/96)

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

BARR PROJECT NO.: 13149-003JSL268

LABORATORY: QAL

DATA REVIEWED BY: mtm

LAB REPORT NO.: MB392

DATE: 8/27/96

REPORT DATE: 8/15/96

BARR SAMPLE I.D.:

REVISED REPORT DATE: _____

PART ____ OF ____

MW3S	MW5S
MW3D	MW5D
MW10S	MW6S
MW10D	MW6D

SAMPLE MATRIX: Soil / Water / Air

ANALYSES: Volatiles / Semivolatiles / Metals / Gen. Chem.

1. Holding times met: Yes / No

2. Accuracy data:

OK

3. Precision data:

OK

4. Surrogate standards data:

OK

Within Acceptance Criteria

5. Blank data:

OK - Metals Blank run on diff. day than samples

QCRPT.FRO

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

6. Completeness check:

? Dilutions/Conc. Range

7. Masked duplicate results:

N/A

? TOC / DOC

8. Comparison with historical data:

Not done

9. Additional data qualifier added: Yes / No

10. Other actions taken:

11. Summary:

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

BARR PROJECT NO.: 13/49-003JSC 268

DATA REVIEWED BY: MTM

DATE: 8/27/96

BARR SAMPLE I.D.:

LABORATORY: QAL

LAB REPORT NO.: MB409

REPORT DATE: 8/16/96

REVISED REPORT DATE: _____

PART ____ OF ____

SAMPLE MATRIX: Soil / Water / Air

ANALYSES: Volatiles / Semivolatiles / Metals / Gen. Chem.

1. Holding times met: Yes / No

2. Accuracy data:

OK

3. Precision data:

OK

4. Surrogate standards data:

OK

5. Blank data:

OK

QCRPT.PRO

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

6. Completeness check:

✓

7. Masked duplicate results:

N/A

DOC > TOC
TKN > T-Amino

8. Comparison with historical data:

NOT Done

9. Additional data qualifier added: (Yes) No J's

10. Other actions taken:

11. Summary:

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

BARR PROJECT NO.: 13/49-003JSL268

DATA REVIEWED BY: MTM

DATE: 8/27/96

BARR SAMPLE I.D.:

14D 8S
14S 8D FB-1
13D m-1
13S m-2

LABORATORY: QAL

LAB REPORT NO.: MB418

REPORT DATE: 8/15/96

REVISED REPORT DATE: _____

PART ____ OF ____

SAMPLE MATRIX: Soil / Water / Air

ANALYSES: Volatiles / Semivolatiles / Metals / Gen. Chem.

1. Holding times met: Yes / No

2. Accuracy data:

OK

3. Precision data:

OK

4. Surrogate standards data:

OK

5. Blank data:

OK / 8 ppb phenol in MBlk

QCRPT.PRO

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

6. Completeness check:

7. Masked duplicate results:

8. Comparison with historical data:

Not Done

9. Additional data qualifier added: Yes / No B's where required due to compounds in blank

10. Other actions taken:

11. Summary:

Sample Receipt Exceptions Report

Batch Number: MB418 Origination date: 7/19/96

Client/Project: Barr

SUMMARY OF EXCEPTION (check one if it applies)

√	Description of exception	Comments (write number of exception description and the impacted sample numbers)
	1. No custody seal as required by the project.	No list provided.
	2. No chain-of-custody provided.	
	3. Chain-of-custody provided but incomplete.	Sample I.D M-1 had 1 broken VOA vial.
	4. Samples broken or leaking on receipt.	
	5. Temperature of samples inappropriate for analysis requested.	Sample IDs. MW13D & MW8D
	6. Container inappropriate for analysis requested.	have Voas with pH>2.
	7. Inadequate sample volume for analysis requested.	
	8. Preservation inappropriate for analysis requested.	
	9. Samples received out of holding time for analysis requested.	
	10. Samples received more than 72 hours after sampling.	
	11. Discrepancies between chain-of-custody and container labels.	
√	12. Other (describe on right)	

FRACTION(S) AFFECTED (specify which fraction was affected by the exceptions detailed above by writing the number of the exception next to it)

Unpreserved	√	Nutrients	~~√~~	Metals	√	Volatiles	√
Cyanide	√	Extractables	√	Extractables		Other (specify)	Wet Chem

ACTION TAKEN:

Originator: Billy Scott Supervisor: [illegible]

Client was notified on: (DATE/TIME) 7/19 Client contact:

Client's comments: Use same list from previous batches & proceed w/ analysis

Client Services: [illegible] QA officer:

QAL Montgomery

000055

RECT_CAR.DOC (7/1/96)

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

BARR PROJECT NO.: ~~[illegible]~~ 13/49-003JSL2768

DATA REVIEWED BY: MTM

DATE: 8/28

BARR SAMPLE I.D.:
Harbor
L1, L2, L3, FB-2

LABORATORY: CQAL

LAB REPORT NO.: MB429

REPORT DATE: 8/13/96

REVISED REPORT DATE: _____

PART ____ OF ____

SAMPLE MATRIX: Soil / Water / Air

ANALYSES: Volatiles / Semivolatiles / Metals / Gen. Chem.

1. Holding times met: Yes / No

2. Accuracy data:

OK

Need lower RL for As + NH_3

3. Precision data:

OK

✓✓ Phenol results - all data OK.

4. Surrogate standards data:

OK

pos. hit in FB.

Sample Order was:

1) Harbor	0.23	
2) L1	0.37	
3) FB	0.03	poss. carry-over from Sam Equip
4) L2	0.09	
5) L3	0.02	

5. Blank data:

OK

QCRPT.PRO

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

6. Completeness check:

7. Masked duplicate results:

N/A

8. Comparison with historical data:

N/A

9. Additional data qualifier added: Yes / No

10. Other actions taken:

11. Summary:

Recollect Phenols for follow up 4AAP and GC/MS analysis.

Reanalyze NH_3-N for lower reporting limit

Review As data to report lower limit.

Revise report to include As + NH_3 results.

Sample Receipt Exceptions Report

Batch Number: MB429 Origination date: 7/20/96

Client/Project: 13/49-003 ISL 268

SUMMARY OF EXCEPTION (check one if it applies)

√	Description of exception	Comments (write number of exception description and the impacted sample numbers)
	1. No custody seal as required by the project.	#12 Sample ID "Harbor" -001, COC has
	2. No chain-of-custody provided.	1 nutrients c̄ H_2SO_4. 2 were received.
	3. Chain-of-custody provided but incomplete.	
	4. Samples broken or leaking on receipt.	
	5. Temperature of samples inappropriate for analysis requested.	
	6. Container inappropriate for analysis requested.	
	7. Inadequate sample volume for analysis requested.	
	8. Preservation inappropriate for analysis requested.	
	9. Samples received out of holding time for analysis requested.	
	10. Samples received more than 72 hours after sampling.	
	11. Discrepancies between chain-of-custody and container labels.	
X	12. Other (describe on right)	

FRACTION(S) AFFECTED (specify which fraction was affected by the exceptions detailed above by writing the number of the exception next to it)

Unpreserved		Nutrients	X	Metals		Volatiles	
Cyanide		Extractables		Extractables		Other (specify)	

ACTION TAKEN:

Originator: Supervisor:

Client was notified on: (DATE/TIME) Client contact:

Client's comments:

Client Services: QA officer:

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

BARR PROJECT NO.: B149-003JSL

DATA REVIEWED BY: MTM

DATE: 8/28/96

BARR SAMPLE I.D.:

12S

12D

TB

LABORATORY: DAL

LAB REPORT NO.: MB430

REPORT DATE: 8/15/96

REVISED REPORT DATE: _____

PART ____ OF ____

SAMPLE MATRIX: Soil / Water / Air

ANALYSES: Volatiles / Semivolatiles / Metals / Gen. Chem.

1. Holding times met: Yes / No

2. Accuracy data:

OK

3. Precision data:

OK

Sol As > Tot A

4. Surrogate standards data:

OK

5. Blank data:

OK / Phenol in MB 8 ppb

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BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

6. Completeness check:

7. Masked duplicate results:

N/A

8. Comparison with historical data:

Not Done

9. Additional data qualifier added: Yes / No

B's if needed phenol

10. Other actions taken:

11. Summary:

Sample Receipt Exceptions Report

Batch Number: MB 618

Origination date: 8/22/96

Client/Project: Barr 13/49-003-JSL 269

SUMMARY OF EXCEPTION (check one if it applies)

√	Description of exception	Comments (write number of exception description and the impacted sample numbers)
	1. No custody seal as required by the project.	Sample ID ~~L3~~ L3 ; did not receive a
	2. No chain-of-custody provided.	semivolatile container.
	3. Chain-of-custody provided but incomplete.	Sample ID ~~L1~~ L1 ; received two semivolatile
	4. Samples broken or leaking on receipt.	containers.
	5. Temperature of samples inappropriate for analysis requested.	
	6. Container inappropriate for analysis requested.	
	7. Inadequate sample volume for analysis requested.	
	8. Preservation inappropriate for analysis requested.	
	9. Samples received out of holding time for analysis requested.	
	10. Samples received more than 72 hours after sampling.	
	11. Discrepancies between chain-of-custody and container labels.	
	12. Other (describe on right)	

FRACTION(S) AFFECTED (specify which fraction was affected by the exceptions detailed above by writing the number of the exception next to it)

Unpreserved		Nutrients		Metals		Volatiles	
Cyanide		Extractables		Extractables		Other (specify)	

ACTION TAKEN:

Originator: David Shine

Supervisor:

Client was notified on: (DATE/TIME) 8/22

Client contact: Mary Mackey

Client's comments: The scratched bottle is L1
The "unscratched" bottle (L1) should be L-3 / Steve Ivesa

Client Services: Richard Mueller

QA officer:

000034

QAL Montgomery

RECT_CAR.DOC (2/11/96)

BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

BARR PROJECT NO.: 13/49003/SL269

LABORATORY: QAL-CHZM

DATA REVIEWED BY: M

LAB REPORT NO.: MB618

DATE: 10/96

REPORT DATE: 8/29/96

BARR SAMPLE I.D.:

L1-L3, HARBOR, QC's GC recollects, confirmational MS - of MB429

REVISED REPORT DATE: _____

PART ____ OF ____

SAMPLE MATRIX: Soil / Water / Air

ANALYSES: Volatiles / Semivolatiles / Metals / Gen. Chem.

WITICS

trace Phenolics

2 inorg 4AAP

1. Holding times met: Yes / No

✓ RUSH

2. Accuracy data:

MS(SVBLK) % rec - all acceptable

3. Precision data:

MSD(SVBLK) % rec - all acceptable
RPD's - all acceptable

4. Surrogate standards data:

all % rec of surrogate stds met acceptable criteria.

5. Blank data:

FB - SVBLK - ND all compounds GC/MS.
FB - MB - 4AAP method also ND @ <0.01 mg/L
Ammonia " " " 0.035 mg/L

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BARR ENGINEERING COMPANY
ROUTINE LEVEL QUALITY CONTROL REPORT

6. Completeness check:

100% per request. - Ammonia added to M-1 Comp. after recpt @ Lab.
QAL add analyzed using solid phase extract. proceed aquiring <.001 RL's -

7. Masked duplicate results:

m1 = HARBOR

m2 = L1

8. Comparison with historical data:

N/A

9. Additional data qualifier added: Yes / No

10. Other actions taken:

11. Summary:

Data is acceptable as reported. No qualifiers are required.
- Results from the solid phase extraction analysis will be reported.
Revisions recieved for M-1, Comp. Ammonia-N data. 9/26

QCRPT.PRO

FIELD DATA SUMMARY

Project: Waukegan Manufactured Gas & Coke Plant
Project number: 13/49-003JSL276
Field Staff: KSJ, JMF

Monitoring location	Date	Temp (oC)	Conductivity @ 25 oC	pH	Eh (mV)	Dissolved Oxygen (mg/L)	Nitrite (mg/L)	Nitrate (mg/L)
SB-61W04	9-9-97	19.9	371	7.47	-71	1.08	0-1.25	0-2.5
SB-61W10	"	16.7	462	7.47	-187	0.39	0-1.25	0-2.5
SB-61W16	"	16.0	70	7.76	-130	9.00	0-1.25	0-2.5
SB-61W22	9-10-97	18.0	50	8.06	-30	8.45	0-1.25	0-2.5
MW13S	"	16.6	487	7.03	-123	0.11	0-1.25	0-2.5
MW13D	"	10.8	1615	8.52	-280	0.43	0-1.25	0-2.5
SB-61W30	"	14.7	39	8.38	-77	3.10	2-5	5-10
MW6S	"	14.4	1310	7.68	-173	0.40	0-1.25	0-2.5
MW6D	"	11.3	2180	7.78	-279	0.21	0-1.25	0-2.5
SB-64W07	9-11-97	18.9	30	7.43	10	5.77	10-15	20-30
SB-64W12	"	17.4		7.85	-102	2.16	10-15	15-20
SB-64W18	"	15.9	40	7.84	-166	2.36	2-4	2.5-5
SB-64W24	"	14	70	7.80	-148	0.06	0-1.25	0-2.5
SB-64W30	9-12-97	12.9	619	8.41	-296	0.05	2-5	5-10
SB-63W06	"	19.3	430	7.47	-173	0.12	7-10	20-25
SB-63W18	"	16.4	130	7.88	-144	8.16	0-1.25	0-2.5
SB-63W12	"	16.2	423	7.70	-205	0.05	2-4	5-10
SB-63W24	"	12.7	721	7.66	-185	0.01	0-1.25	0-2.5
SB-63W30	"	11.4	1400	8.58	-298	0.04	0-1.25	0-2.5
SB-62W06	"	17.6	430	7.46	-198	0.53	0-2.5	0-5
SB-62W12	"	15.1	430	7.81	-211	0.47	0-1.25	0-2.5
SB-62W18	9-13-97	12.7	710	7.85	-152	1.02	3-15	10-15
SB-62W24	"	11.5	283	8.28	-202	0	2-3	3-5
SB-62W30	"	12.3	1531	8.63	-278	0.04	2-3	3-5
LM-1N	9-14-97	20.4	286	8.04	32	8.64		
LM-2N	"	19.7	285	8.07	34	8.07		
LM-3N	"	19.7	285	8.13	46	8.74		
LM-4N	"	20.0	285	8.16	58	8.72		
LM-6N	"	19.8	283	8.17	67	8.66		
LM-5N	"	20.8	284	8.12	66	8.75		
LM-1S	"	20.5	286	8.22	68	9.84		
LM-2S	"	21.5	286	8.19	83	8.63		
H-1	"	21.4	287	8.08	62	8.7		
LCZ-H1	"	20.6	284	8.22	88	8.79		
LCZ-2S	"	20.6	282	8.14	77	9.21		
LCZ-2N	9-15-97	20.5	285	8.09	68	7.86		
LCZ-3N	"	20.5	285	8.17	77	7.87		
LCZ-5N	"	22.4	286	8.11	112	7.51		
LCZ-6N	"	21.3	285	8.16	99	7.92		

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB-61W04
Location:		Date:	9-9-97
Project #:	13149-003JSL276	Sample time:	1500

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*	2-4'	1	3 gal	20.2	375	7.40	12	1.58
Static water level:*		2	7 gal	20.0	373	7.48	-56	1.11
Water depth:*		3	9 gal	19.9	371	7.47	-71	1.08
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:		Dissolved Oxygen:				Odor: none detected		
Stop time:		Purge Appearance: begin - cloudy / end - clear						
Duration: (minutes)		Sample Appearance: clear						
Rate, gpm:	.5	Comments:						
Volume purged:	9 gal	Nitrate - 0 - 2.5						
Duplicate collected?	—	Nitrite - 0 - 1.25						
Sample collection by:	KSJ, JMF							

Others present:	Well condition: temporary borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 1 general 5 COD____ TOC____ nutrient 3 cyanide 2

oil,grease____ ~~whirl pak~~ SULFIDE 1 Total metal 1 Filtered metal 1 500 ml filter 1

others 2-1L NAOH (Thiocyanate), 2-500 ml H_2SO_4 (4 AACP)

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB-61 W10
Location:		Date:	9-9-97
Project # :	13149 - 003JSL276	Sample time:	1600

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*	9-11'	1	3 gal	16.7	463	7.5	-188	0.26
Static water level:*		2	15 gal	16.7	462	7.48	-187	0.40
Water depth:*		3	17 gal	16.7	462	7.47	-187	0.39
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:		Dissolved Oxygen:				Odor:		
Stop time:		Purge Appearance:						
Duration: (minutes)		Sample Appearance:	clear					
Rate, gpm:		Comments:						
Volume purged:		Nitrite - 0						
Duplicate collected?		Nitrate - 0 - 2.5 mg/l						
Sample collection by:	KSJ, JMF							

Others present:	Well condition: temporary borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: SB61 W16
Location:	Date: 9-9-97
Project #: 13149.003JSL276	Sample time: 1830

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*	15-17'	1	2 gal	17.9	56	7.80	-117	2.96
Static water level:*		2	5 gal	16.5	70	7.79	-129	9.04
Water depth:*		3	10 gal	16.0	70	7.76	-130	9.0
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:		Dissolved Oxygen:				Odor: yes		
Stop time:		Purge Appearance: cloudy, turbid						
Duration: (minutes)		Sample Appearance: cloudy, slow recharge						
Rate, gpm:		Comments:						
Volume purged:		Nitrite - 0-1.25						
Duplicate collected?	—	Nitrate - 0-2.25						
Sample collection by: KSJ, JMF								

Others present:	Well condition: temporary borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	W AUKEGAN - NSG	Station:	SB-61W22
Location:		Date:	9-10-97
Project # :	1349 - 003 JSL 276	Sample time:	0930

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	1 gal	17.4	49	8.16	-21	8.6
Static water level:*		2	2 gal	18.0	49	8.00	-37	8.52
Water depth:*		3	4 gal	18.1	50	8.05	-30	8.48
Well volume: (gal)		4	5 gal	18.0	50	8.06	-30	8.45
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:		Dissolved Oxygen:				Odor: yes		
Stop time:		Purge Appearance: cloudy, turbid						
Duration: (minutes)		Sample Appearance: slightly cloudy						
Rate, gpm:		Comments:						
Volume purged:		Nitrite - 0 - 1.25						
Duplicate collected?	—	Nitrate - 0 - 2.25						
Sample collection by:	KSJ, JMF							

Others present:	Well condition: Temporary borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

526.95
- 3.60
523.35

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	MW 13S
Location:		Date:	9-10-97
Project # :	13149 - 003JSL276	Sample time:	1330

GENERAL DATA		STABILIZATION TEST						
Barr lock: (Y) N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:	2		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*	13.0	1	5 gal	16.7	492	6.98	-108	.15
Static water level:*	3.60	2	6.1 gal	16.6	492	6.99	-115	.13
Water depth:*	9.4	3	7.6 gal	16.6	487	7.03	-123	.11
Well volume: (gal)	1.5	4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:	1300	Dissolved Oxygen:				Odor:		
Stop time:	1315	Purge Appearance:	clear					
Duration: (minutes)	15	Sample Appearance:	clear					
Rate, gpm:	.5	Comments:						
Volume purged:	7.6 gal	Nitrite - 0 - 1.25 mg/l						
Duplicate collected?	—	Nitrate - 0 - 2.5 mg/l						
Sample collection by:	KSJ							

Others present:	Well condition: GOOD

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 1-2L general 2-1L 2-500 ml COD ____ TOC ____ nutrient 3-1L 1-250 cyanide 2

oil,grease ____ ~~whirl pak~~ SULFIDE 1 Total metal 1 Filtered metal 1 500 ml filter 1

others 2-1L NAOH (Thiocyanate), 2-500 ml H_2SO_4 (4 AACP)

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

576.90
- 3.62
573.28

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	MW 13D
Location:		Date:	9-10-97
Project # :	13149 . 003JSL276	Sample time:	1415

GENERAL DATA		STABILIZATION TEST						
Barr lock: (Y) N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:	2		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*	33.0 33.3	1	15 gal	10.8	1607	8.51	-281	.74
Static water level:*	3.62	2	19 gal	10.9	1605	8.51	-274	.52
Water depth:*	29.4 29.7	3	24 gal	10.8	1615	8.52	-280	.43
Well volume: (gal)	4.8	4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:	1345	Dissolved Oxygen:				Odor: yes		
Stop time:	1433	Purge Appearance: clear - amber colored						
Duration: (minutes)	48	Sample Appearance: same as purge						
Rate, gpm:	.5	Comments:						
Volume purged:	24 gal	Nitrite - 0 - 1.25 mg/l						
Duplicate collected?	—	Nitrate - 0 - 2.5 mg/l						
Sample collection by:	KSJ, JMF							

Others present:	Well condition: 6000

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 1 general 4 COD ____ TOC ____ nutrient 4 cyanide 2

oil,grease ____ ~~whirl pak~~ SULFIDE 1 Total metal 1 Filtered metal 1 500 ml filter 1

others 2 - 1L NAOH (Thiocyanate), 2-500 ml H_2SO_4 (4 AACP)

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB-61W30
Location:		Date:	9-10-97
Project # :	13149 . 003 JSL 276	Sample time:	1500

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	3 gal	14.4	26	8.27	-62	—
Static water level:*		2	5 gal	14.4	27	8.30	-69	—
Water depth:*		3	7 gal	14.6	28	8.25	-72	3.11
Well volume: (gal)		4	10 gal	14.7	39	8.38	-77	3.10
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						

Start time:		Dissolved Oxygen:	Odor: yes
Stop time:		Purge Appearance:	
Duration: (minutes)		Sample Appearance:	cloudy, turbid
Rate, gpm:		Comments:	
Volume purged:		Nitrite - 2-5 mg/l	
Duplicate collected?	—	Nitrate - 5-10 mg/l	
Sample collection by:	KSJ, JMF		

Others present:	Well condition: Temporary bore hole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN		Station: MW6S	
Location:		Date: 9-10-97	
Project #: 13149-003JSL276		Sample time: 1630	

GENERAL DATA		STABILIZATION TEST					
Barr lock: (Y) N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:	2	Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*	16.8	1 1615/5.4 gal	14.4	1290	7.61	-152	.52
Static water level:*	5.79	2 1620/7.2 gal	14.4	1300	7.65	-168	.43
Water depth:*	11	3 1623/9 gal	14.4	1310	7.68	-173	.40
Well volume: (gal)	1.8	4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:	1605	Dissolved Oxygen:			Odor: yes		
Stop time:	1623	Purge Appearance: clear					
Duration: (minutes)	18	Sample Appearance: clear					
Rate, gpm:	.5	Comments:					
Volume purged:	9 gal	Collected 2 carboys for Fluor-Daniels					
Duplicate collected?	—	Nitrite- 0 mg/l					
Sample collection by: KSJ, JMF		Nitrate- 0 mg/l					

Others present:	Well condition: GOOD

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 1 general 4 COD ____ TOC ____ nutrient 3 cyanide 2

oil,grease ____ ~~whirl pak~~ SULFIDE 1 Total metal 1 Filtered metal 1 500 ml filter 1

others 2-1L NaOH (Thiocyanate), 2-500 ml H_2SO_4 (4 AACP)

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN	Station:	MW 6D
Location:		Date:	9-10-97
Project # :	~~23~~ 13149.003 JSL 276	Sample time:	1630

GENERAL DATA		STABILIZATION TEST					
Barr lock: (Y) N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:	2	Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*	29.4	1 1659/12 gal	11.9	2150	7.74	-277	.22
Static water level:*	5.91	2 1607/16 gal	11.4	2170	7.76	-279	.21
Water depth:*	23.5	3 1615/20 gal	11.3	2180	7.78	-279	.21
Well volume: (gal)	3.8	4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:	1635	Dissolved Oxygen:			Odor: yes		
Stop time:	1615	Purge Appearance: begin - black / end - clear, yellowish					
Duration: (minutes)	40	Sample Appearance: clear, yellowish hue					
Rate, gpm:	.5	Comments:					
Volume purged:	20 gal	3- CARBOYS FOR FLUOR-					
Duplicate collected?	—	Nitrite - ~~0~~ 1.25 mg/l					
Sample collection by:	KSJ, JMF	Nitrate - ~~1.25~~ 0 mg/l					

Others present:	Well condition: GOOD

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 1 general 4 COD ____ TOC ____ nutrient 3 cyanide 2

oil,grease ____ ~~whirl pak~~ SULFIDE 1 Total metal 1 Filtered metal 1 500 ml filter 1

others 2-1L NAOH (Thiocyanate), 2-500 ml H_2SO_4 (4 AAP)

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN-NSG	Station:	SB-64W07
Location:		Date:	9-11-97
Project #:	13149 - 003 JSL276	Sample time:	0900

GENERAL DATA		STABILIZATION TEST					
Barr lock: Y N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1 10 gal	19.0	30	7.49	9	5.69
Static water level:*		2 12 gal	19.0	30	7.47	6	5.70
Water depth:*		3 15 gal	18.9	30	7.43	10	5.77
Well volume: (gal)		4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:		Dissolved Oxygen:			Odor:		
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: clear					
Rate, gpm:		Comments:					
Volume purged:	15 gal	Nitrite - 10-15 mg/l					
Duplicate collected?	—	Nitrate - 20-30 mg/l					
Sample collection by:	KSJ, JMF						

Others present:	Well condition: Temporary borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	Waukegan - NSG	Station:	SB-64W12
Location:		Date:	9-11-97
Project # :	13149 - 003 JSL 276	Sample time:	1100

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	5 gal	18.19	–	7.65	-96	3.19
Static water level:*		2	7 gal	~~2.23~~ 17.4	–	7.82	-101	2.23
Water depth:*		3	10 gal	~~2.16~~ 17.4	–	7.85	-102	2.16
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:		Dissolved Oxygen:				Odor:		
Stop time:		Purge Appearance:						
Duration: (minutes)		Sample Appearance:	clear					
Rate, gpm:		Comments:						
Volume purged:	10 gal	Nitrite - 10-15 mg/l						
Duplicate collected?	—	Nitrate - 15-20 mg/l						
Sample collection by:	KSJ, JMF							
Others present:		Well condition:	Temporary borehole					

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB-64 W18
Location:		Date:	9-11-97
Project #:	13149 - 003JSL 276	Sample time:	1300

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	5 gal	16.0	30	7.86	-150	3.81
Static water level:*		2	8 gal	15.9	40	7.85	-156	3.12
Water depth:*		3	12 gal	15.9	40	7.84	-166 ~~+6~~	2.36
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:		Dissolved Oxygen:				Odor:		
Stop time:		Purge Appearance:						
Duration: (minutes)		Sample Appearance:	clear					
Rate, gpm:		Comments:						
Volume purged:	12 gal	Nitrite - 2-4 mg/l						
Duplicate collected?	–	Nitrate - 2.5 - 5 mg/l						
Sample collection by:	KSJ, JMF							

Others present:	Well condition: temporary borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: SB-64 W24
Location:	Date: 9-11-97
Project #: 13149-003JSL 276	Sample time: 1500

GENERAL DATA		STABILIZATION TEST					
Barr lock: Y N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1 10 gal	14.3	70	7.86	-138	0.06
Static water level:*		2 20 gal	14.0	80	7.76	-146	0.06
Water depth:*		3 22 gal	14.0	70	7.80	-148	0.06
Well volume: (gal)		4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:		Dissolved Oxygen:			Odor:		
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: slightly cloudy gray					
Rate, gpm:		Comments:					
Volume purged:	22 gal	Nitrite - 0 - 1.25 mg/l					
Duplicate collected?	—	Nitrate - 0 - 2.5 mg/l					
Sample collection by:	KSJ, JMF						

Others present:	Well condition: Temporary borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN	Station: SB-64W30
Location:	Date: 9-12-97
Project #: 13149 - 003 JSL 267	Sample time: 0800

GENERAL DATA		STABILIZATION TEST					
Barr lock: Y N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1 1 gal	12.1	638	8.44	-277	.12
Static water level:*		2 2 gal	12.8	625	8.42	-289	.08
Water depth:*		3 3 gal	12.9	619	8.41	-296	.05
Well volume: (gal)	< 1 gal	4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:	0715	Dissolved Oxygen:			Odor:		
Stop time:		Purge Appearance: begin - cloudy brown, turbid					
Duration: (minutes)		Sample Appearance: slightly cloudy					
Rate, gpm:	.1 gpm	Comments:					
Volume purged:	3 gal ~~.1 gpm~~	Nitrite - 2-5 mg/l					
Duplicate collected?	—	Nitrate - 5-10 mg/l					
Sample collection by: KSJ, JMF		Flocculents in VOC vials					

Others present:	Well condition: Temporary borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 1 general 4 COD ____ TOC ____ nutrient 4 cyanide 2

oil,grease ____ ~~whirl pak~~ SULFIDE 1 Total metal 1 Filtered metal 1 500 ml filter 1

others 2-1L NAOH (Thiocyanate), 2-500 ml H_2SO_4 (4 AACP)

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: SB-63W06
Location:	Date: 9-12-97
Project #: 1319 49 - 003 JSL 276	Sample time: 0900

GENERAL DATA		STABILIZATION TEST					
Barr lock: Y N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1 3 gal	18.9	430	8.02	-196	0.24
Static water level:*		2 5 gal	19.1	430	7.57	-185	0.18
Water depth:*		3 10 gal	19.3	430	7.47	-173	0.12
Well volume: (gal)		4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:		Dissolved Oxygen:			Odor:		
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: Clear					
Rate, gpm:		Comments:					
Volume purged:		Nitrite - 7-10 mg/l					
Duplicate collected?	—	Nitrate - 20-25 mg/l					
Sample collection by: KSJ, JMF							

Others present:	Well condition: Temporary Borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: SB-63W18
Location:	Date: 9-12-97
Project #: 13149.003 JSL 276	Sample time: 1030

GENERAL DATA		STABILIZATION TEST					
Barr lock: Y N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1 4 gal	16.7	180	7.91	-144	7.59
Static water level:*		2 8 gal	16.5	135	7.87	-142	7.88
Water depth:*		3 12 gal	16.4	130	7.88	-144	8.16
Well volume: (gal)		4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:		Dissolved Oxygen:			Odor:		
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: clear					
Rate, gpm:		Comments:					
Volume purged:	12 gal	Nitrite - 0 - 1.25 mg/l					
Duplicate collected?	—	Nitrate - 0 - 2.5 mg/l					
Sample collection by: KSJ, JMF							

Others present:	Well condition: Temporary Borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC_____ semi-volatile_____ general_____ COD_____ TOC_____ nutrient_____ cyanide_____

oil,grease_____ whirl pak_____ Total metal_____ Filtered metal_____ 500 ml filter_____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: SB-63W12
Location:	Date: 9-12-97
Project #: 13149.003JSL267	Sample time: 1230

GENERAL DATA		STABILIZATION TEST					
Barr lock: Y N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1 5 gal	16.2	423	7.73	-204	.08
Static water level:*		2 10 gal	16.1	422	7.72	-206	.05
Water depth:*		3 15 gal	16.2	423	7.70	-205	.05
Well volume: (gal)		4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:	1210	Dissolved Oxygen:			Odor:		
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: clear					
Rate, gpm:	.5	Comments:					
Volume purged:	15 gal	Nitrite - 2-4 mg/l					
Duplicate collected?	–	Nitrate - 5-10 mg/l					
Sample collection by: KSJ, JMF							

Others present:	Well condition: Temporary bore hole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 1 general 4 COD ____ TOC ____ nutrient 4 cyanide 2

oil,grease ____ ~~whirl pak~~ SULFIDE 1 Total metal 1 Filtered metal 1 500 ml filter 1

others 2 - 500 ml H_2SO_4 (4AAP) 2 - Thiocyanate

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - USG	Station:	SB-63W24
Location:		Date:	9-12-97
Project # :	13/49-003JSL276	Sample time:	1300

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		10 gal	12.8	759	7.68	-184	0.02
Static water level:*		12 gal	12.8	765	7.68	-185	0.01
Water depth:*		18 gal	12.7	721	7.66	-185	0.01
Well volume: (gal)							
Purge method:	Peristaltic						
Sample method:	Peristaltic						
Start time:		Odor: slight odor					
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: slightly cloudy					
Rate, gpm:		Comments:					
Volume purged:	18 gal	Nitrite - 0 - 1.25 mg/l					
Duplicate collected?	—	Nitrate - 0 - 2.5 mg/l					
Sample collection by:	KSJ, JMF						

Others present:	Well condition: Temporary Borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC-	semi-volatile-	general-	COD-	TOC-	nutrient-	cyanide-
oil,grease-	whirl pak-	total metal-	filtered metal-	500 ml filter-	in-line filter-	
others:						

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB-63W30
Location:		Date:	~~1400~~ 9-12-97
Project # :	13/49-003 JSL276	Sample time:	1400

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		6 gal	11.9	1380	8.55	-290	0.01
Static water level:*		9 gal	11.6	1373	8.56	-291	0.02
Water depth:*		12 gal	11.4	1370	8.58	-297	0.04
Well volume: (gal)		15 gal	11.4	1400	8.58	-298	0.04
Purge method:	Peristaltic						
Sample method:	Peristaltic						
Start time:		Odor: yes					
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: slightly cloudy, flocculent in VOC's					
Rate, gpm:		Comments:					
Volume purged:	15 gal	Nitrite - 0 - 1.25 mg/l					
Duplicate collected?	-	Nitrate - 0 - 2.5 mg/l					
Sample collection by:	KSJ, JMF						

Others present:	Well condition: Temporary Borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC-	semi-volatile-	general-	COD-	TOC-	nutrient-	cyanide-
oil,grease-	whirl pak-	total metal-	filtered metal-	500 ml filter-	in-line filter-	
others:						

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB62 W06
Location:		Date:	9-12-97
Project # :	13/49-003 JSL 276	Sample time:	1500

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		3 gal	17.7	440	7.61	-210	—
Static water level:*		5 gal	17.6	440	7.47	-201	0.63
Water depth:*		6 gal	17.6	440	7.46	-199	0.56
Well volume: (gal)		7 gal	17.6	430	7.46	-198	0.53
Purge method:	Peristaltic						
Sample method:	Peristaltic						
Start time:		Odor:					
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance: clear					
Rate, gpm:		Comments:					
Volume purged:	7 gal	Nitrite - 0 - 2.5 mg/l					
Duplicate collected?	—	Nitrate - 0 - 5 mg/l					
Sample collection by:	KSJ, JMF						
Others present:		Well condition: Temporary Borehole					

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB-62W12
Location:		Date:	9-12-97
Project # :	13/49-003 JSL 276	Sample time:	1800

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		2 gal	15.5	430	7.74	-208	0.52
Static water level:*		5 gal	15.3	440	7.78	-209	0.47
Water depth:*		7 gal	15.1	430	7.81	-211	0.47
Well volume: (gal)							
Purge method:	Peristaltic						
Sample method:	Peristaltic						

Start time:		Odor:	
Stop time:		Purge Appearance:	
Duration: (minutes)		Sample Appearance:	clear
Rate, gpm:		Comments:	
Volume purged:	7 gal	Nitrite - 0 - 1.25 mg/l	
Duplicate collected?	M-1	Nitrate - 0 - 2.5 mg/l	
Sample collection by:	KSJ, JMF		

Others present:	Well condition: Temporary Borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB-62W18
Location:		Date:	9-13-97
Project # :	13/49-003 JSL 276	Sample time:	0900

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		7 gal	13.0	700	7.93	-136	1.05
Static water level:*		9 gal	12.8	700	7.87	-138	1.02
Water depth:*		10 gal	12.7	710	7.86	-147	0.98
Well volume: (gal)		12 gal	12.7	710	7.85	-152	1.02
Purge method:	Peristaltic						
Sample method:	Peristaltic						

Start time:		Odor:	
Stop time:		Purge Appearance:	
Duration: (minutes)		Sample Appearance:	clear
Rate, gpm:		Comments:	
Volume purged:	12 gal	Nitrite - 3-15 mg/l	
Duplicate collected?	-	Nitrate - 10-15 mg/l	
Sample collection by:	KSJ, JMF		

Others present:	Well condition: Temporary Borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB-62 W24
Location:		Date:	9-13-97
Project # :	13/49-003 JSL 276	Sample time:	1100

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		5 gal	11.8	2790	8.25	-190	0.02
Static water level:*		8 gal	11.7	2860	8.25	-194	0.01
Water depth:*		10 gal	11.5	2880	8.28	-202	0.00
Well volume: (gal)		12 gal	11.5	2830	8.28	-202	0.00
Purge method:	Peristaltic						
Sample method:	Peristaltic						

Start time:		Odor:	yes
Stop time:		Purge Appearance:	
Duration: (minutes)		Sample Appearance:	clear
Rate, gpm:		Comments:	
Volume purged:	12 gal	Nitrite - 2-3 mg/l	
Duplicate collected?	-	Nitrate - 3-5 mg/l	
Sample collection by:	KSJ, JMF		

Others present:	Well condition: Temporary Borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC-	semi-volatile-	general-	COD-	TOC-	nutrient-	cyanide-
oil,grease-	whirl pak-	total metal-	filtered metal-	500 ml filter-	in-line filter-	
others:						

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	SB-62W30
Location:		Date:	9-13-97
Project # :	13/49-003 JSL 276	Sample time:	1400

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		3 gal	13.2	1363	8.62	-197	0.03
Static water level:*		5 gal	12.8	1395	8.62	-225	0.02
Water depth:*		7 gal	12.5	1468	8.63	-251	0.00
Well volume: (gal)		10 gal	12.3	1531	8.63	-278	0.04
Purge method:	Peristaltic						
Sample method:	Peristaltic						
Start time:		Odor:					
Stop time:		Purge Appearance:					
Duration: (minutes)		Sample Appearance:	slightly cloudy grey				
Rate, gpm:		Comments:					
Volume purged:	10 gal	Nitrite - 2-3 mg/l					
Duplicate collected?	M-2	Nitrate - 3-5 mg/l					
Sample collection by:	KSJ, JMF						

Others present:	Well condition: Temporary Borehole

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN-NSG	Station:	LM-1N
Location:	Lake Michigan 2' depth	Date:	9-14-97
Project #:	13,49.003JSL276	Sample time:	~~100~~ 1020

GENERAL DATA

Barr lock: Y N	
Casing diameter:	
Total well depth:*	
Static water level:*	
Water depth:*	
Well volume: (gal)	
Purge method:	Peristaltic
Sample method:	Peristaltic
Start time:	0950
Stop time:	1015
Duration: (minutes)	25
Rate, gpm:	1
Volume purged:	25 gal
Duplicate collected?	—
Sample collection by:	KSJ, JMF

STABILIZATION TEST

	Time/ Volume	Temp. oC	Conduct. @ 25 oC	pH	Eh mV	D.O. mg/l
1	0955	20.3	287	7.54	37	8.49
2	1000	20.4	286	7.69	44	8.49
3	1005	20.3	285	7.89	36	8.23
4	1010	20.4	286	7.98	15	8.53
5	1015	20.4	286	8.04	32	8.64
6						

Dissolved Oxygen:

Odor: none detected

Purge Appearance: clear

Sample Appearance: clear

Comments:

Others present:

Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: LM-2N
Location: Lake Michigan ~~Surface~~ 2' depth	Date: 9-14-97
Project #: 13 1 49 - 003 JSL276	Sample time: 1100

GENERAL DATA		STABILIZATION TEST					
Barr lock: Y N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1 1055	19.7	285	8.09	23	8.07
Static water level:*		2 1100	19.8	284	8.07	14	8.11
Water depth:*		3 1105	19.7	285	8.07	34	8.07
Well volume: (gal)		4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:	1050	Dissolved Oxygen:			Odor: none detected		
Stop time:	1105	Purge Appearance: clear					
Duration: (minutes)	15	Sample Appearance: clear					
Rate, gpm:	1	Comments:					
Volume purged:	15 gal						
Duplicate collected?	—						
Sample collection by: KSJ, JMF							

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAKEGAN	Station: LM-3N
Location: Lake Michigan - 2' depth	Date: 9-14-97
Project #: 13,49.003JSL276	Sample time: 1135

GENERAL DATA		STABILIZATION TEST					
Barr lock: Y N		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1 1125	19.7	284	8.10	43	8.90
Static water level:*		2 1130	19.7	285	8.12	43	8.89
Water depth:*		3 1135	19.7	285	8.13	46	8.74
Well volume: (gal)		4					
Purge method:	Peristaltic	5					
Sample method:	Peristaltic	6					
Start time:	1120	Dissolved Oxygen:			Odor: none detected		
Stop time:		Purge Appearance: clear					
Duration: (minutes)		Sample Appearance: clear					
Rate, gpm:	1	Comments:					
Volume purged:							
Duplicate collected?							
Sample collection by: KSJ, JMF							

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	LM-4N
Location:	Lake Michigan - 2' depth	Date:	9-14-97
Project # :	13 149 - 003 JSL 276	Sample time:	1215

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	1200	20.0	287	8.15	44	8.81
Static water level:*		2	1205	20.0	285	8.15	49	8.72
Water depth:*		3	1210	20.0	285	8.16	58	8.72
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:	1155	Dissolved Oxygen:				Odor: none detected		
Stop time:	1210	Purge Appearance:	clear					
Duration: (minutes)	15	Sample Appearance:	clear					
Rate, gpm:	1	Comments:						
Volume purged:	15 gal							
Duplicate collected?	—							
Sample collection by:	KSJ, JMF							

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: LM-6N
Location:	Date: 9-14-97
Project #: 1314 9-003 JSL 276	Sample time: 1315

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	1305	19.7	283	8.19	79	8.64
Static water level:*		2	1310	19.8	282	8.17	72	8.72
Water depth:*		3	1315	19.8	283	8.17	67	8.66
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						

Start time:	1300	Dissolved Oxygen:	Odor: none detected
Stop time:	1315	Purge Appearance: clear	
Duration: (minutes)	15	Sample Appearance: clear	
Rate, gpm:	1	Comments:	
Volume purged:	15 gal	wind & waves beginning to increase	
Duplicate collected?	–		
Sample collection by: KSJ, JMF			

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: LM-5N
Location:	Date: 9-14-97
Project #: 13149-003JSL 276	Sample time: 1400

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	1340	20.8	285	8.13	72	8.67
Static water level:*		2	1345	20.8	284	8.12	84	8.72
Water depth:*		3	1350	20.8	284	8.12	66	8.75
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:	1335	Dissolved Oxygen:				Odor: none detected		
Stop time:	1350	Purge Appearance: clear						
Duration: (minutes)	15	Sample Appearance: clear						
Rate, gpm:	1	Comments:						
Volume purged:	15 gal							
Duplicate collected?	—							
Sample collection by: KSJ, JMF								

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN	Station: LM-1S
Location:	Date: 9-14-97
Project #: 13149-003 JSL 276	Sample time: 1435

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	1425	20.6	287	8.20	70	9.28
Static water level:*		2	1430	20.5	283	8.21	70	9.31
Water depth:*		3	1435	20.5	286	8.22	68	9.84
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:	1420	Dissolved Oxygen:				Odor: none detected		
Stop time:	1435	Purge Appearance: clear						
Duration: (minutes)	15	Sample Appearance: clear						
Rate, gpm:	1	Comments:						
Volume purged:	15 gal							
Duplicate collected?	—							
Sample collection by:	KSJ, JMF							

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: LM - 2S
Location:	Date: 9-14-97
Project #: 13 , 49 . 003 JSL 276	Sample time: 1510

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	1500	21.4	286	8.18	107	8.56
Static water level:*		2	1505	21.4	286	8.19	92	8.60
Water depth:*		3	1510	21.5	286	8.19	83	8.65
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:	1455	Dissolved Oxygen:				Odor: none detected		
Stop time:	1510	Purge Appearance: clear						
Duration: (minutes)	15	Sample Appearance: clear						
Rate, gpm:	1	Comments:						
Volume purged:	15 gal							
Duplicate collected?	–							
Sample collection by: KSJ, JMF								

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: H-1
Location:	Date: 9-14-97
Project #: 13149.003 JSL276	Sample time: 1600

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	1550	21.5	288	8.13	84	8.45
Static water level:*		2	1555	21.3	288	8.06	73	8.57
Water depth:*		3	1600	21.4	287	8.08	62	8.70
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:	1545	Dissolved Oxygen:				Odor: None detected		
Stop time:	1600	Purge Appearance: clear						
Duration: (minutes)	15	Sample Appearance: clear						
Rate, gpm:	1	Comments:						
Volume purged:	15 gal							
Duplicate collected?	—							
Sample collection by: KSJ, JMF								

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN - NSG	Station: LCZ-H1
Location:	Date: 9-14-97
Project #: 131 49.003JSL276	Sample time: 1645

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	1630	20.8	284	8.21	96	8.79
Static water level:*		2	1635	20.5	284	8.21	83	8.79
Water depth:*		3	1640	20.6	284	8.22	88	8.79
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:	1625	Dissolved Oxygen:				Odor: None detected		
Stop time:	1640	Purge Appearance: clear						
Duration: (minutes)	15	Sample Appearance: clear						
Rate, gpm:	1	Comments:						
Volume purged:	15 gal							
Duplicate collected?	—							
Sample collection by:	KSJ, JMF							

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client: WAUKEGAN	Station: LC2-2S
Location:	Date: 9-14-97
Project #: 13149-003JSL276	Sample time: 1715

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	1705	20.6	284	8.14	58	9.15
Static water level:*		2	1710	20.6	284	8.11	61	9.17
Water depth:*		3	1715	20.6	282	8.14	77	9.21
Well volume: (gal)		4						
Purge method:	Peristaltic	5						
Sample method:	Peristaltic	6						
Start time:	1700	Dissolved Oxygen:				Odor: none detected		
Stop time:	1715	Purge Appearance: clear						
Duration: (minutes)	15	Sample Appearance: clear						
Rate, gpm:	1	Comments:						
Volume purged:	15 gal							
Duplicate collected?	—							
Sample collection by: KSJ, JMF								

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	LCZ-2N
Location:		Date:	9-15-97
Project # :	13149 - 003 JSL 276	Sample time:	0800

GENERAL DATA		STABILIZATION TEST						
Barr lock: Y N			Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:			Volume	oC	@ 25 oC		mV	mg/l
Total well depth:*		1	0850	20.5	285	7.80	41	7.86
Static water level:*		2	0855	20.5	285	7.93	44	7.86
Water depth:*		3	0800	20.6	285	8.02	63	7.85
Well volume: (gal)		4	0805	20.5	285	8.06	64	7.87
Purge method:	Peristaltic	5	0810	20.5	285	8.09	68	7.86
Sample method:	Peristaltic	6						
Start time:	0845	Dissolved Oxygen:				Odor: none detected		
Stop time:	0910	Purge Appearance: clear						
Duration: (minutes)	25	Sample Appearance: clear						
Rate, gpm:	1	Comments:						
Volume purged:	25 gal							
Duplicate collected?	—							
Sample collection by:	KSJ, JMF							

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC 3 semi-volatile 2 general 1 COD____ TOC____ nutrient 1 cyanide____

oil,grease____ whirl pak____ Total metal____ Filtered metal____ 500 ml filter____

others

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	LCZ-3N
Location:		Date:	9-15-97
Project # :	13/49-003 JSL276	Sample time:	0945

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		0930	20.5	285	8.14	76	7.88
Static water level:*		0935	20.4	285	8.15	71	7.88
Water depth:*		0940	20.5	285	8.17	77	7.87
Well volume: (gal)							
Purge method:	Peristaltic						
Sample method:	Peristaltic						

Start time:	0925	Odor:	
Stop time:	0940	Purge Appearance:	clear
Duration: (minutes)	15	Sample Appearance:	clear
Rate, gpm:	1	Comments:	
Volume purged:	15 gal		
Duplicate collected?	–		
Sample collection by:	KSJ, JMF		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- 3 semi-volatile- 2 general- 1 COD- TOC- nutrient- 1 cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	LCZ - SN
Location:		Date:	9-15-97
Project # :	13/49-003 JSL276	Sample time:	1020

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		1010	21.7	284	8.14	89	7.55
Static water level:*		1015	22.9	286	8.13	108	7.49
Water depth:*		1020	22.4	286	8.11	112	7.51
Well volume: (gal)							
Purge method:	Peristaltic						
Sample method:	Peristaltic						

Start time:	1005	Odor:	
Stop time:	1020	Purge Appearance:	clear
Duration: (minutes)	15	Sample Appearance:	clear
Rate, gpm:	1	Comments:	
Volume purged:	15 gal		
Duplicate collected?	–		
Sample collection by:	KSJ, JMF		

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well (SW: surface water) SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

Barr Engineering Company
Field Log Data Sheet

Client:	WAUKEGAN - NSG	Station:	LCZ - 6N
Location:		Date:	9-15-97
Project # :	13/49-003 JSL 276	Sample time:	1100

GENERAL DATA		STABILIZATION TEST					
Barr lock:		Time/	Temp.	Conduct.	pH	Eh	D.O.
Casing diameter:		Volume	oC	@25			
Total well depth:*		1040	21.2	285	8.14	98	7.70
Static water level:*		1045	21.1	285	8.15	99	7.84
Water depth:*		1050	21.3	285	8.16	99	7.92
Well volume: (gal)							
Purge method:	Peristaltic						
Sample method:	Peristaltic						
Start time:	1035	Odor:					
Stop time:	1050	Purge Appearance:	clear				
Duration: (minutes)	15	Sample Appearance:	clear				
Rate, gpm:	1	Comments:					
Volume purged:	15 gal						
Duplicate collected?	–						
Sample collection by:	KSJ, JMF						

Others present:	Well condition:

MW: groundwater monitoring well WS: water supply well SW: surface water SE: sediment other:

VOC- semi-volatile- general- COD- TOC- nutrient- cyanide-

oil,grease- whirl pak- total metal- filtered metal- 500 ml filter- in-line filter-

others:

* Measurements are referenced from top of riser pipe, unless otherwise indicated.

9/14/97

7:00 overcast 65° calm

JMF / KSJ

wind like from NW all day.

SET UP REF. POINTS GPS

ROUTE # 0 — "NS6-WCP"

POINT: MW-13D

LONG: N 42° 22.022'

LAT: W 087. 48.950'

WAYPOINT #: 001

POINT: MW-12D

LONG: N 42° 21.947'

LAT: W 087° 48.945'

WP #: 002

POINT: P-108

LONG: N 42° 21.935'

LAT: W 087° 49.126'

WP #: 003

POINT: MW-7D

LONG: N 42° 22.038'

LAT: W 087° 49.022'

WP #: 004

POINT: ¢¢ Pershing / seahorse dr.

LONG: 42° 22.087'

LAT: 087° 49.006'

WP #: 005

SAMPLING POINTS

POINT: LM-1N

LONG: N 42° 21.779'

LAT: W

WP #: 006 087° 48.944'

H2O VEL <10' / 10 min, 30' / 20 min

MEASUREMENTS: rec: 100°

130' / 50 min, rec 100°

2.6 FT/min

POINT: LM-2N

LONG: N 42° 22.006'

LAT: W 087° 48.831'

WP #: 007

H2O VEL: 50' / 4 min 20 sec - 270° rec.

100' / 6 min - 270° rec

INLINE W/ SB 61, 62, 63, 64

16.6 FT/min

POINT : LM -3N
LONG : N 42° 22 . 243'
LAT : W 087° 48 . 782'
WP # : 008
H2O VEL : 35'/5 MIN. 290° vec.
70'/10 min 11 sec 290° vec
7 ft/min

POINT : LM-4N
LONG : N 42° 22. 453'
LAT : W 087° 48. 629'
WP # : 009
H2O VEL : 30'/5 MIN . 290° vec
140'/16 min 43 sec 250° vec
8.8 ft/min

POINT : LM-6N
LONG : N 42° 23,833'
LAT : W 087° 48, 159'
WP # : 010
H2O VEL : 40'/6 min,
vec. ~~220°~~ 220°
120'/12 min 30 sec, 230°
6.6 ft/m

POINT : LM-5N
LONG : N 42° 23, 024
LAT : W 087° 48. 274
WP # : 011
H2O VEL : 20'/2 min 255°, 60'/3 min 30 sec 260°
20 ft/min

"LM1+25" → SAMPLE @ BOTT + 2'
(50' FROM SHORE, 10' deep H2O)

POINT : LM-1S
LONG : N 42° 21, 134'
LAT : W 087° 49. 520'
WP # : 012
H2O VEL : 35'/2 min 15 sec 190°
100'/9 min 190°
11.1

POINT : LM-2S
LONG : N 42° 20, 767'
LAT : W 087° 49. 605'
WP # : 013
H2O VEL : 50'/3 min 30 sec, 190°
14.3

POINT : H-1
LONG : N 42° 21, 690'
LAT : W 087° 48. 857'
WP # : 014
H2O VEL : 30'/5 min 180° vec.
50'/10 min 210° vec
5.0

POINT : LCZ-H1
LONG : N 42° 21. 514'
LAT : W 087° 48. 521
WP # : 015
H2O VEL : 100'/5 min 30 sec. 250° vec.
18.2

POINT : LCZ-2S
LONG : N 42°20,776
LAT : W 087° 49.420
WP # : 016
H2O VEL: 100'/5MIN 240° VECTOR

(10)

9/15/97

POINT : LCZ-2N
LONG : N 42° 22.022
LAT : W 087° 48.645
WP # : 017
H2O VEL : 20'/4½ MIN VECTOR 180°
50'/8 MIN VECTOR 220°

(6.3)

POINT : LCZ-3N
LONG : N 42° 22.226
LAT : W 087° 48.576
WP # : 018
H2O : 30'/3MIN 25 SEC. VECTOR 200°
80'/7MIN VECTOR 220°

(11.4)

LCZ-5N

POINT : ~~42°23.013~~
LONG : N 42° 23.012
LAT : W 087° 48.065
WP # : 019
H2O VEL: 50'/3MIN. 45° VECTOR
100'/5½ MIN 45° VECTOR
(Against Lake wind out of NE)

(18.2)

~~POINT :~~
~~LONG : N~~
~~LAT : W~~
~~WP # :~~
~~H2O VEL :~~

LCZ-6N

POINT : ~~LM-6N~~
LONG : N 42° 23.830
LAT : N 087° 47,948
WP # : 020
H2O VEL : 150'/5½ MIN 330° (N.N.W.!)

(27.3)

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003 JSL 276

№ 21656

Project Manager: JSL
Project Contact: GAP
Laboratory: Cliff Hill

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_aOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Z_nAcetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	AAP	Thio Cyanate	Phenolics				Total No. Of Containers	Remarks/ Analysis Required:
1. SB-61W04	9-9-97		✓			✓				3		1	1	2	2	1			1				1	1	1				14	TABLE 1
2. RA-61W04	9-9-97		✓			✓								2		1							1	1					5	TABLE 1.4
3. RB-61W04	9-9-97		✓			✓								1		1													2	Ammonia Nitrogen, Chloride
4.																														
5.																														
6.																														
7.																														
8.																														
9.																														
10.																														
11.																														
12.																														
13.																														
14.																														
15.																														
16.																														

Sampled By: Kim Johannessen, John Fox

Remarks:

Relinquished By: Kim Johannessen — Date: 9-9-97 — Time:

Relinquished By: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: — Date: — Time:

Received by Lab: — Date: — Time:

Air Bill Number: 4034123001

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003 JSL 276

№ 21655

Project Manager: JSL

Project Contact: GAP

Laboratory: CH-2 M HILL

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N,OH,Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Z,Acetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	4 AAP	Thiocyanate	Phenolics				Total No. Of Containers	Remarks/ Analysis Required:
1. SB-61W10	9-9-97	1600	✓			✓				3		1	1	2	2	1			1				1	1	1				14	TABLE 1
2. RA-61W10	↓	↓	✓			✓								2		1							1	1					5	TABLE 1A
3. RB-61W10	↓	↓	✓			✓								1		1													2	Ammonia Nitrogen, Chloride
4.																														
5. SB-61W16	↓	1830	✓			✓				3		1	1	2	2	1			1				1	1	1				14	TABLE 1
6. RA-61W16	↓	↓	✓			✓								2		1							1	1					5	TABLE 1A
7. RB-61W16	↓	↓	✓			✓								1		1													2	Ammonia Nitrogen, Chloride
8.																														
9.																														
10.																														
11.																														
12.																														
13.																														
14.																														
15.																														
16.																														

Number of Containers/Preservative

Sampled By: Kim Johannessen, John Fox

Remarks:

Relinquished By: Kim Johannessen — Date: 9-9-97 — Time:

Relinquished By: — Date: — Time:

Received by Lab: — Date: — Time:

Received by Lab: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Air Bill Number: 4034923001

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company

8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003JSL267

№ 21486

Project Manager: JSL

Project Contact: ~~GAP~~ MAD

Laboratory: FLUOR DANIEL GTI

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_xOH,Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Z_nAcetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	Total No. Of Containers	Remarks/ Analysis Required:
1. MW 6S	9-10-97		✓			✓								2									2	Contact Mark Deady
2. MW 6D	↓		✓			✓								3									3	for analysis
3.																								
4.																								
5.																								
6.																								
7.																								
8.																								
9.																								
10.																								
11.																								
12.																								
13.																								
14.																								
15.																								
16.																								

Sampled By: Kim Johannessen / John Fox

Remarks:

Relinquished By: Kim Johannessen — Date: 9-11-97 — Time:

Relinquished By: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☑ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: — Date: — Time:

Received by Lab: — Date: — Time:

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003 JSL267

№ 21485

Project Manager: JSL

Project Contact: GAP

Laboratory: CH2 M HILL

Remarks/ Analysis Required:

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_aOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide ($Z_nAcetate$)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	4 AAP	Thiocyanate	Phenolics				Total No. Of Containers	Remarks/ Analysis Required
1. SB-61W22	9-10-97		✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
2. RA-61W22			✓			✓								1		1							1	1					4	TABLE 1A
3. RB-61W22			✓			✓								1		1													2	Ammonia Nitrogen/Chloride
4.																														
5. SB-61W30			✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
6. RA-61W30			✓			✓								1		1							1	1					4	TABLE 1A
7. RB-61W30			✓			✓								1		1													2	Ammonia Nitrogen/Chloride
8.																														
9.																														
10.																														
11.																														
12.																														
13.																														
14.																														
15.																														
16.																														

Number of Containers/Preservative

Sampled By: Kim Johannessen / John Fox

Remarks:

Relinquished By: Kim Johannessen — Date: 9-10-97 — Time:

Relinquished By: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: — Date: — Time:

Received by Lab: — Date: — Time:

Air Bill Number: 4034923012

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company

Chain of Custody A

8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Project Number: 13/4.9-0.03 JSL 2.67

№ 21292

Project Manager: JSL

Project Contact: GAP

Laboratory: Chz M Hill

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_aOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide ($Z_nAcetate$)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	4 AAP	Thiocyanate	Phenolics				Total No. Of Containers	Remarks/ Analysis Required:
1. MW 6S	9-10-97		✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
2. MW 6S RA			✓			✓								1		1							1	1					4	TABLE 1A
3. MW 6S RB			✓			✓								1		1													2	Ammonia Nitrogen, Chloride
4.																														
5. MW 6D			✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
6. MW 6D RA			✓			✓								1		1							1	1					4	TABLE 1A
7. MW 6D RB			✓			✓								1		1													2	Ammonia Nitrogen / Chloride
8.																														
9. MW 13S			✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
10. MW 13S RA			✓			✓								1		1							1	1					4	TABLE 1A
11. MW 13S RB			✓			✓								1		1													2	Ammonia
12.																														
13. MW 13D			✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
14. MW 13D RA			✓			✓								1		1							1	1					4	TABLE 1A
15. MW 13D RB			✓			✓								1		1													2	Ammonia Nitrogen, Chloride
16.																														

Sampled By: Kim Johannesser, John Fox

Remarks:

Relinquished By: Kim Johannesser — Date: 9-10-97 — Time:

Relinquished By: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: — Date: — Time:

Received by Lab: — Date: — Time:

Air Bill Number: 4034923012

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003 JSL267

№ 21487

Project Manager: JSL

Project Contact: GAP

Laboratory: CH2M HILL

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_xOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Z_nAcetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	4 AAP	Thiocyanate	Phenols				Total No. Of Containers	Remarks/ Analysis Required:
1. SB-64W06	9-11-97		✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
2. RA-64W06			✓			✓								1		1							1	1					4	TABLE 1A
3. RB-64W06			✓			✓								1		1													2	Ammonia Nitrogen/Chloride
4. SB-64W12			✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
5. RA-64W12			✓			✓								1		1							1	1					4	TABE 1A
6. RB-64W12			✓			✓								1		1													2	Ammonia Nitrogen/Chloride
7. SB-64W18			✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
8. RA-64W18			✓			✓								1		1							1	1					4	TABLE 1A
9. RB-64W18			✓			✓								1		1													2	Ammonia Nitrogen/Chloride
10. SB-64W24			✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
11. RA-64W24			✓			✓								1		1							1	1					4	TABLE 1A
12. RB-64W24			✓			✓								1		1													2	Ammonia Nitrogen/Chloride
13. TB-1			✓			✓		✓		3																			3	BETX
14. TB-2			✓					✓		3																			3	BETX
15.																														
16.																														

Sampled By: Jim Johannessen / John Fox

Remarks:

Relinquished By: Jim Johannessen — Date: 9-11-97 — Time:

Relinquished By: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: — Date: — Time:

Received by Lab: — Date: — Time:

Air Bill Number: 4034922931

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody A

Project Number: 13/49-003 JSL 276

№ 21291

Project Manager: JSL

Project Contact: GAP

Laboratory: H/2 M HILL

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (N_aOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide ($Z_nAcetate$)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)	4 AAP	Total Cyanide	Phenols				Total No. of Containers	Remarks/ Analysis Required:
1. SB-64W30	9-12-97		✓			✓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
2. RA-64W30	↓		↓			↓								1		1							1	1					4	TABLE 1A
3. RB-64W30	↓		↓			↓								1		1													2	Ammonia Nitrogen/Chloride
4. SB-63W06	↓		↓			↓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
5. RA-63W06	↓		↓			↓								1		1							1	1					4	TABLE 1A
6. RB-63W06	↓		↓			↓								1		1													2	Ammonia Nitrogen/Chloride
7. SB-63W12	↓		↓			↓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
8. RA-63W12	↓		↓			↓								1		1							1	1					4	TABLE 1A
9. RB-63W12	↓		↓			↓								1		1													2	Ammonia Nitrogen/Chloride
10. SB-63W18	↓		↓			↓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
11. RA-63W18	↓		↓			↓								1		1							1	1					4	TABLE 1A
12. RB-63W18	↓		↓			↓								1		1													2	Ammonia Nitrogen/Chloride
13. SB-63W24	↓		↓			↓				3		1	1	2	2	2			1				1	1	1				15	TABLE 1
14. RA-63W24	↓		↓			↓								1		1							1	1					4	TABLE 1A
15. RB-63W24	↓		↓			↓								1		1													2	Ammonia Nitrogen/Chloride
16.																														

Remarks/ Analysis Required:

Sampled By: Kim Johannessen / John Fox

Remarks:

Relinquished By: Kim Johannessen — Date: 9-12-97 — Time:

Relinquished By: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: — Date: — Time:

Received by Lab: — Date: — Time:

Air Bill Number: 7034 1230 2-3

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody

Project Number: 13/49-003 JSL 276
No: № 252

Project Manager: JSL
Project Contact: GAP
Laboratory: Ch2 M HILL

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Type: PAH	VOC's (HCL)	Total Metals (HNO3)	Dissolved Metals (HNO3)	General	Cyanide (NaOH)	Nutrients (H2SO4)	Sulfide (ZnAcetate)	4 AAP (H2SO4)	Thiocyanate	Phenols	No. of VOC Containers	No. of Non-VOC Containers	No. of Brass Liners	Total No. Of Containers	Remarks/Special Instructions
1 SB-63W30	9-12-97		✓			✓				3	1	1	2	2	2	1	1	1	1				15	TABLE 1
2 RA-63W30	↓		↓			↓							1		1		1	1					4	TABLE 1A
3 RB-63W30													1		1								2	Ammonia Nitrogen/Chloride
4 SB-62W06										3	1	1	2	2	2	1	1	1	1				15	TABLE 1
5 RA-62W06													1		1		1	1					4	TABLE 1A
6 RB-62W06													1		1								2	Ammonia Nitrogen/Chloride
7 SB-62W12										3	1	1	2	2	2	1	1	1	1				15	TABLE 1
8 ~~RA~~ (RA)-62W12													1		1		1	1					4	TABLE 1A
9 RB-62W12													1		1								2	Ammonia Nitrogen/Chloride
10 FB-1									✓	3	1	1		2	1		1						9	Phenolics, BETX, cyanide
11 TB-3									✓	3													3	BETX
12																								
13																				FB			1	Ammonia Nitrogen, arsenic (total & filtered)
14																								
15																								
16																								

Sampled By: Kim Johannessen / John Fox

Remarks:

Relinquished By: Kim Johannessen — Date: 9-12-97 — Time:
Relinquished By: — Date: — Time:

Received by Lab: — Date: — Time:
Received by Lab: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Air Bill Number: 4034923023

Distribution: White - Original Accompanies Shipment to Lab; Yellow - Lab Coordinator; Pink - Field Copy

Barr Engineering Company
8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Chain of Custody

Project Number: 13/49-003JSL276
No: M 253

Project Manager: JSL
Project Contact: GAP
Laboratory: CH2 M HILL

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Type: PAH	VOCs (HCL)	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General	Cyanide ($NaOH$)	Nutrients (H_2SO_4)	Sulfide (ZN ACETATE)	4 AAP (H_2SO_4)	Thiocyanate	Phenols	No. of VOC Containers	No. of Non-VOC Containers	No. of Brass Liners	Total No. Of Containers	Remarks/Special Instructions
1. SB-62W18	9-13-97		✓			✓				3	1	1	2	2	2	1	1	1	1				15	TABLE 1
2. RA-62W18			✓			✓							1		1		1	1					4	TABLE 1A
3. RB-62W18			✓			✓							1		1								2	Ammonia Nitrogen / Chloride
4. SB-62W24			✓			✓				3	1	1	2	2	2	1	1	1	1				15	TABLE 1
5. RA-62W24			✓			✓							1		1		1	1					4	TABLE 1A
6. RB-62W24			✓			✓							1		1								2	Ammonia Nitrogen / Chloride
7. SB-62W30			✓			✓				3	1	1	2	2	2	1	1	1	1				15	TABLE 1
8. RA-62W30			✓			✓							1		1		1	1					4	TABLE 1A
9. RB-62W30			✓			✓							1		1								2	Ammonia Nitrogen / Chloride
10. M-1 (18)			✓			✓		✓			1	1			1		1		1				5	Phenolics, ammonia nitrogen, arsenic (total & filtered)
11.																								
12.																								
13. M-2 (30)			✓			✓		✓		3					1								4	BETX, AMMONIA Nitrogen
14.																								
15.																								
16.																								

Sampled By: Kim Johannessen / John Fox
Remarks:

Relinquished By: Kim Johannessen — Date: 9-13-97 — Time:
Relinquished By: — Date: — Time:
Received by Lab: — Date: — Time:
Received by Lab: — Date: — Time:
Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other
Air Bill Number: 4034923454

Distribution: White - Original Accompanies Shipment to Lab; Yellow - Lab Coordinator; Pink - Field Copy

Barr Engineering Company

Chain of Custody

8300 Norman Center Drive
Minneapolis, MN 55437-1026
(612) 832-2600

Project Number: 13/49-003 JSL 276

No: № 254

Project Manager: JSL

Project Contact: GAP

Laboratory: CH2M HILL

Remarks/Special Instructions: TABLE 2

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Type: PAH	Phenolics	HAAP Phenolics	Benzene	Ammonia Nitrogen	General	Containers: No. of VOC Containers	No. of Non-VOC Containers	No. of Brass Liners	Total No. Of Containers
1. LM-1N	9-14-97		✓			✓				1	1	3	1	1				7
2. LM-2N										1	1	3	1	1				7
3. LM-3N										1	1	3	1	1				7
4. LM-4N										1	1	3	1	1				7
5. LM-6N										1	1	3	1	1				7
6. LM-5N										1	1	3	1	1				7
7. LM-1S										1	1	3	1	1				7
8. LM-2S										1	1	3	1	1				7
9. H-1										1	1	3	1	1				7
10. LCZ-H1										1	1	3	1	1				7
11. LCZ-2S										1	1	3	1	1				7
12. LCZ-2N										1	1	3	1	1				7
13. LCZ-3N										1	1	3	1	1				7
14. LCZ-5N										1	1	3	1	1				7
15. LCZ-6N										1	1	3	1	1				7
16. FB-1								✓		1	1	3	1	1				7

Sampled By: Kim Johannesson / John Fox

Remarks:

Relinquished By: Kim Johannesson — Date: 9-15-97 — Time:

Relinquished By: — Date: — Time:

Samples Shipped VIA: ☐ Air Freight ☒ Fed. Exp. ☐ Sampler ☐ Other

Received by Lab: — Date: — Time:

Received by Lab: — Date: — Time:

Air Bill Number: 4634923465

Distribution: White - Original Accompanies Shipment to Lab; Yellow - Lab Coordinator; Pink - Field Copy

HOLE NO. SB - 61

Barr Engineering Company

DRILLING LOG

SHEET 1 OF 2 SHEETS

PROJECT NAME/NO. WCP 13149-003 JSL 276	SIZE AND TYPE OF BIT 4½ HSA
LOCATION (Coordinates or Station) SEE FIGURE	DATUM FOR ELEV. SHOWN MSL
DRILLING AGENCY BOART LONGYEAR	MANUFACTURERS DESIGNATION OF DRILL MOBLE B-57 ATV
HOLE NO. SB - 61	TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN ____ Disturbed ____ Undisturbed
NAME OF DRILLER MIKE MUELLER	TOTAL NO. CORE BOXES
DIRECTION OF HOLE ☒ Vertical ☐ Inclined ____ Deg. from Vert.	ELEV. GROUNDWATER 582.4
THICKNESS OF OVERBURDEN NA	DATE HOLE: 9/9/97 Started 9/9/97 Completed
DEPTH DRILLED INTO ROCK NA	ELEV. TOP OF HOLE 585.4
TOTAL DEPTH OF HOLE 33.5'	SIGNATURE OF INSPECTOR John M Fox

SAMPLE	DEPTH	SOIL pH	CLASSIFICATION OF MATERIALS (Description)	RECOVERY	N	REMARKS
SS	1	7.3	POORLY GRADED SAND (SP) FINE GRAINED PALE BROWN (10YR6/3) MOIST (ALLUVIUM)	10"	2	OVA READINGS 0/0/0 = 0
HP	2					W/O / W / W/O CARBON FILTER RESULT IS 1ST NUMBER MINUS 2ND NUMBER. SB61.62.63.64
HP EXPOSED	3		WET BELOW 3.0'	SB61W04		
	4		4.0' (581.4')			
HSA	5		POORLY GRADED SAND (SP) FINE GRAINED GREY (5GY 6/0) WET			SEWER-LIKE ODOR BELOW 3-FEET.
SS	6	7.5	W/ SMALL SHELL FRAGMENTS (ALLUVIUM)	16"	10	OVA 10/10/10 = 0
HP	7					
HP EXPOSED	8		10.0' (575.4')	SB61W10		
HSA	9		POORLY GRADED SAND (SP/SP-SM) FINE GRAINED GREY (5GY 6/0) WET			
SS	10	7.8	W/ SOME SHELL FRAGMENTS (ALLUVIUM)	22"	11	OVA 15/8/6 = 7
HP	11					
HP EXPOSED	12			SB61W16		
HSA	13					
SS	14	8.6		20"	15	OVA 175/75/70 = 100

HOLE NO. SB - 61

Barr Engineering Company

DRILLING LOG

SHEET 2 OF 2 SHEETS

PROJECT NAME/NO. WCP 13/49-003 JSL 276	SIZE AND TYPE OF BIT 4 1/2 HSA
LOCATION (Coordinates or Station)	DATUM FOR ELEV. SHOWN MSL
DRILLING AGENCY BOART LONGYEAR	MANUFACTURERS DESIGNATION OF DRILL B-57
HOLE NO. SB - 61	TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN ____ Disturbed ____ Undisturbed
NAME OF DRILLER MIKE MUELLER	TOTAL NO. CORE BOXES
DIRECTION OF HOLE ☒ Vertical ☐ Inclined ____ Deg. from Vert.	ELEV. GROUNDWATER
THICKNESS OF OVERBURDEN NA	DATE HOLE: 9/9/91 Started 9/9/91 Completed
DEPTH DRILLED INTO ROCK NA	ELEV. TOP OF HOLE 585.4
TOTAL DEPTH OF HOLE 33.5'	SIGNATURE OF INSPECTOR [illegible]

SAMPLE	DEPTH	SOIL pH	CLASSIFICATION OF MATERIALS (Description)	RECOVERY	N	REMARKS
HP			SAME AS ABOVE SEE PAGE 1 for CLASSIFICATION.			
	21					
HP EXPOSED	22		22.5' (562.9)	SB61W22		
	23					
HSA	24		POORLY GRADED SAND W/ SILT (SP-SM) FINE GRAINED DARK GREY (5GY4/0) WET (ALLUVIUM)			
	25					
SS	26	8.4		19"	14	OVA 600/175/175 = 425
	27					
HSA						
	28					
HP						
	29					
HP EXPOSED	30			SB61W30		2-FOOT / 2" SPLIT SPOON DRIVEN W/ 140 Lb HAMMER 30-INCH DROP W/ WINCH CABLES.
	31					
HSA	32					
	33		TOP OF TILL @ 33.5± BASED ON TOOL ACTION			
	34		33.5' END OF BORING (551.9')			SB61, 62, 63, 64
	35					
	16					SS = SPLIT SPOON HP = HYDRO PUNCH HSA = HOLLOW STEM AUGER SB61, 62, 63, 64
	37					
	38					ODORS UNLESS DEFINED ARE PHENOLIC-LIKE SB-61, 62, 63, 64
	39					

HOLE NO. SB- 62

Barr Engineering Company

DRILLING LOG

SHEET 1 OF 2 SHEETS

PROJECT NAME/NO. WCP 13/49-003 JSL 276	SIZE AND TYPE OF BIT 4½ HSA
LOCATION (Coordinates or Station) SEE FIGURE	DATUM FOR ELEV. SHOWN MSL
DRILLING AGENCY BOART LONGYEAR	MANUFACTURERS DESIGNATION OF DRILL MOBLE 8-5T ATV
HOLE NO. SB-62	TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN ____ Disturbed ____ Undisturbed
NAME OF DRILLER MIKE MUELLER	TOTAL NO. CORE BOXES
DIRECTION OF HOLE ☒ Vertical ☐ Inclined ____ Deg. from Vert.	ELEV. GROUNDWATER 582.9
THICKNESS OF OVERBURDEN NA	DATE HOLE: 9/12/97 Started 9/13/97 Completed
DEPTH DRILLED INTO ROCK NA	ELEV. TOP OF HOLE 584.4
TOTAL DEPTH OF HOLE 31.5'	SIGNATURE OF INSPECTOR John M Fox

SAMPLE	DEPTH	SOIL pH	CLASSIFICATION OF MATERIALS (Description)	RECOVERY	N	REMARKS
HSA	1	7.8	POORLY GRADED SAND (SP) FINE GRAINED PALE BROWN (10YR 6/3) MOIST			OVA 0/0/0 = 0 NO ODOR
	2					
SS	3	7.8	W/ SMALL SHELL FRAGMENTS	15"	11	OVA 25/15/10 = 15 NO ODOR
	4		WET BELOW 1.5 - FEET			
HP						
	5		(ALLUVIUM)			
HP EXPOSED	6		6.0' (678.4')	SB62W06		
			POORLY GRADED SAND W/ SILT (SP-SM / SP) FINE GRAINED GREY (10YR 5/1) WET (ALLUVIUM)			
	7					
HSA	8					
SS	9	8.5		24"	11	OVA 100/90/70 = 10 NO ODOR
	10					
HP						
	11					
HP EXPOSED	12			SB62W12		
	13					
HSA	14					
SS	15	8.7		16"	35	OVA 10/5/5 = 2 NO ODOR
	16					
HP						
	17					
HP EXPOSED	18			SB62W18		
	19					
HSA						

HOLE NO. SB – 62

Barr Engineering Company	DRILLING LOG	SHEET 2 OF 2 SHEETS

PROJECT NAME/NO. WCP 13/49-003 JSL 276	SIZE AND TYPE OF BIT 4½ HSA
LOCATION (Coordinates or Station)	DATUM FOR ELEV. SHOWN MSL
DRILLING AGENCY BOART LONGYEAR	MANUFACTURERS DESIGNATION OF DRILL B-57
HOLE NO. SB – 62	TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN ____ Disturbed ____ Undisturbed
NAME OF DRILLER MIKE MUELLER	TOTAL NO. CORE BOXES
DIRECTION OF HOLE ☒ Vertical ☐ Inclined ____ Deg. from Vert.	ELEV. GROUNDWATER
THICKNESS OF OVERBURDEN NA	DATE HOLE: 9/12/97 Started 9/13/97 Completed
DEPTH DRILLED INTO ROCK NA	ELEV. TOP OF HOLE 584.4
TOTAL DEPTH OF HOLE 31.5'	SIGNATURE OF INSPECTOR [illegible]

SAMPLE	DEPTH	SOIL PH	CLASSIFICATION OF MATERIALS (Description)	RECOVERY	N	REMARKS
SS	21	8.2	SAME AS ABOVE SEE PAGE 1 FOR CLASSIFICATION	15"	33	OVA 50/25/40 = 25
HP	22					SLIGHT ODOR
HP EXPOSED	23			SB6ZW24		
	24		24.5 (559.9')			
HSA	25		SILTY SAND (SM/SP-SM) FINE GRAINED DARK GREY (10YR 4/1) WET (ALLUVIUM)			
SS	25	8.5		24"	17	OVA 400/200/200 = 200
HP	27					STRONG ODOR
HP EXPOSED	29			SB6ZW30		
HSA	30		TOP OF TILL 31.5± BASED ON TOOL ACTION			
	31		31.5 END OF BORING (552.9')			
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					

HOLE NO. SB - 63

Barr Engineering Company

DRILLING LOG

SHEET 1 OF 2 SHEETS

PROJECT NAME/NO. WCP 13149-003 JSL 276	SIZE AND TYPE OF BIT 4 1/2 HSA
LOCATION (Coordinates or Station) SEE FIGURE	DATUM FOR ELEV. SHOWN MSL
DRILLING AGENCY BOART LONGYEAR	MANUFACTURERS DESIGNATION OF DRILL MOBLE 2-57 ATV
HOLE NO. SB - 63	TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN ____ Disturbed ____ Undisturbed
NAME OF DRILLER MIKE MUELLER	TOTAL NO. CORE BOXES
DIRECTION OF HOLE ☒ Vertical ☐ Inclined ____ Deg. from Vert.	ELEV. GROUNDWATER 583.1
THICKNESS OF OVERBURDEN NA	DATE HOLE: 9/12/97 Started 9/12/97 Completed
DEPTH DRILLED INTO ROCK NA	ELEV. TOP OF HOLE 583.6
TOTAL DEPTH OF HOLE 31.5'	SIGNATURE OF INSPECTOR John M Fox

SAMPLE	DEPTH	Soil PH	CLASSIFICATION OF MATERIALS (Description)	RECOVERY	N	REMARKS
HSA	1		POORLY GRADED SAND (SP) FINE TO MEDIUM GRAINED			NO SOIL OVA OR PH Readings 0-2'
	2		PALE BROWN (10YR 6/3) MOIST			
SS	3	7.8		14"	5	OVA 20/19/10 = 2 NO ODOR
	4		WET BELOW 6"			
HP						
	5		(ALLUVIUM)			
HP EXPOSED	6			SB63W06		
	7		W/ SMALL SHELL FRAGMENTS			
HSA	8					
SS	9	8.3		24"	10	5/5/4 = 1 NO ODOR
	10					
HP	11					
HP EXPOSED	12			SB63W12		
	13					
HSA	14					
SS	15	8.0	15.0' (568.6)	20"	13	100/75/75 = 25 SLIGHT ODOR
	16		SILTY SAND (SM/SP-SM) FINE GRAINED			
HP	17		GREY (10YR 5/1) WET			
HP EXPOSED	18		(ALLUVIUM)	SB63W18		
	19					
HSA						

HOLE NO. SB - 63

Barr Engineering Company

DRILLING LOG

SHEET 2 OF 2 SHEETS

PROJECT NAME/NO. WCP 13/49-003 JSL 276	SIZE AND TYPE OF BIT 4 1/2 HSA
LOCATION (Coordinates or Station)	DATUM FOR ELEV. SHOWN MSL
DRILLING AGENCY BOART LONGYEAR	MANUFACTURERS DESIGNATION OF DRILL B-57
HOLE NO. SB - 63	TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN ____ Disturbed ____ Undisturbed
NAME OF DRILLER MIKE MUELLER	TOTAL NO. CORE BOXES
DIRECTION OF HOLE ☒ Vertical ☐ Inclined ____ Deg. from Vert.	ELEV. GROUNDWATER
THICKNESS OF OVERBURDEN NA	DATE HOLE: 9/12/97 Started 9/12/97 Completed
DEPTH DRILLED INTO ROCK NA	ELEV. TOP OF HOLE 583.6
TOTAL DEPTH OF HOLE 31.5'	SIGNATURE OF INSPECTOR [signature]

SAMPLE	DEPTH	SOIL PH	CLASSIFICATION OF MATERIALS (Description)	RECOVERY	N	REMARKS
SS	21	8.0	SAME AS ABOVE SEE PAGE 1 FOR CLASSIFICATION	22"	13	OVA 7 5/50/60 = 25 ODOR
	22					
HP						
	23					
HP EXPOSED	24			5863U24		
	25					
HSA						
	26					
SS	27	8.2		17"	13	OVA 130/30/25 = 100 STRONG ODOR
	28					
HP						
	29					
HP EXPOSED	30			5863U30		
	31		TOP OF TILL @ 31.5± BASED ON TOOL ACTION			
HSA						
	32		END OF BORING 31.5 (552.1')			
	33					
	34					
	35					
	36					
	37					
	38					
	39					

HOLE NO. SB-64

Barr Engineering Company

DRILLING LOG

SHEET 1 OF 2 SHEETS

PROJECT NAME/NO. WCP 13/49-003 JSL 276	SIZE AND TYPE OF BIT 4½ HSA
LOCATION (Coordinates or Station) SEE FIGURE	DATUM FOR ELEV. SHOWN MSL
DRILLING AGENCY BOART LONGYEAR	MANUFACTURERS DESIGNATION OF DRILL MOBILE B-57 ATV
HOLE NO. SB-64	TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN ____ Disturbed ____ Undisturbed
NAME OF DRILLER MIKE MUELLER	TOTAL NO. CORE BOXES
DIRECTION OF HOLE ☒ Vertical ☐ Inclined ____ Deg. from Vert.	ELEV. GROUNDWATER 583.9'
THICKNESS OF OVERBURDEN NA	DATE HOLE: 9/11/97 Started 9/12/97 Completed
DEPTH DRILLED INTO ROCK NA	ELEV. TOP OF HOLE 585.9
TOTAL DEPTH OF HOLE 32.7'	SIGNATURE OF INSPECTOR [signature]

SAMPLE	DEPTH	SOIL pH	CLASSIFICATION OF MATERIALS (Description)	RECOVERY	N	REMARKS
HSA	1	8.1	POORLY GRADED SAND (SP) FINE GRAINED PALE BROWN (10YR6/3) MOIST			OVA 0/0/0 = 0 NO ODOR
SS	2–3	8.2	WET BELOW 2'	12"	7	OVA 2/3/2 = 1 NO ODOR
HP	4–5					
HP EXPOSED	5–7		(ALLUVIUM)	SBGHW06		
HSA	7–8					
SS	8–9	8.2		22"	11	OVA 0/0/0 = 0 NO ODOR
HP	9–11					
HP EXPOSED	11–13			SBGHW12		
HSA	13–14					
SS	14–15	8.2		22"	12	OVA 9/5/6 = 4 NO ODOR
HP	15–17					
HP EXPOSED	17–18		18.0 (567.9')	SBGHW18		
HSA	18–19		SEE DESCRIPTION ON PAGE 2			

HOLE NO. SB - 64

Barr Engineering Company

DRILLING LOG

SHEET 2 OF 2 SHEETS

PROJECT NAME/NO. WCP 13149-003 JSL 276	SIZE AND TYPE OF BIT 4 1/2 HSA
LOCATION (Coordinates or Station)	DATUM FOR ELEV. SHOWN MSL
DRILLING AGENCY BARRT LONGYEAR	MANUFACTURERS DESIGNATION OF DRILL B-57
HOLE NO. SB - 64	TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN ____ Disturbed ____ Undisturbed
NAME OF DRILLER MIKE MUELLER	TOTAL NO. CORE BOXES
DIRECTION OF HOLE ☒ Vertical ☐ Inclined _____ Deg. from Vert.	ELEV. GROUNDWATER
THICKNESS OF OVERBURDEN NA	DATE HOLE: 9/11/97 Started 9/12/97 Completed
DEPTH DRILLED INTO ROCK NA	ELEV. TOP OF HOLE 585.9'
TOTAL DEPTH OF HOLE 32.7'	SIGNATURE OF INSPECTOR [illegible]

SAMPLE	DEPTH	SOIL PH	CLASSIFICATION OF MATERIALS (Description)	RECOVERY	N	REMARKS
SS	21	8.4	POORLY GRADED SAND W/ SILT (SP-SM/SP) FINE GRAINED	23"	9	OVA 45/15/25 = 30 NO ODOR
	22					
HP			GREYISH-BROWN (10YR 5/2)			
	23					
HP EXPOSED	24		WET	SB64W 24		
	25		W/ SMALL SHELL FRAGMENTS			
HSA						
	26					
SS	27	8.1	(ALLUVIUM)	24"	11	OVA 100/100/80 = 0 SLIGHT ODOR
	28					
HP						
	29					
HP EXPOSED	30			SB64W 30		
	31					
HSA	32		TILL @ 32.7' ± BASED ON TOOL ACTION			
	33		32.7' END OF BORING (553.2')			
	34					
	35					
	36					
	37					
	38					
	39					

Grain Size Distribution

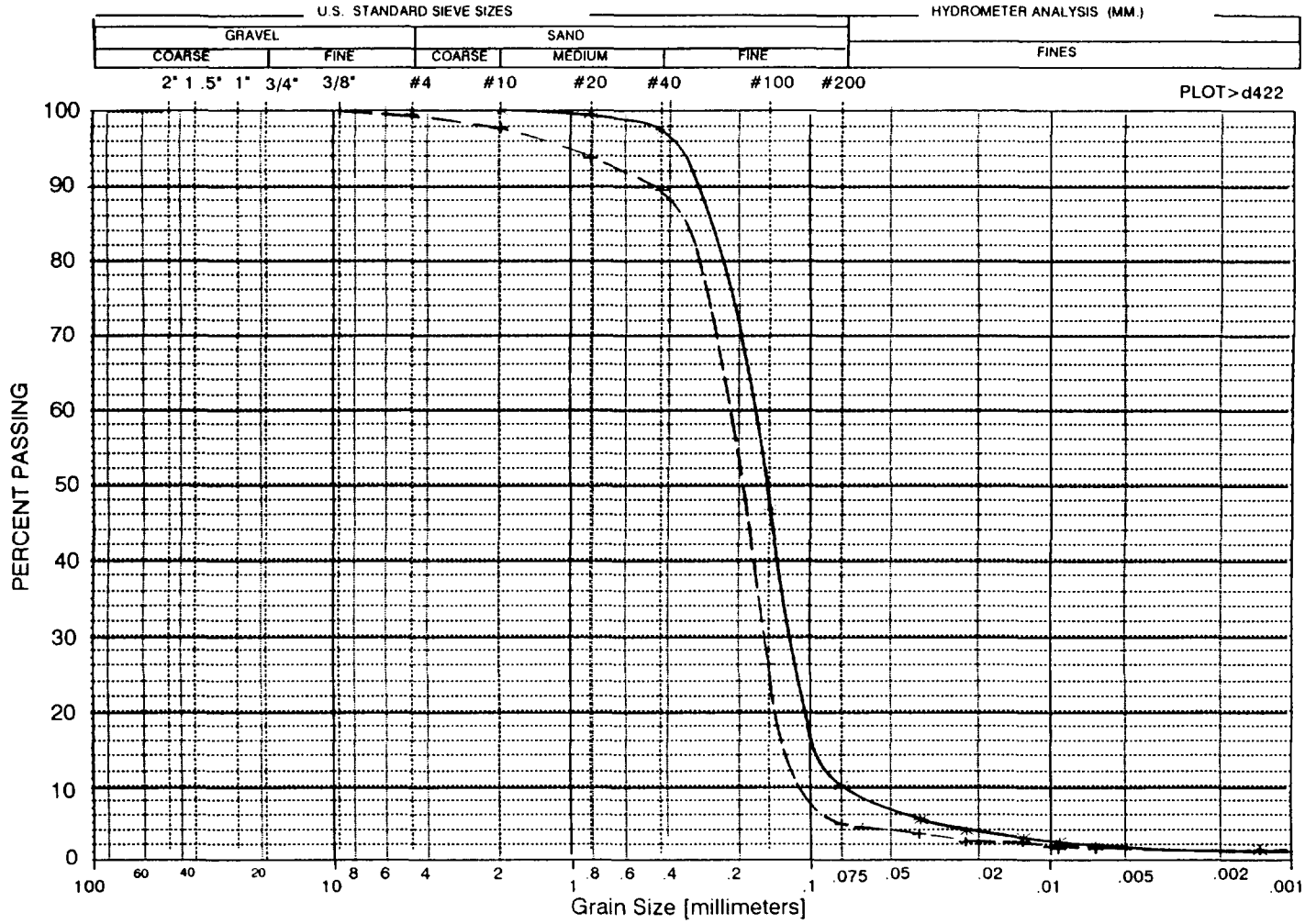
Job No. : 3100

PROJECT: NSG-WCP - # 13/49-003 JSL 276

REPORTED TO: BARR ENGINEERING COMPANY

Date: 09-18-97

	Boring Number	Sample Number	Depth (feet)	Type of Sample	Soil Classification
x		SB-63	26-28	JAR	SAND W/SILT, FINE GRAINED (SP-SM)
+		SB-64	14-16	JAR	SAND, FINE GRAINED (SP/SP-SM)
▯					



OTHER TESTS

	x	+	▯
Liquid Limit (%)			
Plastic Limit (%)			
Plasticity Index			
Water Content (%)			
Dry Density [pcf]			
Specific Gravity (*)	2.66*	2.66*	
Porosity			
Organic Content (%)			
pH			
Shrinkage Limit [SL]			
Penetrometer [tsf]			
Qu [psf]			

* Assumed Value

PERCENT PASSING

	x	+	▯
Mass [gm]	423	502	
2"			
1-1/2"			
1"			
3/4"			
3/8"		100.0	
#4	100.0	99.4	
#10	100.0	97.8	
#20	99.6	93.6	
#40	97.5	89.5	
#100	46.6	26.1	
#200	10.0	4.6	

ASTM: D422 Sieve Set

	x	+	▯
D_{60}			
D_{30}			
D_{10}			
C_u			
C_c			

Remarks:

PS'111 01:23 PM 18-Sep-97 ARS

9301 Bryant Avenue South Suite 107

SOIL ENGINEERING TESTING, INC.

Bloomington, Minnesota 55420-3436

Grain Size Distribution

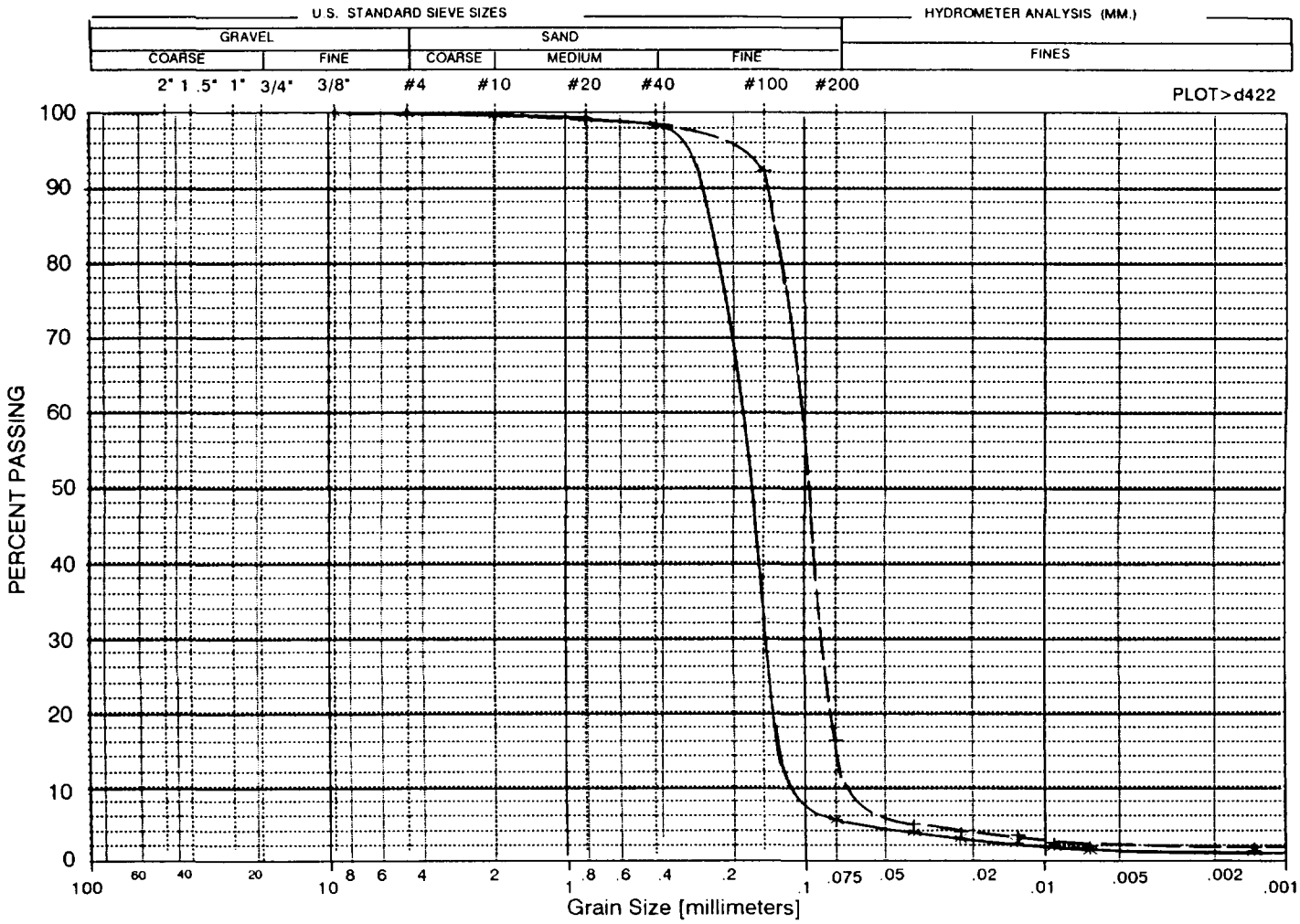
Job No. : 3100

PROJECT: NSG-WCP - # 13/49-003 JSL 276

REPORTED TO: BARR ENGINEERING COMPANY

Date: 09-18-97

	Boring Number	Sample Number	Depth (feet)	Type of Sample	Soil Classification
x		SB-64	20-22	JAR	SAND W/SILT, FINE GRAINED (SP-SM)
+		SB-64	26-28	JAR	SILTY SAND, FINE GRAINED (SM)
[]					



OTHER TESTS

	x	+	[]
Liquid Limit (%)			
Plastic Limit (%)			
Plasticity Index			
Water Content (%)			
Dry Density [pcf]			
Specific Gravity (*)	2.66*	2.66*	
Porosity			
Organic Content (%)			
pH			
Shrinkage Limit [SL]			
Penetrometer [tsf]			
Qu [psf]			

* Assumed Value

PERCENT PASSING

	x	+	[]
Mass [gm]	382	428	
2"			
1-1/2"			
1"			
3/4"			
3/8"	100.0	100.0	
#4	99.9	99.9	
#10	99.7	99.5	
#20	99.3	98.9	
#40	98.2	98.3	
#100	32.4	92.2	
#200	5.5	16.2	

ASTM: D422 Sieve Set

	x	+	[]
D_{60}			
D_{30}			
D_{10}			
C_u			
C_c			

Remarks:

PS'111 01:35 PM 18-Sep-97 ARS

9301 Bryant Avenue South Suite 107

SOIL ENGINEERING TESTING, INC.

Bloomington, Minnesota 55420-3436

TABLE 1

QC DATA SUMMARY
BLANK SAMPLES

(concentrations in ug/L, unless noted otherwise)

	FIELD BLANK	TRIP BLANKS			LAB BLANKS			
	07/18/1996	07/16/1996	07/17/1996	07/19/1996	07/16/1996	07/16/1996	07/16/1996	07/17/1996
Benzene	1 0 U	1 0 U	1.0 U	1.0 U	1 0 U	1 0 U	1 0 U	1.0 U
Ethyl benzene	1 0 U	1 0 U	1.0 U	1 0 U	1 0 U	1.0 U	1.0 U	1.0 U
Toluene	1 0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylene m & p	2 0 U	2 0 U	2.0 U	2.0 U	2 0 U	2.0 U	2 0 U	2 0 U
Xylene o-	1 0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1 0 U
Phenol	1 J	--	--	--	10 U	--	--	10 U
2-Chlorophenol	10 U	--	--	--	10 U	--	--	10 U
o-Cresol	10 U	--	--	--	10 U	--	--	10 U
p-Cresol	10 U	--	--	--	10 U	--	--	10 U
2 [illegible] methylphenol	10 U	--	--	--	10 U	--	--	10 U
[illegible]phenol	10 U	--	--	--	10 U	--	--	10 U
Benzoic Acid	50 U	--	--	--	50 U	--	--	50 U
2 4-Dichlorophenol	10 U	--	--	--	10 U	--	--	10 U
4-Chloro-3-methylphenol	10 U	--	--	--	10 U	--	--	10 U
2 4 6-Trichlorophenol	10 U	--	--	--	10 U	--	--	10 U
2 4 5-Trichlorophenol	10 U	--	--	--	10 U	--	--	10 U
2 4-Dinitrophenol	50 U	--	--	--	50 U	--	--	50 U
4-Nitrophenol	50 U	--	--	--	50 U	--	--	50 U
2-Methyl-4 6-dinitrophenol	50 U	--	--	--	50 U	--	--	50 U
Pentachlorophenol	10 U	--	--	--	10 U	--	--	10 U
Alkalinity total mg/L	--	--	--	--	0 1 U	--	--	0 1 U
Specific Gravity @4oC g/cc	--	--	--	--	--	--	--	--
Chloride mg/L	--	--	--	--	1 0 U	--	--	1 0 U
Cyanide Total	5 0 U	--	--	--	5.0 U	5.0 U	--	5.0 U
Sulfate mg/L	--	--	--	--	2.0 U	2.0 U	--	2.0 U
Sulfide total, mg/L	--	--	--	--	0.1 U	--	--	0.1 U
T [illegible] yanate mg/L	--	--	--	--	100 U	--	--	100 U
[illegible]gen ammonia as N, mg/L	0 2 U	--	--	--	0.2 U	0 2 U	--	0.2 U
Nitrogen Nitrate mg/L	--	--	--	--	0.05 U	--	--	0.05 U
Nitrogen Nitrite, mg/L	--	--	--	--	0.05 U	--	--	0.05 U
Phosphorus total, mg/L	--	--	--	--	0.05 U	--	--	0.05 U
Nitrogen total kjeldahl, mg/L	--	--	--	--	0.1 U	--	--	0.1 U
Biochemical Oxygen Demand (5-day), mg/L	--	--	--	--	2 U	--	--	2 U
Chemical Oxygen Demand mg/L	--	--	--	--	20.0 U	--	--	20 U
Carbon dissolved mg/L	--	--	--	--	1.0 U	1 0 U	--	1.0 U
Phenol 4AAP mg/L	0 01 U	--	--	--	0.01 U	--	--	0.01 U
Carbon total organic, mg/L	--	--	--	--	1.0 U	1 0 U	--	1.0 U
Carbon dissolved organic mg/L	--	--	--	--	1 0 U	1 0 U	--	1 0 U
Arsenic	5 0 U	--	--	--	100 U	5 0 U	--	100 U
Iron	--	--	--	--	100 U	--	--	100 U
Arsenic dissolved	5 0 U	--	--	--	100 U	5.0 U	--	100 U
Iron dissolved	--	--	--	--	100 U	--	--	100 U

-- Not analyzed
J Associated value is an estimate
U Not detected

TABLE 1 (cont.)

QC DATA SUMMARY
BLANK SAMPLES

(concentrations in ug/L, unless noted otherwise)

	LAB BLANKS					
	07/17/1996	07/17/1996	07/17/1996	07/18/1996	07/18/1996	07/19/1996
Benzene	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U
Ethyl benzene	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U
Toluene	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U
Xylene m & p	2.0 U	2.0 U	2.0 U	2.0 U	--	2.0 U
Xylene o-	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U
Phenol	--	--	--	8 J	--	8 J
2-Chlorophenol	--	--	--	10 U	--	10 U
o-Cresol	--	--	--	10 U	--	10 U
p-Cresol	--	--	--	2 J	--	2 J
2 [illegible]methylphenol	--	--	--	10 U	--	10 U
[illegible]phenol	--	--	--	10 U	--	10 U
Benzoic Acid	--	--	--	50 U	--	50 U
2 4-Dichlorophenol	--	--	--	10 U	--	10 U
4-Chloro-3-methylphenol	--	--	--	10 U	--	10 U
2 4 6-Trichlorophenol	--	--	--	10 U	--	10 U
2 4 5-Trichlorophenol	--	--	--	10 U	--	10 U
2 4-Dinitrophenol	--	--	--	50 U	--	50 U
4-Nitrophenol	--	--	--	50 U	--	50 U
2-Methyl-4 6-dinitrophenol	--	--	--	50 U	--	50 U
Pentachlorophenol	--	--	--	10 U	--	10 U
Alkalinity total mg/L	0 1 U	--	--	0 1 U	--	0.1 U
Specific Gravity @4oC g/cc	--	--	--	--	--	--
Chloride mg/L	--	--	--	1 0 U	--	1.0 U
Cyanide Total	--	--	--	5 0 U	--	5.0 U
Sulfate mg/L	--	--	--	2 0 U	--	2.0 U
Sulfide total mg/L	--	--	--	0 1 U	--	0.1 U
T [illegible]yanate mg/L	--	--	--	100 U	--	100 U
[illegible]en ammonia as N mg/L	--	--	--	0 2 U	0.2 U	0.2 U
Nitrogen Nitrate mg/L	--	--	--	0 05 U	--	0.05 U
Nitrogen Nitrite mg/L	--	--	--	0 05 U	--	0.05 U
Phosphorus total mg/L	0 05 U	--	--	0 05 U	--	0.05 U
Nitrogen total kjeldahl mg/L	0 1 U	--	--	0 1 U	--	0.1 U
Biochemical Oxygen Demand (5-day) mg/L	--	--	--	2 U	--	2 U
Chemical Oxygen Demand mg/L	--	--	--	20 U	--	20.0 U
Carbon dissolved mg/L	1 0 U	--	--	1 0 U	1.0 U	1.0 U
Phenol 4AAP mg/L	0 01 U	--	--	0 01 U	0 01 U	0.01 U
Carbon total organic mg/L	1 0 U	--	--	1.0 U	1 0 U	1.0 U
Carbon dissolved organic mg/L	1 0 U	--	--	1 0 U	1 0 U	1.0 U
Arsenic	5 0 U	--	--	100 U	5.0 U	5.0 U
Iron	--	--	--	100 U	--	100 U
Arsenic dissolved	5.0 U	--	--	100 U	5.0 U	5.0 U
Iron dissolved	--	--	--	100 U	--	100 U

-- Not analyzed
J Associated value is an estimate
U Not detected

TABLE 1 (cont.)

QC DATA SUMMARY
BLANK SAMPLES

(concentrations in ug/L, unless noted otherwise)

	FIELD BLANKS		LAB BLANKS		
	07/19/1996	08/21/1996	07/19/1996	07/19/1996	08/21/1996
Specific Gravity @4oC, g/cc	1.0002	--	--	--	--
Cyanide, WAD	5.0 U	--	5.0 U	--	--
Nitrogen, ammonia as N, mg/L	0.035 U	--	0.2 U	--	0.035 U
Phenol 4AAP, mg/L	0.03	0.01 U	0.01 U	--	0.01 U
Phenol 4AAP, low level, mg/L	--	0.001 U	--	--	--
Arsenic, total	2.0 U	--	5.0 U	--	--
Benzene	1.0 U	--	1.0 U	1.0 U	--
Phenol	--	6 U	--	--	6 U
'orophenol	--	6 U	--	--	6 U
esol	--	6 U	--	--	6 U
p-Cresol	--	6 U	--	--	6 U
2,4-Dimethylphenol	--	6 U	--	--	6 U
2-Nitrophenol	--	6 U	--	--	6 U
Benzoic Acid	--	29 U	--	--	29 U
2,4-Dichlorophenol	--	6 U	--	--	6 U
4-Chloro-3-methylphenol	--	6 U	--	--	6 U
2,4,6-Trichlorophenol	--	6 U	--	--	6 U
2,4,5-Trichlorophenol	--	6 U	--	--	6 U
2,4-Dinitrophenol	--	29 U	--	--	29 U
4-Nitrophenol	--	29 U	--	--	29 U
2-Methyl-4,6-dinitrophenol	--	29 U	--	--	29 U
Pentachlorophenol	--	6 U	--	--	6 U

-- Not analyzed
J Associated value is an estimate
Not detected

TABLE 1 (cont.)

QC DATA SUMMARY
DUPLICATE SAMPLES

(concentrations in ug/L, unless noted otherwise)

	MW8D		RPD	MW13D		RPD
	07/18/1996 Sample	07/18/1996 Duplicate		07/18/1996 Sample	07/18/1996 Duplicate	
Benzene	11000	9900	11	1300	--	
Ethyl benzene	500 U	500 U		50 U	--	
Toluene	840	770	8.7	58	--	
Xylene m & p	1000 U	1000 U		100 U	--	
Xylene o-	500 U	500 U		50 U	--	
Phenol	110000	--		480000	430000	11
2-Chlorophenol	15000 U	--		30000 U	30000 U	0
o-Cresol	28000	--		81000	87000	7.1
p-Cresol	85000	--		230000	220000	4.4
2,4-Dimethylphenol	6600 J	--		18000 J	17000 J	5.7
2-Nitrophenol	15000 U	--		30000 U	30000 U	
Benzoic Acid	44000 J	--		150000 U	150000 U	
2 4-Dichlorophenol	15000 U	--		30000 U	30000 U	
4-Chloro-3-methylphenol	15000 U	--		30000 U	30000 U	
2,4,6-Trichlorophenol	15000 U	--		30000 U	30000 U	
2,4 5-Trichlorophenol	15000 U	--		30000 U	30000 U	
2,4-Dinitrophenol	75000 U	--		150000 U	150000 U	
4-Nitrophenol	75000 U	--		150000 U	150000 U	
2-Methyl-4,6-dinitrophenol	75000 U	--		150000 U	150000 U	
Pentachlorophenol	15000 U	--		30000 U	30000 U	
Alkalinity, total, mg/L	5520	--		2730	--	
Specific Gravity @4oC, g/cc	1.0059	--		1.0050	--	
Chloride, mg/L	940	--		3760	--	
Cyanide, total	1350	--		577	--	
Sulfate, mg/L	399	--		594	--	
Sulfide total, mg/L	1 1	--		12.8	--	
Thiocyanate	140000	--		665000	--	
Nitrogen, ammonia as N, mg/L	1260	--		854	--	
Nitrogen Nitrate, mg/L	0 05 U	--		0.05 U	--	
Nitrogen Nitrite, mg/L	0.07	--		0.05	--	
Phosphorus total, mg/L	6.15	--		6.60	--	
Nitrogen total kjeldahl, mg/L	1570	--		1950	--	
Biochemical Oxygen Demand (5-day), mg/L	900	--		3100	--	
Chemical Oxygen Demand, mg/L	1780	--		5190	--	
Carbon, dissolved, mg/L	694	--		1250	--	
Phenol 4AAP, mg/L	284	--		859	857	0 23
Carbon, total organic, mg/L	631	--		1290	--	
Carbon, dissolved organic, mg/L	573	--		1290	--	
Arsenic	9600	--		29000	29000	0
Iron	1270	--		922	--	
Arsenic, dissolved	8620	--		29500	29200	1 0
Iron, dissolved	--	--		764	--	

-- Not analyzed

J Associated value is an estimate

U Not detected

TABLE 1 (cont.)

QC DATA SUMMARY
DUPLICATE SAMPLES

(concentrations in ug/L, unless noted otherwise)

	L1	L1	RPD
	08/21/1996	08/21/1996	
	Sample	Duplicate	
Phenol 4AAP, mg/L	0.01 U	0.01 U	
Phenol 4AAP, low level, mg/L	0.001 U	0.001 U	
Phenol	6 U	6 U	
2-Chlorophenol	6 U	6 U	
o-Cresol	6 U	6 U	
p-Cresol	6 U	6 U	
2,4-Dimethylphenol	6 U	6 U	
2-Nitrophenol	6 U	6 U	
Benzoic Acid	29 U	29 U	
2,4-Dichlorophenol	6 U	6 U	
4-Chloro-3-methylphenol	6 U	6 U	
2,4,6-Trichlorophenol	6 U	6 U	
2,4,5-Trichlorophenol	6 U	6 U	
2,4-Dinitrophenol	29 U	29 U	
4-Nitrophenol	29 U	29 U	
2-Methyl-4,6-dinitrophenol	29 U	29 U	
Pentachlorophenol	6 U	6 U	

U Not detected

TABLE 1 (cont.)

QC DATA SUMMARY
DUPLICATE SAMPLES

(concentrations in ug/L, unless noted otherwise)

	FIELD BLANKS		TRIP BLANKS				
	09/12/1997	09/14/1997	09/11/1997	09/11/1997	09/12/1997	09/13/1997	09/14/1997
Benzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethyl benzene	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--
Toluene	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--
Xylene m & p	--	--	--	--	--	--	--
Xylene o-	--	--	--	--	--	--	--
Phenol	43	2.0 U	--	--	--	--	--
2-Chlorophenol	10 U	--	--	--	--	--	--
o-Cresol	3 J	2.0 U	--	--	--	--	--
p-Cresol	9 J	2.0 U	--	--	--	--	--
2,4-Dimethylphenol	10 U	2.0 U	--	--	--	--	--
2-Nitrophenol	10 U	--	--	--	--	--	--
Benzoic Acid	50 U	--	--	--	--	--	--
2,4-Dichlorophenol	10 U	--	--	--	--	--	--
4-Chloro-3-methylphenol	10 U	--	--	--	--	--	--
2,4,6-Trichlorophenol	10 U	--	--	--	--	--	--
2,4,5-Trichlorophenol	50 U	--	--	--	--	--	--
2,4-Dinitrophenol	50 U	--	--	--	--	--	--
4-Nitrophenol	50 U	--	--	--	--	--	--
2-Methyl-4,6-dinitrophenol	50 U	--	--	--	--	--	--
Pentachlorophenol	50 U	--	--	--	--	--	--
Alkalinity, total, mg/L	--	--	--	--	--	--	--
Specific Gravity @60oF, g/cc	--	--	--	--	--	--	--
Chloride, mg/L	--	1.0 U	--	--	--	--	--
Cyanide, total	--	--	--	--	--	--	--
Sulfate, mg/L	--	2.0 U	--	--	--	--	--
Sulfide total, mg/L	--	--	--	--	--	--	--
Thiocyanate	--	--	--	--	--	--	--
Nitrogen, ammonia as N, mg/L	0.2 U	0.2 U	--	--	--	--	--
Nitrogen Nitrate, mg/L	--	--	--	--	--	--	--
Nitrogen Nitrite, mg/L	--	--	--	--	--	--	--
Phosphorus total, mg/L	--	--	--	--	--	--	--
Nitrogen total kjeldahl, mg/L	--	--	--	--	--	--	--
Biochemical Oxygen Demand (5-day), mg/L	--	--	--	--	--	--	--
Chemical Oxygen Demand, mg/L	--	--	--	--	--	--	--
Carbon, dissolved, mg/L	--	--	--	--	--	--	--
Phenol 4AAP, mg/L	--	0.01 U	--	--	--	--	--
Carbon, total organic, mg/L	--	--	--	--	--	--	--
Carbon, dissolved organic, mg/L	--	--	--	--	--	--	--
Temperature, degrees C	--	--	--	--	--	--	--
Specific Conductance umhos/cm @ 25oC	--	--	--	--	--	--	--
Redox (oxidation potential), mV	--	--	--	--	--	--	--
pH, standard units	--	--	--	--	--	--	--
Dissolved oxygen, mg/L	--	--	--	--	--	--	--
Iron, Ferrous, mg/L	--	--	--	--	--	--	--
Arsenic	5.0 U	--	--	--	--	--	--
Iron	--	--	--	--	--	--	--
Arsenic, dissolved	5.0 U	--	--	--	--	--	--
Iron, dissolved	--	--	--	--	--	--	--

-- Not analyzed
J Associated value is an estimate
U Not detected

TABLE 1 (cont.)

QC DATA SUMMARY
DUPLICATE SAMPLES

(concentrations in ug/L, unless noted otherwise)

	LAB BLANKS							
	09/09/1997	09/09/1997	09/10/1997	09/10/1997	09/11/1997	09/12/1997	09/12/1997	09/13/1997
Benzene	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethyl benzene	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylene m & p	--	--	--	--	--	--	--	--
Xylene o-	--	--	--	--	--	--	--	--
Phenol	10 U	10 U	10 U	10 U	10 U	6 J	24	24
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
o-Cresol	10 U	10 U	10 U	10 U	10 U	10 U	2 J	2 J
p-Cresol	10 U	10 U	10 U	10 U	10 U	10 U	5	5
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2,4-Dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
4-Nitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
2-Methyl-4,6-dinitrophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Pentachlorophenol	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Alkalinity, total, mg/L	--	--	--	--	--	--	--	--
Specific Gravity @60oF, g/cc	--	--	--	--	--	--	--	--
Chloride, mg/L	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U
Cyanide, total	--	--	--	--	--	--	--	--
Sulfate, mg/L	2.0 U	--	2.0 U	--	2.0 U	2.0 U	--	2.0 U
Sulfide total, mg/L	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	0.1 U
Thiocyanate	100 U	--	100 U	--	100.0 U	100.0 U	--	100.0 U
Nitrogen, ammonia as N, mg/L	0.2 U	--	0.2 U	--	0.2 U	0.2 U	--	0.2 U
Nitrogen Nitrate, mg/L	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	0.05 U
Nitrogen Nitrite, mg/L	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	0.05 U
hosphorus total, mg/L	0.02 U	--	0.02 U	--	0.02 U	0.02 U	--	0.02 U
Nitrogen total kjeldahl, mg/L	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	0.1 U
Biochemical Oxygen Demand (5-day), mg/L	2 U	--	2.0 U	--	2 U	2 U	--	2.0 U
Chemical Oxygen Demand, mg/L	20 U	--	20 U	--	20 U	20 U	--	20 U
Carbon, dissolved, mg/L	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U
Phenol 4AAP, mg/L	0.01 U	--	0.01 U	--	0.01 U	0.01 U	--	0.01 U
Carbon, total organic, mg/L	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U
Carbon, dissolved organic, mg/L	1.0 U	--	1.0 U	--	1.0 U	1.0 U	--	1.0 U
Temperature, degrees C	--	--	--	--	--	--	--	--
Specific Conductance umhos/cm @ 25oC	--	--	--	--	--	--	--	--
Redox (oxidation potential), mV	--	--	--	--	--	--	--	--
pH, standard units	--	--	--	--	--	--	--	--
Dissolved oxygen, mg/L	--	--	--	--	--	--	--	--
Iron, Ferrous, mg/L	--	--	--	--	--	--	--	--
Arsenic	5.0 U	--	5.0 U	--	5.0 U	5.0 U	--	5.0 U
Iron	--	--	--	--	--	--	--	--
Arsenic, dissolved	5.0 U	--	5.0 U	--	5.0 U	5.0 U	--	5.0 U
Iron, dissolved	100 U	--	100 U	--	100 U	100 U	--	100 U

-- Not analyzed.

J Associated value is an estimate.

U Not detected

TABLE 1 (cont.)

QC DATA SUMMARY
DUPLICATE SAMPLES

(concentrations in ug/L, unless noted otherwise)

	LAB BLANKS	
	09/13/1997	09/14/1997
Benzene	1.0 U	1.0 U
Ethyl benzene	1.0 U	--
Toluene	1.0 U	--
Xylene m & p	--	--
Xylene o-	--	--
Phenol	100	2.0 U
2-Chlorophenol	10 U	--
o-Cresol	8 J	2.0 U
p-Cresol	23	2.0 U
2,4-Dimethylphenol	1 J	2.0 U
2-Nitrophenol	10 U	--
Benzoic Acid	50 U	--
2,4-Dichlorophenol	10 U	--
4-Chloro-3-methylphenol	10 U	--
2,4,6-Trichlorophenol	10 U	--
2,4,5-Trichlorophenol	50 U	--
2,4-Dinitrophenol	50 U	--
4-Nitrophenol	50 U	--
2-Methyl-4,6-dinitrophenol	50 U	--
Pentachlorophenol	50 U	--
Alkalinity, total, mg/L	--	--
Specific Gravity @60oF, g/cc	--	--
Chloride, mg/L	--	1.0 U
Cyanide, total	--	--
Sulfate, mg/L	--	2.0 U
Sulfide total, mg/L	--	--
Thiocyanate	--	--
Nitrogen, ammonia as N, mg/L	--	0.02 U
Nitrogen Nitrate, mg/L	--	--
Nitrogen Nitrite, mg/L	--	--
Phosphorus total, mg/L	--	--
Nitrogen total kjeldahl, mg/L	--	--
Biochemical Oxygen Demand (5-day), mg/L	--	--
Chemical Oxygen Demand, mg/L	--	--
Carbon, dissolved, mg/L	--	--
Phenol 4AAP, mg/L	--	0.01 U
Carbon, total organic, mg/L	--	--
Carbon, dissolved organic, mg/L	--	--
Temperature, degrees C	--	--
Specific Conductance umhos/cm @ 25oC	--	--
Redox (oxidation potential), mV	--	--
pH, standard units	--	--
Dissolved oxygen, mg/L	--	--
Iron, Ferrous, mg/L	--	--
Arsenic	--	--
Iron	--	--
Arsenic, dissolved	--	--
Iron, dissolved	--	--

-- Not analyzed.

J Associated value is an estimate

U Not detected.

TABLE 1 (cont.)

QC DATA SUMMARY
BLANK SAMPLES

(concentrations in ug/L, unless noted otherwise)

	SB6218		RPD	SB6230		RPD
	09/13/1997 Sample	09/13/1997 Duplicate		09/13/1997 Sample	09/13/1997 Duplicate	
Benzene	13	--		750	720	4.1
Ethyl benzene	1.0 U	--		25 U	50 U	
Toluene	1.0 U	--		25 U	50 U	
Xylene m & p	--	--		--	--	
Xylene o-	--	--		--	--	
Phenol	17	35	69	430000	--	
2-Chlorophenol	10 U	10 U		70000 U	--	
o-Cresol	2 J	3 J	40	43000 J	--	
p-Cresol	7 J	10	35	170000	--	
2,4-Dimethylphenol	10 U	10 U		10000 J	--	
2-Nitrophenol	10 U	10 U		70000 U	--	
Benzoic Acid	13 J	12 J	8	350000 U	--	
2,4-Dichlorophenol	10 U	10 U		70000 U	--	
4-Chloro-3-methylphenol	10 U	10 U		70000 U	--	
2,4,6-Trichlorophenol	10 U	10 U		70000 U	--	
2,4,5-Trichlorophenol	50 U	50 U		350000 U	--	
2,4-Dinitrophenol	50 U	50 U		350000 U	--	
4-Nitrophenol	50 U	50 U		350000 U	--	
2-Methyl-4,6-dinitrophenol	50 U	50 U		350000 U	--	
Pentachlorophenol	50 U	50 U		350000 U	--	
Alkalinity, total, mg/L	287	--		2840	--	
Specific Gravity @60oF, g/cc	--	--		--	--	
Chloride, mg/L	74.1	--		3950	--	
Cyanide, total	--	--		--	--	
Sulfate, mg/L	2.0 U	--		630	--	
Sulfide total, mg/L	0.1 U	--		11.1	--	
Thiocyanate	1000.0 U	--		679000	--	
Nitrogen, ammonia as N, mg/L	6.9	7.3	5.6	903	996	9.8
Nitrogen Nitrate, mg/L	0.05 U	0.39	176	0.05 U	--	
Nitrogen Nitrite, mg/L	0.05 U	--		0.05 U	--	
Phosphorus total, mg/L	0.35	0.39	11	4.85	--	
Nitrogen total kjeldahl, mg/L	8.3	8.5	2.4	1480	--	
Biochemical Oxygen Demand (5-day), mg/L	20 U	--		3600	--	
Chemical Oxygen Demand, mg/L	40	20 U	120	5980	--	
Carbon, dissolved, mg/L	44.0	--		1600	--	
Phenol 4AAP, mg/L	0.01 U	0.02	120	1150	--	
Carbon, total organic, mg/L	4.1	3.0	31	1710	--	
Carbon, dissolved organic, mg/L	3.5	--		1630	--	
Temperature, degrees C	--	--		--	--	
Specific Conductance umhos/cm @ 25oC	--	--		--	--	
Redox (oxidation potential), mV	--	--		--	--	
pH, standard units	--	--		--	--	
Dissolved oxygen, mg/L	--	--		--	--	
Iron, Ferrous, mg/L	--	--		--	--	
Arsenic	1120	1140	1.8	62700	--	
Iron	--	--		--	--	
Arsenic, dissolved	1070	991	7.7	53600	--	
Iron, dissolved	898	888	1.1	1230	--	

-- Not analyzed.

J Associated value is an estimate.

U Not detected