Laboratory Chain of Custody Forms

O'BRIEN & GERE ENGINEERS, INC.

CHAIN OF CUSTODY RECORD

LABORATORIES, INC.

..RVEY: Jarl/ALCAN site #828005	SAMPLED BY: Paul Gottler
..CATION: East Rochester, N.Y.	ORGANIZATION: O'B G.

..ION ..BER	SAMPLE LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	COMP. OR GRAB	NO. OF CONTAINERS	ANALYSIS REQUIRED
3-1	East Impoundment (6-8 ft.) S	10/17		Sand	G	2	TCLP for
-1	" (8-8.5 ft) South	10/17		Sludge	G	2	TCL Metals
1	" (8-8.5 ft) South	10/17		Sludge	G	2	TCL volatiles
3-1	" (12-14 ft) South			Soil	G	2	Chrome +6
1	Rinseate Blank			water	G	1	Phenol, Boron
-2	East Imp. (9-9.5 ft) Center			Soil	G	2	Sulfate, Chloride
-3	" (3.5-4 ft) North			Soil	G	2	Cyanide & Fluoride
3	" (6-8 ft) North			Sludge	G	2	TCLP for
-3	" (10-12 ft) North			Soil	G	2	chromium
	West Impoundment (8.7-9.2 ft) North			Soil	G	2	mercury & lead
-5	West Impoundment Center			Soil	G	2	
-	Composite of All		NA	Soil	C	1	ALL TCL (Semivol, Org+Metal)

	DATE	TIME		DATE	TIME
..quished By: Paul F. Gottler	10/17		Received By:		
..ed By:			Received By:		
..ed By:			Received by Laboratory: Wendy Smith	10/18/90	09:00

..MMENTS:

..can: Jarl Samples

.. — 3057.032

..HOD OF SHIPMENT:

Left in cooler 10/17/90

90

OBG LABORATORIES, INC.

CHAIN OF CUSTODY RECORD

3057.002.517

AlCAN, E. Rochester				SAMPLERS: (Signature) Paul F [illegible]					
STATION LOCATION	DATE	TIME	SAMPLE TYPE: Water Comp.	Grab	Soil	SEQ. NO.	NO. OF CONTAINERS	ANALYSIS REQUIRED
E Side Property	10/3/90	1510			X	1	2	
N of B3		1515			✓	2	2	
NW of B3		1525			✓	3	2	TCL Volatiles
N of B4		1540			✓	4	4	TCL Metals
S of S-4		1545			✓	5	2	hexavalent chromium
E of B-5		1600			✓	6	2	boron
NE of B-5		1615			✓	7	2	phenols
NE of S-7		1620			✓	8	2	fluoride
Berm N of B-1		1645			✓	9	2	cyanide
S of B-1		1655			✓	10	2	sulfate
Rinseate		1600		✓		11	1	chloride

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Paul F [illegible]		
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time
Dispatched by: (Signature) — Date/Time	Received for Laboratory by: [illegible] Barnes	10/4/90 10:00

Method of Shipment:

OBG Laboratories, Inc., an O'Brien & Gere Limited Company
5000 Brittonfield Parkway / Suite 300 / PO Box 4942 / Syracuse, NY 13221 / (315) 437-0200

CHAIN OF CUSTODY RECORD

ORATORIES, INC.

:: JPRI/ALCAN Site #828005	SAMPLED BY: R. Foresti
ION: East Rochester, N.Y.	ORGANIZATION: O'BG

SAMPLE LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	COMP. OR GRAB	NO. OF CONTAINERS	ANALYSIS REQUIRED
Composite Soil Sample	10/1[illegible]		Soil	Comp	1	TCL Volatile organics
of all borings						
IB-C						

	DATE	TIME		DATE	TIME
d By: R.J. Foresti	10/18		Received By:		
	DATE	TIME	Received By:	DATE	TIME
	DATE	TIME	Received by Laboratory: Wendy Smith	10/18/90	09:00

ENTS: Sample is the "volatile sample" for the composite sample which was selected from the waste sludge sample IB-3 (6-8 ft).

D OF SHIPMENT:

Laboratories, Inc., an O'Brien & Gere Limited Company
Brittonfield Parkway / Suite 300 / PO Box 4942 / Syracuse, NY 13221 / (315) 437-0200

OBRIEN & GERE ENGINEERS, INC.

Job No. 3057.032.001
Sheet 1 of 1

Office:
Address:
Phone:

CHAIN OF CUSTODY

CLIENT: Alcan site 828005
LOCATION: East Rochester, NY

COLLECTED BY:
(Signature) Paul 7 Gottler

SAMPLE DESCRIPTION	Date	Time	Sample Matrix[1]	Sample Type[2]	No. of Containers	ANALYSIS REQUESTED
B-7	11/26	1700	water	Grab	1	TCL Metals (unfiltered)
B-7	|	|	|	|	1	TCL Metals (Filtered)

[1] Matrix = water, wastewater, air, sludge, sediment, etc.
[2] Type = grab, composite

Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by: Paul 7 Gottler of: Division 76	11/26	1920	Received by: of:		
Relinquished by: of:			Received by: of:		
Relinquished by: of:			Received by: of:		
Use this space if shipped via courier (e.g., Fed Ex) Relinquished by: of:			Courier Name: *Attach delivery/courier receipt to Chain of Custody		
Relinquished by: of:			Received by: of:		

CHAIN OF CUSTODY RECORD

OBG LABORATORIES, INC.

SURVEY: [illegible] 828005 | SAMPLED BY: [illegible]

LOCATION: E Rochester, NY | ORGANIZATION: [illegible] 76, OBG

STATION NUMBER	SAMPLE LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	COMP. OR GRAB	NO. OF CONTAINERS	ANALYSIS REQUIRED
1	B-5D	11/14/90	1000	water	grab	6	TCL Metals Filtered unfiltered
2	B-7S	11/14/90	1100	↓	↓	1	TCL volatiles
3	B-8S	11/14/90	1200	↓	↓	7	Boron
							phenols
	250 ml			NaOH			chlorides
							sulfates
							hex. chromium
							cyanide
							Fluoride
							per CLP

Relinquished By:	DATE	TIME	Received By:	DATE	TIME
Paul F Gattle	11/14	1700			
Relinquished By:	DATE	TIME	Received By:	DATE	TIME
Relinquished By:	DATE	TIME	Received by Laboratory:	DATE	TIME

COMMENTS:

METHOD OF SHIPMENT:

OBG Laboratories, Inc., an O'Brien & Gere Limited Company
5000 Brittonfield Parkway / Suite 300 / PO Box 4942 / Syracuse, NY 13221 / (315) 437-0200

CHAIN OF CUSTODY RECORD

OBG
LABORATORIES, INC.

SURVEY: Alcan site 828005

LOCATION: E. Rochester, N.Y.

SAMPLED BY: C O'Dell & P. Gotter

ORGANIZATION: Div 76 OBG

STATION NUMBER	SAMPLE LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	COMP. OR GRAB	NO. OF CONTAINERS	ANALYSIS REQUIRED
1 ~~B-7~~	B-7	11/15	1700	W	G	3	TCL volatiles sulfates Hex chrom, chlorides
2	B-25	|	1800	|	|	6	TCL Metals
3	B-6	|	1030	|	|	21	Filtered/unfiltered
4	B-15	|	1430	|	|	7	TCL volatiles
5	B-35	|	1600	|	|	4	Boron, sulfates
							chlorides, Hex. chrm
	(2) 40 ml vol						Phenols, cyanide
	(1) 1000 ml unpres.						fluoride
							per CLP
							Also MS + MSD
							from B-6

Relinquished By:	DATE	TIME	Received By:	DATE	TIME
Paul F. Gotter	11/15	1820			
Relinquished By:	DATE	TIME	Received By:	DATE	TIME
Relinquished By:	DATE	TIME	Received by Laboratory:	DATE	TIME

COMMENTS:

Please adjust pH for 40 ml vials from B-15 as it had no preservatives

METHOD OF SHIPMENT:

Taken directly to cooler in lab

CHAIN OF CUSTODY RECORD

OBG LABORATORIES, INC.

SURVEY: Alcan site 828005

LOCATION: East Rochester, N.Y.

SAMPLED BY: P. Gottler - C. O'Dell

ORGANIZATION: Div. 76

STATION NUMBER	SAMPLE LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	COMP. OR GRAB	NO. OF CONTAINERS	ANALYSIS REQUIRED
B-2D	S E side of site	11/13	1100	W	G	6	All TCL Metals
B-3D	N E side of site	|	1350	|	|	6	unFiltered only
B-4D	N central side of site	|	1515	|	|	6	All TCL Volatiles
							Boron ~~Semivolatiles~~
							phenols
							chlorides
							sulfates
							Hex. Chromium
							Cyanide
							Fluoride
							per clP.

Relinquished By:	DATE	TIME	Received By:	DATE	TIME
Paul F Gottler	11/13	1800			
Relinquished By:	DATE	TIME	Received By:	DATE	TIME
Relinquished By:	DATE	TIME	Received by Laboratory:	DATE	TIME

COMMENTS:

METHOD OF SHIPMENT:

LABORATORIES, INC.

CHAIN OF CUSTODY RECORD

SURVEY	SAMPLERS: (Signature)
Alcan site 828005	

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE Water Comp.	Grab.	Air	SEQ. NO.	NO. OF CONTAINERS	ANALYSIS REQUIRED
1	B-3S	11/19	1100		X			1	chlorides, sulfates, hex chrom.
2	B-7S		1115		X			1	Phenol
									per NYS CLP

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Paul F. Gottler		
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time

Dispatched by: (Signature)	Date/Time	Received for Laboratory by:	Date/Time
		Ann Barnes	11/19/90 1350

Method of Shipment:

OBG Laboratories, Inc.
Box 4942 / 1304 Buckley Road / Syracuse, New York 13221 / (315) 457-1494

LABORATORIES, INC.

CHAIN OF CUSTODY RECORD

SURVEY: Alcan site 82800 S

SAMPLERS: (Signature) Paul F [signature]

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE Water Comp.	Grab.	Air	SEQ. NO.	NO. OF CONTAINERS	ANALYSIS REQUIRED
1	B - 35	11/16	1315		X		1	2	Cyanide
~~2~~		~~+~~							~~Boron~~ phenol PCBs
									Per
									NYS CLP

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Paul F [signature]		
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by Mobile Laboratory for field analysis: (Signature)	Date/Time

Dispatched by: (Signature)	Date/Time	Received for Laboratory by:	Date/Time
		[signature] Barnes	11/19/90 0800

Method of Shipment: Hand delivery

OBG Laboratories, Inc.
Box 4942 / 1304 Buckley Road / Syracuse New York 13221 / (315) 457-1494

general testing corporation

g.t.c.

[illegible]

Date: [illegible]

water and wastewater testing specialists

710 Exchange Street
Rochester, NY 14608
(716) 454-3760

85 Trinity Place
Hackensack, NJ 07601
(201) 488-5242

BOTTLE AND LABEL SET REQUIREMENTS

#1=Ice

Shipping Date: ______ Number of Samples: 13

Send To: ______ Send Via: ______

Analysis	Bottle Type	Number of Bottles	Preservative
SO4, Fl, Cl, Extra	~~4 oz.~~ Quart Plastic	1	Ice
Cr+6	8 oz. Plastic	1	Ice #2-13
NO3+NO2, NH3/TKN	16 oz. Plastic	1	H2SO4
NO2	~~Quart~~ 4oz Plastic	1	Ice
SO4 Fl Cl Extra	½ Gallon Plastic	1	Ice
Cr+6	16 oz Plastic	1	Ice #1=Ice
NO3+NO2, NH3/TKN	~~[illegible]~~ Quart Plastic	1	H2SO4
NO2	4 oz Plastic		Ice
	Liter Amber Glass		
	Pint Glass (Soil Jars)		
	200 ml. Sterile Plastic		

Client: B & G Job # ______ Sample 1-13

Location: T C S [illegible]

Date: ______ Time: ______

Analyses: See Above Preservative: See Above

GENERAL TESTING CORPORATION

General Testing Corporation

LABORATORY REQUEST
Client & Job Information — Form I, Page 1 of 4

Job#:
Date of Order: / /
Cl. Rep:

CLIENT

Client: O'Brien + Gere Eng Requested by: Mr. Robert Forasti
Street: 5000 Brittonfield Pkwy City: Syracuse State: NY Zip: 13221
Reports to: Same Copies to:
Phone # (315) 432-6100 ext. ____ FAX # (315) 463-7554

PROJECT INFO.

Project Reference: Jarl Extrusions
Estimated Start Date: 2/27/91 Est. Finish Date: 2/28/91 Phases: 1
Est. Sample Arrival Dates: 2/27-28 Est. Lot Sizes:
Work Plan Available: Yes☐ No ☑ Comments: Can't go to OBG Labs because they missed past TAT commitment
Nature of Samples & Safety Concerns:

Client Consultant:
TAT (Date Due): Verbal Report: 3/27 Rush Written: / / Final Report: 3/28/91 (FiAm)

ANALYTICAL

Summary of Analytical Requirements (see Form III for details)

Type	Matrix	#	Analyses Required
A	Water	13	SO4, Cr+6, Fl, Cl, NO3, NH3, TKN, NO3+NO2, NO2
B			
C			
D			

A: groundwaters B:
C: D:

Refer to Form II (reverse side) when specifying analytical protocol, field services & sample processing needs.

INVOICE

Invoice To: Same Contact:
Address (if different):
Quotation #: 71-0218 PMS Date: 2/25/91 P.O.#:
Cost Estimate Analytical $ 140 each (see Form III for details) Reportables $
Field $ ____ Shipping $ ____ TAT $ ____ Total $ 2150

Client Confirmation — (Please verify the above information and sign below.)

Comments:
Client Signature: ____ Date: / /

710 Exchange Street
Rochester, NY 14608
(716) 454-3760
FAX (716) 454-1245

85 Trinity Place
Hackensack, NJ 07601
(201) 488-5242
FAX 201-489-6383

435 Lawrence Bell Drive
Amherst, NY 14221-7077
(716) 634-0454
FAX 716-634-8318

General Testing Corporation

LABORATORY REQUEST
Client & Job Information — Form I, Page 1 of 4

Job#:
Date of Order:
Cl. Rep:

CLIENT

Client: O'Brien & Gere Eng. Requested by: Mr. Robert Forest
Street: 5000 Britain Field Pkwy City: Syracuse State: NY Zip: 13221
Reports to: Same Copies to:
Phone # (315) 437-6100 ext. ______ FAX # (315) 433-2554

PROJECT INFO.

Project Reference: Jarl Extrusions
Estimated Start Date: 2/27/91 Est. Finish Date: 2/28/91 Phases: 1
Est. Sample Arrival Dates: 2/27-28 Est. Lot Sizes:
Work Plan Available: Yes☐ No ☑ Comments: Can't go to OBG Labs because They Missed last TAT commitment
Nature of Samples & Safety Concerns:

Client Consultant:
TAT (Date Due): Verbal Report: 3/13/__ Rush Written: __/__/__ Final Report: 3/28/91 (Firm)

ANALYTICAL

Summary of Analytical Requirements (see Form III for details)

Type	Matrix	#	Analyses Required
A	Water	13	TCL VOA by 8240 + LS, Tot and Sol Cr, Cd, Pb, Fe, Hg, Ni, Zn, Na
B	Water	2	TCL VOA by 8240 + LS
C			
D			

A: Groundwater B: Trip blank
C: D:

Refer to Form II (reverse side) when specifying analytical protocol, field services & sample processing needs.

INVOICE

Invoice To: Same Contact:
Address (if different):
Quotation #: 91-0318 AMS Date: 2/25/91 P.O.#:
Cost Estimate Analytical $ 757 each (see Form III for details) Reportables $
Field $ ______ Shipping $ ______ TAT $ ______ Total $ 11280

Client Confirmation — (Please verify the above information and sign below.)

Comments:
Client Signature: Date: __/__/__

general testing corporation

gtc

Date: ____________

water and wastewater testing specialists

710 Exchange Street
Rochester, NY 14608
(716) 454-3760

85 Trinity Place
Hackensack, NJ 07601
(201) 488-5242

BOTTLE AND LABEL SET REQUIREMENTS ~~# 14,15 = F B~~

Shipping Date: ____________ Number of Samples: ~~[illegible]~~ 1 (# 1 = QC (see page 2))

Send To: ____________ Send Via: ____________

Analysis	Bottle Type	Number of Bottles	Preservative
Total - CR+6	~~8~~ 16 oz. Plastic	1	ice #1
Soluble - CL, FL, SO4	~~8 oz.~~ 1/2 Gallon Plastic	1	ice - Field Filter
Total - CL, FL, SO4	~~16 oz.~~ 1/2 Gallon Plastic	1	ice
Total Metals	1/2 Gallon Plastic	1	HNO3 #
Soluble Metals	1/2 Gallon Plastic	1	HNO3 Field Filter #
87-CLP VOA + LS	40 ml. Glass Vial w/Septum	3	ice #
Soluble - CR+6	~~4 oz. Glass~~ 16 oz. Plastic	1	ice - Field Filter #
metal - Prefilt Bottle	~~500 ml. Amber Glass~~ 1/2 Gallon plastic	2	ice #
CL, FL, SO4 (Anion) - Prefilt Bottle	~~Liter Amber Glass~~ 1/2 Gallon Plastic	1	ice #
	Pint Glass (Soil Jars)		
	200 ml. Sterile Plastic		

Client: OB&G Job #: ____________ Sample: ~~[illegible]~~ 1

Location: Jarl Extrusions

Date: ____________ Time: ____________

Analyses: See Above Preservative: See Above

GENERAL TESTING CORPORATION

TCL / CLP 87 / CLP87 / None / QC#1

TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT

nytest environmental inc

CHAIN OF CUSTODY RECORD

SHIP TO: Nytest Environmental Inc.
60 Seaview Blvd.
Port Washington, NY 11050
(516) 625-5500
Attn. Joe Dockery

REPORT TO: Client Name O'Brien & Gere Engineers, I
Address 5000 Brittonfield Pkwy
Syracuse, N.Y. 13221
Phone (315) 437-6100
Attn. Guy Swenson / Paul Gottler

Project No.	Project Name	Date Shipped	Carrier
3057.032	Jacl / Alcan site 828005	6-3-92	Airborne Express
Sampler: (Signature)	**Analytical Protocol**	**Air Bill No.**	**Cooler No.**
Paul F Gottler	NYS ASP B	4882188I3	1

Sample I.D.	Date Sampled	Time Sampled	Sample Description	No. Of Containers	ANALYSIS REQUESTED
East Pumphouse	6/3/92	1020	water	2	Cr^{+6}, Cr, Cd, Fe, Hg, Pb, Mg, Zn, Ni, Cl, SO_4, F
East Pumphouse	6/3/92	1020	water MS/MSD	4	
west Pumphouse	6/3/92	1100	water	2	
Equipment Blank	6/3/92	1130	water	2	
B-9	6/3/92	1330	water	2	
Cistern	6/3/92	1400	water	2	
cistern	6/3/92	1400	Filtered water	2	
B-13	6/3/92	1500	water	2	
B-13	6/3/92	1500	Filtered water	2	
Blind dup.	6/3/92	[redacted]	water	2	
Blind dup	6/3/92	—	Filtered water	2	
Trip Blank	6/3/92	-	water	1	TCL Volatiles

Relinquished by (Signature)	Date / Time	Rec'd. By (Signature)	Date / Time
Paul F Gottler	6/3/92 / 1925		
Print Name: Paul F. Gottler		Print Name	
Relinquished by (Signature)	Date / Time	Rec'd. by (Signature)	Date / Time
Print Name		Print Name	
Relinquished by (Signature)	Date / Time	Received for Laboratory by (Signature) Patrick Alvarez	6/4/92 / 1030
Print Name		Print Name PATRICK ALVAREZ	

Special Instructions/Comments

0000007

TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT

NEI nytest environmental inc

CHAIN OF CUSTODY RECORD

SHIP TO: Nytest Environmental Inc.
60 Seaview Blvd.
Port Washington, NY 11050
(516) 625-5500
Attn. Joe Dockery

REPORT TO: Client Name OBRIEN & Gere ENG. INC
Address 5000 Brittonfield PKWY,
EAST SYRACUSE, N.Y. 13221
Phone (315) 437-6100
Attn. Guy Swenson / PAUL Gottler

Project No.	Project Name	Date Shipped	Carrier
3057.032	JARL/ALCAN site	6-3-92	Airborne Express
Sampler: (Signature) Paul F Gottler	Analytical Protocol NYS ASP B	Air Bill No. 488218813	Cooler No. 2

Sample I.D.	Date Sampled	Time Sampled	Sample Description	No. Of Containers	ANALYSIS REQUESTED
Cistern	6/3/92	1400	Soil	1	Cr^{+6}, Cr, Cd, Fe, Hg, Pb, Na, Zn, Cl, SO_4, F
Cistern	6/3/92	1400	Soil	1	↓
Blind duplicate	6/3/92	-	Soil	1	↓

Relinquished by (Signature)	Date / Time	Rec'd. By (Signature)	Date / Time
Paul F Gottler / Print Name: Paul F. Gottler	6/3/92 1925	Print Name	
Relinquished by (Signature) / Print Name	Date / Time	Rec'd. by (Signature) / Print Name	Date / Time
Relinquished by (Signature) / Print Name	Date / Time	Received for Laboratory by (Signature): Patrick Alvarez / Print Name: PATRICK ALVAREZ	6/4/92 10:30

Special Instructions/Comments

0000008

O'BRIEN & GERE ENGINEERS, INC.

Job No. 305 ?.??

Sheet 1 of 2

Office: SYRACUSE, NY

Address: 5000 BRITTONFIELD PKWY

Phone: (315)-437-6100

CHAIN OF CUSTODY

CLIENT: JARL/ALCAN SITE

LOCATION: PITTSFORD, NY

COLLECTED BY: (Signature) [signature] JAMES A. MOORE

SAMPLE DESCRIPTION	Date	Time	Sample Matrix[1]	Sample Type[2]	No. of Containers	ANALYSIS REQUESTED
B-12D	8/10/92	1110	WATER	GRAB	2	TCL VOLATILES
B-~~[illegible]~~ 10 JAM	8/10/92	1220	WATER	GRAB	2	TCL VOLATILES
B-9	8/10/92	~~[illegible]~~ JAM	WATER	GRAB	2	TCL VOLATILES
EQUIPMENT BLANK	8/10/92	1515	WATER	GRAB	2	TCL VOLATILES
B-1D	8/10/92	1555	WATER	GRAB	2	TCL VOLATILES
BLIND DUPLICATE	8/10/92	—	WATER	GRAB	2	TCL VOLATILES
WEST-PUMPHOUSE	8/10/92	1615	WATER	GRAB	2	TCL VOLATILES
EAST-PUMPHOUSE	8/10/92	1645	WATER	GRAB	2	TCL VOLATILES
EAST-PUMPHOUSE (MS&MSD)	8/10/92	1645	WATER	GRAB	4	TCL VOLATILES
CISTERN	8/10/92	1715	WATER	GRAB	2	TCL VOLATILES
CISTERN	8/10/92	1730	SOIL	GRAB	2	TCL VOLATILES
CISTERN (MS&MSD)	8/10/92	1730	SOIL	GRAB	2	TCL VOLATILES (NOTE 1 GRAB)
BLIND DUPLICATE	8/10/92	—	SOIL	GRAB	2	TCL VOLATILES
TRIP BLANK (LAB)	—	—	WATER	GRAB	2	TCL VOLATILES
JAM B-13	8/10/92	1310	WATER	GRAB	2	TCL VOLATILES

[1] Matrix = water, wastewater, air, sludge, sediment, etc.

[2] Type = grab, composite

	Date	Time		Date	Time
Relinquished by: [signature] of: O'BRIEN & GERE ENGINEERS INC.	8/10/92	1900	Received by: of:		
Relinquished by: of:			Received by: of:		
Relinquished by: of:			Received by: of:		
Use this space if shipped via courier (e.g., Fed Ex) Relinquished by: of: FEDERAL EXPRESS	8/10/92	1900	Courier Name: *Attach delivery/courier receipt to Chain of Custody		
Relinquished by: of:			Received by: of:		

O'BRIEN & GERE ENGINEERS, INC.

Job No. 3057.032
Sheet 2 of 2

Office: SYRACUSE, NY
Address: 5000 BRITTONFIELD PKWY
Phone: (315)-437-6100

CHAIN OF CUSTODY

CLIENT: JARL/ALCAN SITE
LOCATION: PITTSFORD, NY

COLLECTED BY: (Signature) JAMES A. MOORE

SAMPLE DESCRIPTION	Date	Time	Sample Matrix[1]	Sample Type[2]	No. of Containers	ANALYSIS REQUESTED
B-13	8/10/92	1310	WATER	GRAB	2	Cr^{+6}, Cr, Cd, Fe, Hg, Pb, Al, Ni, CL, SO_4, F, Zn
B-13	8/10/92	1310	FILTERED WATER	GRAB	2	
B-9	8/10/92	1445	WATER	GRAB	2	
EQUIPMENT BLANK	8/10/92	1515	WATER	GRAB	2	
WEST - PUMP HOUSE	8/10/92	1615	WATER	GRAB	2	
EAST-PUMPHOUSE	8/10/92	1645	WATER	GRAB	2	
EAST-PUMPHOUSE (MS & MSD)	8/10/92	1645	WATER	GRAB	4	
CISTERN	8/10/92	1715	WATER	GRAB	2	
CISTERN	8/10/92	1730	SOIL	GRAB	1	
CISTERN (MS & MSD)	8/10/92	1730	SOIL	GRAB	2	
BLIND DUP	8/10/92	—	SOIL	GRAB	1	
BLIND DUP	8/10/92	—	WATER	GRAB	2	

1 Matrix = water, wastewater, air, sludge, sediment, etc.
2 Type = grab, composite

Relinquished by:	Date	Time	Received by:	Date	Time
[signature] of: O'BRIEN & GERE ENGINEERS INC	8/10/92		of:		
Relinquished by: of:	Date	Time	Received by: of:	Date	Time
Relinquished by: of:	Date	Time	Received by: of:	Date	Time
Use this space if shipped via courier (e.g., Fed Ex) Relinquished by: of: FEDERAL EXPRESS	Date: 8/10/92	Time:	Courier Name: *Attach delivery/courier receipt to Chain of Custody	Date:	Time:
Relinquished by:	Date	Time	Received by:	Date	Time

Appendix H

Ground Water Sampling Field Logs

O'BRIEN & GERE
ENGINEERS, INC.

GROUND WATER SAMPLING FIELD LOG

Sample Location S W portion of site Well No. B-15

Sampled By [illegible] & P. [illegible] Date [illegible] Time 1430

Weather Sunny, clear, warm Sampled with Bailer X Pump X

A. WATER TABLE:

Well depth:
(below top of casing) 12.47 ft.

Well elevation:
(top of casing) ______ ft.

Depth to water table:
(below top of casing) 22.29 ft.

Water table elevation: ______ ft.

Length of water column (LWC) 10.18 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 7.1 gallons X 3 = 22

4" diameter wells = 0.653 X (LWC) = ______ gallons

6" diameter wells = 1.469 X (LWC) = ______ gallons

B. PHYSICAL APPEARANCE AT START:

Color light brown Odor none detected Turbidity [illegible]

Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 40 gallons.

Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color light brown - clear Odor none detected Turbidity [illegible]

Was an oil film or layer apparent? no

E. CONDUCTIVITY 600 uS -

F. pH 7.5

G. TEMPERATURE 14 °C

H. WELL SAMPLING NOTES:

Sampled with [illegible] pump

NTU's measured @ >100 [illegible] filtered

sample [illegible] [illegible] to [illegible]

GROUND WATER SAMPLING FIELD LOG

Sample Location S.E. portion of site Well No. B-1D

Sampled By C. O'Dell & P. Gruhler Date 11/12/90 Time 1515

Weather Snowing Sampled with Bailer _____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 70.03 ft. Well elevation: (top of casing) _______ ft.

Depth to water table: (below top of casing) 57.39 ft. Water table elevation: _______ ft.

Length of water column (LWC) 12.61 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 2.00 gallons X 3 = 6.0

4" diameter wells = 0.653 X (LWC) = _______ gallons

6" diameter wells = 1.469 X (LWC) = _______ gallons

B. PHYSICAL APPEARANCE AT START:

Color V. low turbidity Odor none detected Turbidity V. low

Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 7.0 gallons.

Did well go dry? no

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color lt grey Odor none detected Turbidity v. low

Was an oil film or layer apparent? (measured [illegible]

E. CONDUCTIVITY ~~1450~~ 1150-

F. pH ~~7.5~~ 7.2

G. TEMPERATURE 11° C

H. WELL SAMPLING NOTES:

water remained only v. slightly turbid during bladder pumpage

GROUND WATER SAMPLING FIELD LOG

Sample Location SE portion of site Well No. B-25
Sampled By P. Gottler & C. O'Dell Date 11/15 Time 1300
Weather Sunny & cool Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 17.98 ft.
Well elevation: (top of casing) ________ ft.

Depth to water table: (below top of casing) 8.29 ft.
Water table elevation: ________ ft.

Length of water column (LWC) 9.69 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.5 gallons X3 = 4.5
4" diameter wells = 0.653 X (LWC) = ________ gallons
6" diameter wells = 1.469 X (LWC) = ________ gallons

B. PHYSICAL APPEARANCE AT START:

Color V. lt brn Odor none detected Turbidity low

Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 4.5 gallons.

Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear Odor none detected Turbidity measured @ 210 16.5 NTU

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 840 uS

F. pH 7.9

G. TEMPERATURE 14 °C

H. WELL SAMPLING NOTES:

A small amount of black organic particles floating in first bottle sampled, phenol jar.

GROUND WATER SAMPLING FIELD LOG

Sample Location S E portion of site Well No. B-2D

Sampled By P Gutler + C O'Dell Date 11/13/90 Time 1100

Weather Snow Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 70.07 ft. Well elevation: (top of casing) ________ ft.

Depth to water table: (below top of casing) 64.42 ft. Water table elevation: ________ ft.

Length of water column (LWC) 5.65 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 0.90 gallons x3 = 2.7

4" diameter wells = 0.653 X (LWC) = ________ gallons

6" diameter wells = 1.469 X (LWC) = ________ gallons

B. PHYSICAL APPEARANCE AT START:

Color slightly gray Odor none detected Turbidity moderate

Was an oil film or layer apparent? none visible

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 4.0 gallons.

Did well go dry? no

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear Odor none detected Turbidity ~ 25

Was an oil film or layer apparent? no

E. CONDUCTIVITY ~~1070~~ 770 -

F. pH ~~7.7~~ 7.6

G. TEMPERATURE 9 °C

H. WELL SAMPLING NOTES:

Pumped water cleared after ~ 1 gal removed. remained constant ~ 25 NTU's for last 3 gallons

GROUND WATER SAMPLING FIELD LOG

Sample Location N E section of site Well No. B-35

Sampled By C. O'Dell & P. Gartler Date 11/15/90 Time 1600

Weather Sunny + Cool Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) 20.30 ft.

Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 17.95 ft.

Water table elevation: ____ ft.

Length of water column (LWC) 2.35 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 0.38 gallons X 3 = 1.1

4" diameter wells = 0.653 X (LWC) = ____ gallons

6" diameter wells = 1.469 X (LWC) = ____ gallons

B. PHYSICAL APPEARANCE AT START:

Color Lt Brown Odor none detected Turbidity moderately [illegible]

Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 1.2 gallons.

Did well go dry? yes

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Dark brown Odor none detected Turbidity [illegible]

Was an oil film or layer apparent? no

E. CONDUCTIVITY 940 mS

F. pH 7.7

G. TEMPERATURE 14 °C

H. WELL SAMPLING NOTES:

Sampled with bailer after unsuccessfull attempt with bladder pump on 11/14/90

GROUND WATER SAMPLING FIELD LOG

Sample Location NE section of site Well No. B-3D

Sampled By P Gottler / C. O'Dell Date 11/13/90 Time 1350

Weather clear + cold + windy Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 83.71 ft.

Well elevation: (top of casing) ________ ft.

Depth to water table: (below top of casing) 68.29 ft.

Water table elevation: ________ ft.

Length of water column (LWC) 15.42 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 2.5 gallons x 3 = 7.5

4" diameter wells = 0.653 X (LWC) = ________ gallons

6" diameter wells = 1.469 X (LWC) = ________ gallons

B. PHYSICAL APPEARANCE AT START:

Color slightly cloudy Odor none detected Turbidity low

Was an oil film or layer apparent? No

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 80 gallons gallons.

Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear Odor none detected Turbidity measured at 7 and 5

Was an oil film or layer apparent? No

E. CONDUCTIVITY 1030

F. pH 7.7

G. TEMPERATURE 11 °C

H. WELL SAMPLING NOTES:

No filtered sample retrieved as turbidity was measured @ 7.0 and 5.0 for two separate tubes immediately after calibration

GROUND WATER SAMPLING FIELD LOG

Sample Location N side to Center Well No. B-41D

Sampled By P Gutler : C. O'Dell Date 11/13/90 Time 1515

Weather Clear : Cold Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 89.93 ft.

Well elevation: (top of casing) ________ ft.

Depth to water table: (below top of casing) 83.53 ft.

Water table elevation: ________ ft.

Length of water column (LWC) 6.40 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.02 gallons X 3 = 3.1g

4" diameter wells = 0.653 X (LWC) = ________ gallons

6" diameter wells = 1.469 X (LWC) = ________ gallons

B. PHYSICAL APPEARANCE AT START:

Color Slightly brown Odor none detected Turbidity Low-Moderate

Was an oil film or layer apparent? No

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 50 gallons.

Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color ________ Odor none detected Turbidity [illegible] measured [illegible]

Was an oil film or layer apparent? ________

E. CONDUCTIVITY 880

F. pH 7.5

G. TEMPERATURE 11°C

H. WELL SAMPLING NOTES:

GROUND WATER SAMPLING FIELD LOG

Sample Location N.W. section of site Well No. B-5D

Sampled By [illegible] Date 11/19/90 Time 1000

Weather Sunny & cool Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth:
(below top of casing) 90.02 ft.

Well elevation:
(top of casing) ________ ft.

Depth to water table:
(below top of casing) 82.61 ft.

Water table elevation: ________ ft.

Length of water column (LWC) 7.41 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.2 gallons X3 = 3.6
4" diameter wells = 0.653 X (LWC) = ________ gallons
6" diameter wells = 1.469 X (LWC) = ________ gallons

B. PHYSICAL APPEARANCE AT START:

Color clear Odor none Turbidity [illegible]

Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 4.0 gallons.

Did well go dry? no

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear Odor none Turbidity [illegible]

Was an oil film or layer apparent? no

E. CONDUCTIVITY 1530

F. pH 7.0

G. TEMPERATURE 11 °C

H. WELL SAMPLING NOTES:

GROUND WATER SAMPLING FIELD LOG

Sample Location side Center of site Well No. B-6

Sampled By C. O'Dell + Paul Gettker Date 11/15 Time 1030

Weather Sunny + Cold Sampled with Bailer ____ Pump x

A. WATER TABLE:

Well depth: (below top of casing) 20.75 ft.

Well elevation: (top of casing) ________ ft.

Depth to water table: (below top of casing) 14.44 ft.

Water table elevation: ________ ft.

Length of water column (LWC) 6.31 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.01 gallons x3 = 3.0

4" diameter wells = 0.653 X (LWC) = ________ gallons

6" diameter wells = 1.469 X (LWC) = ________ gallons

B. PHYSICAL APPEARANCE AT START:

Color lt. Brown t Odor none detected Turbidity > 100 NTUs

Was an oil film or layer apparent? No

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 3.5 gallons.

Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Dark brown Odor none detected Turbidity > 100 NTUs

Was an oil film or layer apparent? No

E. CONDUCTIVITY >1900 uS -

F. pH 9.7

G. TEMPERATURE 16° C

H. WELL SAMPLING NOTES:

At end of sampling well was dry.

Filled triplicate sampling as per QAPP.

GROUND WATER SAMPLING FIELD LOG

Sample Location: N center of site Well No.: R-7

Sampled By: [illegible] Date: 11/19/90 Time: 1115

Weather: [illegible] Sampled with Bailer: X Pump: ____

A. WATER TABLE:

Well depth: (below top of casing) 19.52 ft. Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 18.57 ft. Water table elevation: ____ ft.

Length of water column (LWC) 0.95 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 0.15 gallons X3 = 0.45

4" diameter wells = 0.653 X (LWC) = ____ gallons

6" diameter wells = 1.469 X (LWC) = ____ gallons

B. PHYSICAL APPEARANCE AT START:

Color: Brown Odor: none detected Turbidity: [illegible]

Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling: 0.5 gallons.

Did well go dry? yes

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color: Brown Odor: none detected Turbidity: [illegible]

Was an oil film or layer apparent? no

E. CONDUCTIVITY: 1010 uS

F. pH: 9.5

G. TEMPERATURE: 15°C

H. WELL SAMPLING NOTES:

[illegible]

[illegible]

[illegible]

GROUND WATER SAMPLING FIELD LOG

Sample Location W side center of site Well No. B-8
Sampled By C. O'Dell & P. Gottler Date 11/14/90 Time 1200
Weather Sunny + Cool Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) 21.92 ft.
Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 18.57 ft.
Water table elevation: ____ ft.

Length of water column (LWC) 3.35 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 0.5 gallons X 3 = 1.5
4" diameter wells = 0.653 X (LWC) = ____ gallons
6" diameter wells = 1.469 X (LWC) = ____ gallons

B. PHYSICAL APPEARANCE AT START:

Color Brown - tan Odor None detected Turbidity high
Was an oil film or layer apparent? No

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 1.0 gallons.
Did well go dry? Yes

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Brown Odor none detected Turbidity v high
Was an oil film or layer apparent? none

E. CONDUCTIVITY 1080

F. pH 9.1

G. TEMPERATURE 11 °C

H. WELL SAMPLING NOTES:

After Sample was filtered it still had a brown tint to it.

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/JARL Extrusion Well No. B-1S

Sampled By P. Gottler / C. ODell Date [illegible] Time [illegible]

Weather Cold Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 22.99 ft. Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 11.96 ft. Water table elevation: ____ ft.

Length of water column (LWC) 11.03 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.79 gallons X 3 = [illegible]
4" diameter wells = 0.653 X (LWC) = ____ gallons
6" diameter wells = 1.469 X (LWC) = ____ gallons

B. PHYSICAL APPEARANCE AT START:

Color Clear Odor none Turbidity [illegible]

Was an oil film or layer apparent? [illegible]

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling [illegible] gallons.

Did well go dry? [illegible]

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Clear Odor ____ Turbidity [illegible]

Was an oil film or layer apparent? [illegible]

E. CONDUCTIVITY [illegible]

F. pH 7.6

G. TEMPERATURE 7°C

H. WELL SAMPLING NOTES:

Sample Bottle set ~~#3~~ #4 (no filtered samples)

GROUND WATER SAMPLING FIELD LOG

Sample Location AlCan/JARL EXTRUSION Well No. B-1D
Sampled By D.Gottler/C.ODell Date 2-27-91 Time 1400
Weather Cloudy - snow : Cold Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 70.03 ft.
Well elevation: (top of casing) ________ ft.

Depth to water table: (below top of casing) 57.28 ft.
Water table elevation: ________ ft.

Length of water column (LWC) 12.75 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 2.07 gallons X 3 = 6.2
4" diameter wells = 0.653 X (LWC) = ________ gallons
6" diameter wells = 1.469 X (LWC) = ________ gallons

B. PHYSICAL APPEARANCE AT START:

Color Clean Odor none detected Turbidity low
Was an oil film or layer apparent? No

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 6.3 gallons.
Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear Odor None Turbidity measured @ 7
Was an oil film or layer apparent? No

E. CONDUCTIVITY 1500 µS

F. pH 7.6

G. TEMPERATURE 10.0 °C

H. WELL SAMPLING NOTES:

Sample Bottle set #3 (No filtered samples)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/Jarl Extrusion Well No. B-2S

Sampled By P. Gottke/C. O'Dell Date 2-28-91 Time 1430

Weather snowing Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 17.98 ft.

Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 8.26 ft.

Water table elevation: ____ ft.

Length of water column (LWC) 9.72 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.58 gallons x 3 = 4.

4" diameter wells = 0.653 X (LWC) = ____ gallons

6" diameter wells = 1.469 X (LWC) = ____ gallons

B. PHYSICAL APPEARANCE AT START:

Color Dk Brown-Black Odor swamp-like Turbidity V. High

Was an oil film or layer apparent? No

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 4.8 gallons.

Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Clear Odor None Turbidity measured @ 13 + 5 NTU

Was an oil film or layer apparent? No

E. CONDUCTIVITY 790 μS

F. pH 7.9

G. TEMPERATURE 5° C

H. WELL SAMPLING NOTES:

turbidity increased slightly during sampling then decreased again

well dry @ end of sampling

Sample bottle set # 12 (No filtered Samples)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/Jarl Extrusion Well No. B-2D

Sampled By P. Gottler/C. ODell Date 2-28-91 Time 1200

Weather Cloudy + Cold Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 70.07 ft. Well elevation: (top of casing) ________ ft.

Depth to water table: (below top of casing) 63.88 ft. Water table elevation: ________ ft.

Length of water column (LWC) 6.19 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1 gallons X 3 = 3

4" diameter wells = 0.653 X (LWC) = ________ gallons

6" diameter wells = 1.469 X (LWC) = ________ gallons

B. PHYSICAL APPEARANCE AT START:

Color [illegible] Odor [illegible] Turbidity [illegible]

Was an oil film or layer apparent? [illegible]

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 3.1 gallons.

Did well go dry? no

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color lt Brown Odor [illegible] Turbidity [illegible] down to 40

Was an oil film or layer apparent? [illegible]

so no filtered samples taken

E. CONDUCTIVITY ~~1100~~ [illegible]

F. pH ~~7.5~~

G. TEMPERATURE ~~9°C~~

H. WELL SAMPLING NOTES:

Turbidity decreased as pumping continued so no total metal filtered or any other filtered samples taken changed bottles

Sample bottle set # 11 (No filtered samples)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/JARL Extrusion Well No. B-3S
Sampled By P. Gottler/C. ODell Date 2-28-91 Time 1230
Weather Snowy Sampled with Bailer X Pump

A. WATER TABLE:

Well depth: (below top of casing) 21.29 ft.
Well elevation: (top of casing) ______ ft.

Depth to water table: (below top of casing) 12.12 ft.
Water table elevation: ______ ft.

Length of water column (LWC) 9.17 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = ______ gallons x3
4" diameter wells = 0.653 X (LWC) = ______ gallons
6" diameter wells = 1.469 X (LWC) = ______ gallons

B. PHYSICAL APPEARANCE AT START:

Color clear-brown Odor none Turbidity low
Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 3 gallons.
Did well go dry? no

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color lt Brown Odor None Turbidity ~90 NTU
Was an oil film or layer apparent? ______

E. CONDUCTIVITY 1710 μS

F. pH 6.7

G. TEMPERATURE 8°C

H. WELL SAMPLING NOTES:

No susp. solids, just brown/tea colored

Sample bottle set #5 (has filtered samples)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/Jarl Extrusion Well No. B-3D

Sampled By P. Gottler/C. O'Dell Date 2-28-91 Time 1530

Weather Snowing Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 83.71 ft.
Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 77.87 ft.
Water table elevation: ____ ft.

Length of water column (LWC) 5.84 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 0.95 gallons X 3 = 2.8
4" diameter wells = 0.653 X (LWC) = ____ gallons
6" diameter wells = 1.469 X (LWC) = ____ gallons

B. PHYSICAL APPEARANCE AT START:

Color Clear Odor none Turbidity v. low

Was an oil film or layer apparent? No

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 2.9 gallons.

Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Clear Odor none Turbidity measured @ >100

Was an oil film or layer apparent? No

E. CONDUCTIVITY 1470

F. pH 7.6

G. TEMPERATURE 9°C

H. WELL SAMPLING NOTES:

Fine sand in all samples
except filtered samples

Sample bottle set 6 (includes filtereds)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/Jarl Extrusion Well No. B-4S
Sampled By P. Gottler/C. O'Dell Date ?-28-91 Time 11:15
Weather ______ Sampled with Bailer X Pump ______

A. WATER TABLE:

Well depth: (below top of casing) 20.67 ft.
Well elevation: (top of casing) ______ ft.

Depth to water table: (below top of casing) 10.27 ft.
Water table elevation: ______ ft.

Length of water column (LWC) 10.40 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.71 gallons x 3 = 4.?
4" diameter wells = 0.653 X (LWC) = ______ gallons
6" diameter wells = 1.469 X (LWC) = ______ gallons

B. PHYSICAL APPEARANCE AT START:

Color clear Odor none Turbidity [illegible]
Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 2 gallons.
Did well go dry? Yes

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear Odor none Turbidity From ~30-4?
Was an oil film or layer apparent? no

E. CONDUCTIVITY 1980 uS

F. pH 7.8

G. TEMPERATURE 8°C

H. WELL SAMPLING NOTES:

Sample submitted for total metals was v. clear, Turbidity estimated @ < 25 NTU's
Well was dry after initial sampling so no filtered metals, Cr^{+6} or Cl, SO_4 sample taken

Sample bottle set # 9 (No filtered sample)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan / JARL Extrusion Well No. B-4D

Sampled By P. Gottler / C. O'Dell Date 2-28-91 Time 1650

Weather ______ Sampled with Bailer ______ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 89.93 ft. Well elevation: (top of casing) ______ ft.

Depth to water table: (below top of casing) 83.15 ft. Water table elevation: ______ ft.

Length of water column (LWC) 6.78 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.10 gallons X 3 = 3.3

4" diameter wells = 0.653 X (LWC) = ______ gallons

6" diameter wells = 1.469 X (LWC) = ______ gallons

B. PHYSICAL APPEARANCE AT START:

Color clean Odor none Turbidity V low

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 34 gallons.

Did well go dry? ______

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Clear Odor None Turbidity measured @ 4 NTUs

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 1380 uS

F. pH 7.5

G. TEMPERATURE 10° C

H. WELL SAMPLING NOTES:

Sample bottle set #10 (No Filtered Samples)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/Karl Extrusion Well No. B-5D

Sampled By P. Gotten/C. ODell Date 2-28-91 Time 1730

Weather Cold Sampled with Bailer ____ Pump X

A. WATER TABLE:

Well depth: (below top of casing) 90.02 ft.

Well elevation: (top of casing) ______ ft.

Depth to water table: (below top of casing) 82.11 ft.

Water table elevation: ______ ft.

Length of water column (LWC) 7.91 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.28 gallons X 3 = 3.9

4" diameter wells = 0.653 X (LWC) = ______ gallons

6" diameter wells = 1.469 X (LWC) = ______ gallons

B. PHYSICAL APPEARANCE AT START:

Color Clear Odor None Turbidity V low

Was an oil film or layer apparent? No

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 4.0 gallons.

Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Clear Odor None Turbidity measured @ 55 then 90-40

Was an oil film or layer apparent? No

E. CONDUCTIVITY 1620 uS

F. pH 7.6

G. TEMPERATURE 10 °C

H. WELL SAMPLING NOTES:

measured turbidity @ 95 after 3 gallons removed,
sample contained some fine sand
measured turbidity @ 55 after 4 gal
Sample bottle set # 13 (No Filtered Samp)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/Karl Extrusion Well No. B-6

Sampled By C. O'Dell / R. Goffler Date 2-27-[illegible] Time 1630

Weather Bitterly cold Sampled with Bailer ____ Pump x

A. WATER TABLE:

Well depth: (below top of casing) 21.54 ft.

Well elevation: (top of casing) ______ ft.

Depth to water table: (below top of casing) 11.81 ft.

Water table elevation: ______ ft.

Length of water column (LWC) 9.73 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.59 gallons x 3 = 4.8

4" diameter wells = 0.653 X (LWC) = ______ gallons

6" diameter wells = 1.469 X (LWC) = ______ gallons

B. PHYSICAL APPEARANCE AT START:

Color clear - lt brn Odor None Turbidity low

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 50 gallons.

Did well go dry? yes

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Lt Brown Odor None Turbidity >100

Was an oil film or layer apparent? No

E. CONDUCTIVITY 1980 µS

F. pH 9.0

G. TEMPERATURE 7 °C

H. WELL SAMPLING NOTES:

Sample bottle set #1 + QC (contains filtered samples)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/JARL EXTRUSION Well No. B-7

Sampled By C. ODell / P. Gottler Date 2-28-91 Time 0830

Weather Clear & Cold Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) 19.52 ft.

Well elevation: (top of casing) ____ ft.

2/27/91 Depth to water table: (below top of casing) 11.18 ft.

Water table elevation: ____ ft.

Length of water column (LWC) 8.34 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.36 gallons X 3 = 4.1

4" diameter wells = 0.653 X (LWC) = ____ gallons

6" diameter wells = 1.469 X (LWC) = ____ gallons

B. PHYSICAL APPEARANCE AT START:

Color Brown Odor None Turbidity Moderate

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 3.75 gallons.

Did well go dry? Yes

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Brown Odor None Turbidity High

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 710

F. pH [illegible]4

G. TEMPERATURE 10° C

H. WELL SAMPLING NOTES:

Samples filtered for metals by filling tube and forcing through in-line filters a couple of times.

Sample bottle set # 7 (has filtered samples)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan/JARL Extrusion Well No. B-8

Sampled By C. O'Dell/P. Gottler Date ______ Time 1030

Weather ______ Sampled with Bailer x Pump ______

A. WATER TABLE:

Well depth: (below top of casing) 21.94 ft. Well elevation: (top of casing) ______ ft.

Depth to water table: (below top of casing) 11.93 ft. Water table elevation: ______ ft.

Length of water column (LWC) 10.01 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.63 gallons x3=4.9

4" diameter wells = 0.653 X (LWC) = ______ gallons

6" diameter wells = 1.469 X (LWC) = ______ gallons

B. PHYSICAL APPEARANCE AT START:

Color Clear lt brown Odor none Turbidity low

Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 5.0 gallons.

Did well go dry? yes

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color lt brown Odor none Turbidity [illegible]

Was an oil film or layer apparent? no

E. CONDUCTIVITY [illegible]

F. pH 7.4

G. TEMPERATURE [illegible]

H. WELL SAMPLING NOTES:

Sample Bottle set #8 (has filtered set)

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. B-10

Sampled By C. O'Dell / P. Gottler Date 6-3-92 Time 1630

Weather clear ~ 70°F Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth:
(below top of casing) 70.03 ft.

Well elevation:
(top of casing) ____ ft.

Depth to water table:
(below top of casing) 57.98 ft.

Water table elevation: ____ ft.

Length of water column (LWC) 12.05 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.96 gallons x3 = 5.89

B. PHYSICAL APPEARANCE AT START:

Color clear Odor none detected Turbidity v. low

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 6.8 gallons.

Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear Odor none detected Turbidity v. low

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 1430 μS

F. pH 6.5

G. TEMPERATURE 51°F

H. WELL SAMPLING NOTES:

Took VOC's only, took blind VOC duplicate

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. B-9

Sampled By C. O'Dell / P. Gottler Date 6-3-92 Time 1330

Weather clear ~ 70°F Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) 21.54 ft.

Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 13.40 ft.

Water table elevation: ____ ft.

Length of water column (LWC) 8.14 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.32 gallons x 3 = 3.98

B. PHYSICAL APPEARANCE AT START:

Color Clear Odor None detected Turbidity V. low

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 8.0 gallons.

Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear Odor none detected Turbidity 15 NTU's

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 670 µS

F. pH 6.9

G. TEMPERATURE 63 °F

H. WELL SAMPLING NOTES:

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. B-12D

Sampled By C. O'Dell / P. Gottler Date 6-3-92 Time 1615

Weather Clear ~70 °F Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) 55.63 ft.

Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 46.95 ft.

Water table elevation: ____ ft.

Length of water column (LWC) 8.68 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.41 gallons x 3 = 4.24

B. PHYSICAL APPEARANCE AT START:

Color clear Odor none detected Turbidity v. low

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 4.2 gallons.

Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear Odor none detected Turbidity v. low

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 2,450 uS

F. pH 6.5

G. TEMPERATURE 50.5 °F

H. WELL SAMPLING NOTES:

Sampled for VOC's only

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. B-13

Sampled By C. ODell / P. Gottler Date 6-3-92 Time 1500

Weather clear ~ 70°F Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) 19.71 ft.

Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 14.42 ft.

Water table elevation: ____ ft.

Length of water column (LWC) 5.29 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 0.86 gallons × 3 = 2.58

B. PHYSICAL APPEARANCE AT START:

Color lt brown Odor none detected Turbidity moderate

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 8.0 gallons.

Did well go dry? yes.

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color tan-brown Odor none detected Turbidity > 50 NTU's

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 2,310 µS

F. pH 6.1

G. TEMPERATURE 51 °F

H. WELL SAMPLING NOTES:

Took blind duplicate for filtered & unfiltered inorganic samples

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. East Pumphouse
Sampled By C. O'Dell / P. Gottler Date 6-3-92 Time 1020
Weather clear 70°F Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) — ft.
Well elevation: (top of casing) ____ ft.
Depth to water table: (below top of casing) 8.5 ft.
Water table elevation: ____ ft.
Length of water column (LWC) — ft.
Volume of water in well:
2" diameter wells = 0.163 x (LWC) = — gallons

B. PHYSICAL APPEARANCE AT START:

Color clear / lt gry Odor none detected Turbidity V. low
Was an oil film or layer apparent? no

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling — gallons.
Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color clear / lt grey Odor none detected Turbidity V. low
Was an oil film or layer apparent? NO

E. CONDUCTIVITY 290 µS

F. pH 7.52

G. TEMPERATURE 57.2 °F

H. WELL SAMPLING NOTES:

Well / Holding Tank was not bailed before sampling as it appears that water in pumphouse is standing water that is separate from the shallow ground water system

TOOK MS/MSD for volatiles at same site

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. Cistern

Sampled By C. O'Dell / P. Gottler Date 6-3-92 Time 1430

Weather Clear 70°F Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) ~11.5 ft.

Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 9.78 ft.

Water table elevation: ____ ft.

Length of water column (LWC) — ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = — gallons

B. PHYSICAL APPEARANCE AT START:

Color black Odor slightly petroleum Turbidity high

Was an oil film or layer apparent? Yes.

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling None gallons.

Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color black Odor slightly oily Turbidity high (>50 NTU)

Was an oil film or layer apparent? Yes

E. CONDUCTIVITY 120 uS

F. pH 6.5

G. TEMPERATURE 61 °F

H. WELL SAMPLING NOTES:

Also sampled soils for VOC's and inorganics

Filtered + Total samples collected for water inorganics

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. B-1D

Sampled By C. ODell / J. Moose Date 8-10-92 Time 1540

Weather PARTLY CLOUDY Sampled with Bailer X Pump ______

A. WATER TABLE:

Well depth: (below top of casing) 70.39 ft. Well elevation: (top of casing) ______ ft.

Depth to water table: (below top of casing) 57.65 ft. Water table elevation: ______ ft.

Length of water column (LWC) 12.74 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 2.08 gallons 6.23 gallons

B. PHYSICAL APPEARANCE AT START:

Color COLORLESS Odor NONE Turbidity LOW

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling ~6.5 gallons.

Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color LIGHT TAN Odor NONE Turbidity MODERATE

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 1472

F. pH 7.28

G. TEMPERATURE 62°F

H. WELL SAMPLING NOTES:

SAMPLED B-1D & BLIND DUPLICATE FOR VOC'S (1555)
TCL VOLATILES

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. B-9

Sampled By C. O'Dell / J. Moore Date 8-10-92 Time 1400

Weather OVERCAST / 80°F Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) 21.54 ft.

Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 8.01 ft.

Water table elevation: ____ ft.

Length of water column (LWC) 13.53 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 2.21 gallons 6.63 gallons

B. PHYSICAL APPEARANCE AT START:

Color COLORLESS Odor NONE Turbidity LOW

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling ~7.0 gallons.

Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color COLORLESS Odor NONE Turbidity LOW

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 580

F. pH 7.2

G. TEMPERATURE 65°F

H. WELL SAMPLING NOTES:

SAMPLED AT 1445 TURBIDITY <50 NTUS

VOC'S UNFILTERED CN & METALS

GROUND WATER SAMPLING FIELD LOG

Sample Location ALCAN SITE 828005 Well No. B-10

Sampled By J. MOORE / C. ODELL Date 8-10-92 Time 0900

Weather OVERCAST, 80°F Sampled with Bailer X Pump ______

A. WATER TABLE:

Well depth: (below top of casing) 18.75 ft.

Well elevation: (top of casing) ______ ft.

Depth to water table: (below top of casing) 17.67 ft.

Water table elevation: ______ ft.

Length of water column (LWC) 1.08 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = .18 gallons .54

4" diameter wells = 0.653 X (LWC) = ______ gallons

6" diameter wells = 1.469 X (LWC) = ______ gallons

B. PHYSICAL APPEARANCE AT START:

Color COLORLESS Odor NONE Turbidity LOW

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling ~ .20 gallons.

Did well go dry? YES

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color TAN Odor NONE Turbidity MODERATE

Was an oil film or layer apparent? NO

E. CONDUCTIVITY —

F. pH —

G. TEMPERATURE —

H. WELL SAMPLING NOTES:

SAMPLED B-10 AT 1220, ONLY FOR TCL VOLATILES

IN SIGNIFICANT WATER PREVENTED pH, SpCond, Temp

READINGS.

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. MW-12D
Sampled By C. O'Dell / J. Moore Date 8-10-92 Time 10:50
Weather PARTLY CLOUDY Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) 55.63 ft.
Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 46.59 ft.
Water table elevation: ____ ft.

Length of water column (LWC) 9.04 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.47 gallons 4.4 gallons

B. PHYSICAL APPEARANCE AT START:

Color Colorless Odor NONE Turbidity Low

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling 6 gallons.

Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Brown Odor None Turbidity Moderate

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 1830

F. pH 7.58

G. TEMPERATURE 61.02°F

H. WELL SAMPLING NOTES:

SAMPLED AT 1110
COLLECTED TCL VOLATILES

GROUND WATER SAMPLING FIELD LOG

Sample Location Alcan Site 828005 Well No. B-135

Sampled By C. O'Dell / J. Moore Date 8-10-92 Time 1310

Weather PARTLY Cloudy Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) 19.71 ft. Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 9.64 ft. Water table elevation: ____ ft.

Length of water column (LWC) 10.09 ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = 1.64 gallons

B. PHYSICAL APPEARANCE AT START:

Color Colorless Odor NONE Turbidity Low

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling ~5.0 gallons.

Did well go dry? No

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color Brown Odor NONE Turbidity HIGH

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 1515 uS/cm

F. pH 7.45

G. TEMPERATURE 64°F

H. WELL SAMPLING NOTES:

SAMPLED AT 1310 >100NTUs.

TCL VOLATILES & FILTERED & UNFILTERED Cr+6 & METALS

GROUND WATER SAMPLING FIELD LOG

Sample Location ALCAN SITE 828005 Well No. EAST PUMPHOUSE

Sampled By J. MOORE / C. ODELL Date 8/10/92 Time 1635

Weather OVERCAST 80°F Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth: (below top of casing) — ft.

Well elevation: (top of casing) ____ ft.

Depth to water table: (below top of casing) 7.96 ft.

Water table elevation: ____ ft.

Length of water column (LWC) — ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = — gallons
4" diameter wells = 0.653 X (LWC) = ____ gallons
6" diameter wells = 1.469 X (LWC) = ____ gallons

B. PHYSICAL APPEARANCE AT START:

Color COLORLESS Odor NONE Turbidity LOW

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling — gallons.

Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color CLEAR Odor NONE Turbidity LOW

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 498

F. pH 7.95

G. TEMPERATURE 65°F

H. WELL SAMPLING NOTES:

SAMPLED AT 1645 <50 NTU'S

COLLECTED TCL VOLATILES & (Cr+6 & METALS, UNFILTERED) & MS & MSD.

GROUND WATER SAMPLING FIELD LOG

Sample Location ALCAN SITE 828005 Well No. WEST PUMPHOUSE
Sampled By S.T. MOORE / C. O'DELL Date 8-10-92 Time 1605
Weather OVERCAST Sampled with Bailer X Pump ____

A. WATER TABLE:

Well depth:
(below top of casing) — ft.

Well elevation:
(top of casing) ____ ft.

Depth to water table:
(below top of casing) 9.18 ft.

Water table elevation: ____ ft.

Length of water column (LWC) — ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = — gallons
4" diameter wells = 0.653 X (LWC) = ____ gallons
6" diameter wells = 1.469 X (LWC) = ____ gallons

B. PHYSICAL APPEARANCE AT START:

Color COLORLESS Odor NONE Turbidity LOW

Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling — gallons.

Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color COLORLESS Odor NONE Turbidity LOW

Was an oil film or layer apparent? NO

E. CONDUCTIVITY 667

F. pH 7.5

G. TEMPERATURE 64°F

H. WELL SAMPLING NOTES:

SAMPLED AT 1615 (<50 NTU'S)
COLLECTED TCL VOLATILES & (Cr+6, METALS, UNFILTERED)

GROUND WATER SAMPLING FIELD LOG

Sample Location ALCAN SITE 828005 Well No. CISTERN
Sampled By J. MOORE / C. O'DELL Date 8/10/92 Time 1705
Weather OVERCAST 80°F Sampled with Bailer X Pump ______

A. WATER TABLE:

Well depth: (below top of casing) — ft.
Well elevation: (top of casing) ______ ft.

Depth to water table: (below top of casing) 2.07 ft.
Water table elevation: ______ ft.

Length of water column (LWC) — ft.

Volume of water in well:

2" diameter wells = 0.163 x (LWC) = — gallons
4" diameter wells = 0.653 X (LWC) = ______ gallons
6" diameter wells = 1.469 X (LWC) = ______ gallons

B. PHYSICAL APPEARANCE AT START:

Color COLORLESS Odor NONE Turbidity LOW
Was an oil film or layer apparent? NO

C. PREPARATION OF WELL FOR SAMPLING:

Amount of water removed before sampling — gallons.
Did well go dry? NO

D. PHYSICAL APPEARANCE DURING SAMPLING:

Color CLEAR Odor NONE Turbidity LOW
Was an oil film or layer apparent? NO

E. CONDUCTIVITY 55

F. pH 7.8

G. TEMPERATURE 68°F

H. WELL SAMPLING NOTES:

SAMPLED WATER AT 1715 FOR TCL VOLATILES & (Cr+6, METALS UNFILTERED.) TURBIDITY < 50 NTU'S
BLIND DUPLICATE COLLECT AT CISTERN FOR (Cr+6, METALS, UNFILTERED)

1730 SOILS WERE COLLECTED FOR TCL VOLATILES & TOTAL METALS, Cr+6. ALSO MS & MSD & BLIND DUPLICATE WERE COLLECTED FOR SOILS AT CISTERN

Fugitive Dust Exposure Evaluation

O'BRIEN & GERE
ENGINEERS, INC.

Fugitive Dust Exposure Evaluation

In order to evaluate the ambient concentrations of indicator chemicals released in fugitive emissions through wind scour, the following stepwise approach was used:

1) Total soil loss ($kg/m^2/day$) due to wind erosion is estimated.
2) The fraction of these emissions expected to remain suspended in the air column is estimated.
3) The volume of air into which soil emissions are released is estimated, to calculate a release rate per unit volume ($kg/m^3/day$)
4) The residence time (days) of air over the site is calculated
5) The average incremental airborne concentration of soil from on-site fugitive dust emissions is estimated (mg soil/m^3 air).
6) The on-site ambient air concentration of indicator chemicals released through fugitive dust emissions is estimated (mg chemical/m^3 air)

Each of these steps is described below.

1 - *Calculation of Total Soil Loss Due to Wind Scour (E)*

The United States Soil Conservation Service (SCS) has developed a Technical Guide for estimating total loss of soil from a site due to wind scour (USDA 1987). This method is recommended by the United States Environmental Protection Agency in the Superfund Exposure Assessment Manual (EPA 1988) for use in evaluating airborne contaminant levels. Variables and assumptions used in the application of this method to the Jarl Site are presented in Figure 1.

According to the SCS Wind Erosion Technical Guide, the estimated total soil loss (E) due to wind erosion is:

$$E = 4.5 \text{ tons/acre/year} = 2.7 \times 10^{-3} \text{ kg/m}^2\text{/day}$$

(value obtained from Figure 1)

2 - *Calculation of Suspended Particulate Emissions (E_s)*

The following equation (EPA 1985) is used to calculate the suspended particulate fraction (E_s) of total wind erosion losses (E).

$E_s =$ E x A, where A = the portion of total wind erosion losses that would be measured as suspended particulates; estimated to be 0.025 (EPA 1985)

$$E_s = (2.7 \times 10^{-3} \text{ kg/m}^2\text{/day}) \times (0.025) = 6.75 \times 10^{-5} \text{ kg/m}^2\text{/day}$$

3 - *Calculation of Volumetric Emission Rate (E_s^1)*

It is assumed for this estimate that dust emissions will be limited to a 2-meter height above the site. Therefore, dust emissions (E_s) will be suspended into 2 m^3air/m^2 area.

$$E_s^1 = (6.75 \times 10^{-5}\ kg/m^2/day) \times (1m^2/2m^3) = 3.38 \times 10^{-5}\ kg/m^3/day$$

---

4 - *Calculation of Air Mass Residence Time Over the Site (RT)*

Residence time of air over the site is estimated as follows:

$$RT = L \div AWS$$

Where:

RT = Residence time of the air mass over the site (days)
L = Length of the area of concern along the axis of predominant wind direction (meters)
AWS= Average Wind Speed (meters/day)

Average wind speed in the area is documented at 5.12 m/s, or 4.42×10^5 m/day; the predominant wind direction is from the westsouthwest (see Figure 2). Length of the site along the westsouthwest-eastnortheast axis is approximately 198 meters (650 ft).

$$RT = 198 \div 4.42 \times 10^5 = 4.48 \times 10^{-4}\ days$$

---

5 - *Calculation of Incremental Fugitive Dust Concentration in On-Site Air (C_{soil})*

The estimated average airborne concentration of fugitive dusts from on-site soils in air is estimated as follows:

$$C_{soil} = E_s^1 \times RT$$

$$C_{soil} = (33.8\ mg/m^3/day) \times (4.48 \times 10^{-4}\ days) = 1.5 \times 10^{-2}\ mg\ soil/m^3\ air$$

---

6 - *Calculation of Estimated Chemical Concentration in On-Site Air ($C_{chemical}$)*

The estimated average chemical concentration in air due to fugitive dust emissions from the site through wind scour is estimated as follows:

$$C_{chemical} = C_{soil} \times CS$$

Where:

$C_{chemical}$ = estimated concentration of chemical in air (mg chemical/m^3 air)
C_{soil} = calculated concentration of soil in air (mg soil/m^3 air)
CS = concentration of chemical in soils (mean concentration + 2 standard deviations observed in on-site soils) (mg chemical/kg soil).

(see calculations in Table 1)

Figure 1

Estimation of Total Soil Loss (E) Due to Wind Erosion

A "Wind Erosion Equation" has been developed by the United States Department of Agriculture Soil Conservation Service (USDA 1987). The equation is expressed symbolically as follows:

$$E = f(I, K, C, L, V)$$

Where:

E =	The potential avarage annual soil loss in tons/acre/yr
f =	A function of
I =	The soil erodibility index (tons/acre/yr). It is related to the percentage of non-erodible soil aggregates larger than 0.84 mm in diameter
K =	The surface roughness factor (dimensionless)
C =	Climatic factor (dimensionless); based on the average wind velocity and soil moisture
L =	Field length along the prevailing wind direction (feet)
V =	Vegetative cover factor (dimensionless)

The above primary wind erosion variables are actually aggregate factors which are themselves functions of other variables. The Soil Conservation Service (SCS) Wind Erosion Equation Technical Guide (USDA 1985) allows each variable to be accessed via graphs, tables, or nomographs (EPA 1984).

Based on site-specific conditions at the Jarl Site (*e.g.* site location, meterology, soil type), the following variable values were selected:

I =	134 tons/acre/yr, based on characterization of soil as loamy sand (National Soils Handbook, Table 603-6)
C =	5, region-specific value (National Agronomy Manual, Exhibit 502.63(a))
K =	1.0, assumes flat terrain, with no wind shielding or obstructions
L =	650 feet; assumes prevailing wind direction is from the westsouthwest (PCGEMS database, Figure 2)
V =	0, specified by the USEPA for remedial investigations and feasibility studies (EPA 1988)

The value of the function (E), expressed in tons/acre/year, is presented within the Wind Erosion Equation Technical Guide for the each possible combination of variable values. The applicable table for the above values is presented below for reference.

(E)* SOIL LOSS FRCM WIND EROSION IN TCNS PER ACRE PER YEAR — JANUARY,1981

C = 5

I = 134

SURFACE - K = 1.0

(L) UNSHELTERED DISTANCE IN FEET	(V)** - FLAT SMALL GRAIN RESIDUE IN POUNDS PER ACRE												
	0	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
10000	6.7	5.3	3.5	1.9	0.8								
8000	6.7	5.3	3.5	1.9	0.8								
6000	6.7	5.3	3.5	1.9	0.8								
4000	6.7	5.3	3.5	1.9	0.8								
3000	6.7	5.3	3.5	1.9	0.8								
2000	6.7	5.3	3.5	1.9	0.8								
1000	5.6	4.4	2.8	1.5	0.6								
800	5.2	4.1	2.6	1.4	0.5								
600	4.5	3.6	2.3	1.2	0.5								
400	3.8	3.0	1.9	0.9									
300	3.3	2.6	1.6	0.8									
200	2.3	1.8	1.1	0.5									
150	1.8	1.4	C.7										
100	1.4	1.1	0.6										
80	1.1	0.8	0.4										
60	0.8	0.5											
50	0.7	0.4											
40													
30													
20													
10													

Based on this table, the estimated total soil loss from the Jarl Site due to wind erosion is:

$$E = 4.5 \text{ tons/acre/year}$$

Figure 2

Windspeed and Wind Direction Data for the Rochester/Monroe Area

GRAPHICAL EXPOSURE MODELING SYSTEM

STAR STATION 0598 ROCHESTER/MONROE NY ANNUAL 1955-1964

DIRECTION	FREQUENCY	WINDSPEED	DIRECTION	FREQUENCY	WINDSPEED
N	0.02721	4.84	S	0.08717	4.20
NNE	0.02470	5.33	SSW	0.11596	4.55
NE	0.02632	5.15	SW	0.11732	4.78
ENE	0.03153	4.09	WSW	0.17756	6.66
E	0.04050	3.93	W	0.08059	6.12
ESE	0.03816	3.70	WNW	0.07567	6.26
SE	0.03838	3.27	NW	0.04498	5.30
SSE	0.04157	4.08	NNW	0.03235	4.79

:RAPHICAL EXPOSURE MODELING SYSTEM

STAR STATION 0598 ROCHESTER/MONROE NY ANNUAL 1955-1964

STABILITY	FREQUENCY	WINDSPEED
1	0.00357	2.09
2	0.03344	2.82
3	0.08333	4.29
4	0.65418	6.11
5	0.12048	3.69
6	0.10497	2.08

AUXILIARY VARIABLES		
Afternoon mixing height	(meters)	1324
Nocturnal mixing height	(meters)	679
Ambient air temperature	(Kelvin)	281.9
Precipitation frequency	(fraction)	0.09
Precipitation intensity	(mm/hour)	1.30
Grand average windspeed	(m/s)	5.12

Source: PCGEMS (EPA's Graphic Exposure Modeling System); data is based on the Rochester/Monroe weather station located approximately 13.7 km from the site.

TABLE 1

CALCULATION OF CHEMICAL CONCENTRATIONS IN AIR

Chemical	Conc. of Soil in Air (mg soil/m^3)	X	95% UCL Conc. of Chemical in Soil (mg Chem/kg Soil)	X	Conversion Factor (1 kg/10^6 mg)	=	Conc. of Chem. in Air (mg Chem/m^3
Aluminum	1.5E-02		41964		1E-06		6.29E-04
Calcium	1.5E-02		34878		1E-06		5.23E-04
Chromium	1.5E-02		2135		1E-06		3.20E-05
Copper	1.5E-02		257		1E-06		3.85E-06
Iron	1.5E-02		23044		1E-06		3.46E-04
Lead	1.5E-02		33.9		1E-06		5.09E-07
Magnesium	1.5E-02		10832		1E-06		1.62E-04
Nickel	1.5E-02		24.7		1E-06		3.71E-07
Zinc	1.5E-02		99.2		1E-06		1.49E-06
Cyanide	1.5E-02		24		1E-06		3.64E-07

UCL = upper confidence limit

Appendix J

Wildlife Species Potentially Present at the Site

O'BRIEN & GERE
ENGINEERS, INC.

SUCCESSIONAL NORTHERN HARDWOODS

RED MAPLE — AMERICAN ELM

MAMMALS

Opossum
Masked Shrew
Smoky Shrew
Least Shrew
Shorttail Shrew
Starnose Mole
Eastern Mole
Hairytail Mole
Little Brown Myotis
Keen Myotis
Indiana Myotis
Silver-haired Bat
Eastern Pipistrelle
Big Brown Bat
Red Bat
Hoary Bat
Black Bear
Raccoon
Fisher
Shorttail Weasel
Longtail Weasel
Mink
River Otter
Striped Skunk
Coyote
Red Fox
Gray Fox
Bobcat
Woodchuck
Eastern Chipmunk
Gray Squirrel
Fox Squirrel
Red Squirrel
Southern Flying Squirrel
Beaver
Deer Mouse
White-footed Mouse
Southern Bog Lemming
Boreal Red-backed Vole
Meadow Vole
Pine Vole
Meadow Jumping Mouse
Woodland Jumping Mouse
Porcupine
Snowshoe Hare
Eastern Cottontail
New England Cottontail
White-tailed Deer

BIRDS

Great Blue Heron
Green Heron
Little Blue Heron
Great Egret
Snowy Egret
Louisiana Heron
Black-crowned Night Heron
Yellow-crowned Night Heron
Mallard
American Black Duck
Wood Duck
Common Merganser
Hooded Merganser
Turkey Vulture
Northern Goshawk
Cooper's Hawk
Red-tailed Hawk
Red-shouldered Hawk
Broad-winged Hawk
Bald Eagle
Osprey
Peregrine Falcon
American Kestrel
Ruffed Grouse
Common Bobwhite
American Woodcock
Mourning Dove
Yellow-billed Cuckoo
Black-billed Cuckoo
Barn Owl
Common Screech Owl
Great Horned Owl
Barred Owl
Long-eared Owl
Saw-whet Owl
Whip-poor-will
Common Nighthawk
Ruby-throated Hummingbird
Common Flicker
Pileated Woodpecker
Red-bellied Woodpecker
Red-headed Woodpecker
Yellow-bellied Sapsucker
Hairy Woodpecker
Downy Woodpecker
Eastern Kingbird
Great Crested Flycatcher
Eastern Phoebe
Acadian Flycatcher
Willow Flycatcher
Alder Flycatcher
Least Flycatcher
Eastern Pewee
Tree Swallow
Blue Jay
Northern Raven
American Crow
Black-capped Chickadee
Tufted Titmouse
White-breasted Nuthatch
Brown Creeper
House Wren
Winter Wren
Carolina Wren
Northern Mockingbird
Gray Catbird
Brown Thrasher
American Robin
Wood Thrush
Veery
Eastern Bluebird
Blue-gray Gnatcatcher
Cedar Waxwing
Loggerhead Shrike
White-eyed Vireo
Yellow-throated Vireo
Red-eyed Vireo
Warbling Vireo
Black and White Warbler
Prothonotary Warbler
Worm-eating Warbler
Golden-winged Warbler
Blue-winged Warbler
Nashville Warbler
Yellow Warbler
Cerulean Warbler
Chestnut-sided Warbler
Prairie Warbler
Ovenbird
Northern Waterthrush
Louisiana Waterthrush
Mourning Warbler
Kentucky Warbler
Common Yellowthroat
Yellow Breasted Chat
Hooded Warbler
Canada Warbler
American Redstart
Orchard Oriole
Northern Oriole
Rusty Blackbird
Common Grackle
Brown-headed Cowbird
Scarlet Tanager
Northern Cardinal
Rose-breasted Grosbeak
Indigo Bunting
American Goldfinch
Rufous-sided Towhee
Chipping Sparrow
Field Sparrow
White-throated Sparrow
Swamp Sparrow
Song Sparrow

RED MAPLE — AMERICAN ELM (CONT'D)

REPTILES

Common Snapping Turtle
Bog Turtle
Wood Turtle
Eastern Box Turtle
Eastern Painted Turtle
Five-lined Skink
Coal Skink
Northern Water Snake
Queen Snake
Northern Brown Snake
Northern Redbelly Snake
Eastern Garter Snake
Shorthead Garter Snake
Eastern Ribbon Snake
Eastern Hognose Snake
Northern Ringneck Snake
Eastern Worm Snake
Northern Black Racer
Eastern Smooth Green Snak
Black Rat Snake
Eastern Milk Snake
Northern Copperhead
Eastern Massasauga
Timber Rattlesnake

AMPHIBIANS

Marbled Salamander
Jefferson Salamander
Spotted Salamander
Eastern Tiger Salamander
Red-spotted Newt
Northern Dusky Salamander
Mountain Dusky Salamander
Redback Salamander
Slimy Salamander
Four-toed Salamander
Northern Spring Salamander
Northern Red Salamander
Northern Two-lined Salamander
American Toad
Fowler's Toad
Northern Spring Peeper
Gray Treefrog
Western Chorus Frog
Bullfrog
Green Frog
Mink Frog
Wood Frog
Northern Leopard Frog
Southern Leopard Frog
Pickerel Frog

Source: Chambers, 1983.

SUCCESSIONAL SOUTHERN HARDWOODS

ASPEN

MAMMALS

Masked Shrew
Smoky Shrew
Northern Water Shrew
Least Shrew
Shorttail Shrew
Hairytail Mole
Little Brown Myotis
Keen Myotis
Small-footed Myotis
Silver-haired Bat
Eastern Pipistrelle
Big Brown Bat
Red Bat
Hoary Bat
Black Bear
Raccoon
Fisher
Shorttail Weasel
Longtail Weasel
Mink
River Otter
Striped Skunk
Coyote
Red Fox
Gray Fox
Bobcat
Woodchuck
Eastern Chipmunk
Red Squirrel
Southern Flying Squirrel
Northern Flying Squirrel
Beaver
Deer Mouse
White-footed Mouse
Southern Bog Lemming
Boreal Red-backed Vole
Meadow Vole
Pine Vole
Meadow Jumping Mouse
Woodland Jumping Mouse
Porcupine
Snowshoe Hare
Eastern Cottontail
New England Cottontail
White-tailed Deer

BIRDS

Great Blue Heron
Green Heron
Little Blue Heron
Great Egret
Snowy Egret
Louisiana Heron
Black-crowned Night Heron
Yellow-crowned Night Heron
Mallard
American Black Duck
Wood Duck
Common Merganser
Hooded Merganser
Northern Goshawk
Cooper's Hawk
Red-tailed Hawk
Red-shouldered Hawk
Broad-winged Hawk
Bald Eagle
Osprey
Peregrine Falcon
American Kestrel
Ruffed Grouse
Common Bobwhite
American Woodcock
Mourning Dove
Yellow-billed Cuckoo
Black-billed Cuckoo
Barn Owl
Common Screech Owl
Great Horned Owl
Long-eared Owl
Saw-whet Owl
Whip-poor-will
Common Nighthawk
Common Flicker
Pileated Woodpecker
Red-bellied Woodpecker
Red-headed Woodpecker
Yellow-bellied Sapsucker
Hairy Woodpecker
Downy Woodpecker
Eastern Kingbird
Great Crested Flycatcher
Eastern Phoebe
Acadian Flycatcher
Willow Flycatcher
Alder Flycatcher
Least Flycatcher
Eastern Pewee
Tree Swallow
Blue Jay
American Crow
Black-capped Chickadee
White-breasted Nuthatch
Brown Creeper
House Wren
Winter Wren
Carolina Wren
Gray Catbird
Brown Thrasher
American Robin
Wood Thrush
Hermit Thrush
Swainson's Thrush
Veery
Eastern Bluebird
Cedar Waxwing
Loggerhead Shrike
White-eyed Vireo
Yellow-throated Vireo
Red-eyed Vireo
Philadelphia Vireo
Warbling Vireo
Black and White Warbler
Worm-eating Warbler
Golden-winged Warbler
Blue-Winged Warbler
Tennessee Warbler
Nashville Warbler
Yellow Warbler
Chestnut-sided Warbler
Prairie Warbler
Ovenbird
Mourning Warbler
Common Yellowthroat
Yellow Breasted Chat
Canada Warbler
American Redstart
Common Grackle
Brown-headed Cowbird
Scarlet Tanager
Northern Cardinal
Rose-breasted Grosbeak
Indigo Bunting
American Goldfinch
Rufous-sided Towhee
Chipping Sparrow
Field Sparrow
White-throated Sparrow
Swamp Sparrow
Song Sparrow

REPTILES

Common Snapping Turtle	Northern Water Snake	Northern Black Racer
Bog Turtle	Northern Brown Snake	Eastern Smooth Green Snake
Wood Turtle	Northern Redbelly Snake	Black Rat Snake
Eastern Box Turtle	Eastern Garter Snake	Eastern Milk Snake
Five-lined Skink	Northern Ringneck Snake	Northern Copperhead
Coal Skink	Eastern Worm Snake	Eastern Massasauga

AMPHIBIANS

Jefferson Salamander	American Toad	Wood Frog
Redback Salamander		

Source: Chambers, 1983.

PINE-NORTHERN HARDWOOD FOREST

WHITE PINE - NORTHERN HARDWOOD

MAMMALS

Masked Shrew
Smoky Shrew
Least Shrew
Shorttail Shrew
Starnose Mole
Hairytail Mole
Little Brown Myotis
Keen Myotis
Silver-haired Bat
Eastern Pipistrelle
Big Brown Bat
Red Bat
Hoary Bat
Black Bear
Raccoon
Marten
Fisher
Shorttail Weasel
Longtail Weasel
Mink
River Otter
Striped Skunk
Coyote
Red Fox
Gray Fox
Bobcat
Woodchuck
Eastern Chipmunk
Gray Squirrel
Red Squirrel
Southern Flying Squirrel
Deer Mouse
White-footed Mouse
Southern Bog Lemming
Boreal Red-backed Vole
Meadow Vole
Yellownose Vole
Pine Vole
Meadow Jumping Mouse
Woodland Jumping Mouse
Porcupine
Snowshoe Hare
Eastern Cottontail
New England Cottontail
White-tailed Deer

BIRDS

Great Blue Heron
Green Heron
Little Blue Heron
Great Egret
Snowy Egret
Louisiana Heron
Black-crowned Night Heron
Yellow-crowned Night Heron
Mallard
American Black Duck
Wood Duck
Common Merganser
Hooded Merganser
Turkey Vulture
Northern Goshawk
Sharp-shinned Hawk
Cooper's Hawk
Red-tailed Hawk
Red-shouldered Hawk
Broad-winged Hawk
Bald Eagle
Osprey
Peregrine Falcon
American Kestrel
Ruffed Grouse
Common Bobwhite
Mourning Dove
Yellow-billed Cuckoo
Barn Owl
Common Screech Owl
Great Horned Owl
Barred Owl
Long-eared Owl
Saw-whet Owl
Whip-poor-will
Chuck-will's-widow
Common Nighthawk
Ruby-throated Hummingbird
Common Flicker
Pileated Woodpecker
Red-bellied Woodpecker
Red-headed Woodpecker
Yellow-bellied sapsucker
Hairy Woodpecker
Downy Woodpecker
Eastern Kingbird
Great Crested Flycatcher
Eastern Phoebe
Acadian Flycatcher
Willow Flycatcher
Alder Flycatcher
Least Flycatcher
Eastern Pewee
Tree Swallow
Blue Jay
Northern Raven
American Crow
Black-capped Chickadee
Tufted Titmouse
White-breasted Nuthatch
Red-breasted Nuthatch
Brown Creeper
House Wren
Gray Catbird
Brown Thrasher
American Robin
Wood Thrush
Hermit Thrush
Eastern Bluebird
Blue-gray Gnatcatcher
Cedar Waxwing
Loggerhead Shrike
White-eyed Vireo
Yellow-throated Vireo
Solitary Vireo
Red-eyed Vireo
Warbling Vireo
Black and White Warbler
Worm-eating Warbler
Golden-winged Warbler
Blue-winged Warbler
Tennessee Warbler
Nashville Warbler
Northern Parula Warbler
Yellow Warbler
Black-throated Green Warbler
Cerulean Warbler
Chestnut-sided Warbler
Pine Warbler
Prairie Warbler
Ovenbird
Northern Waterthrush
Mourning Warbler
Kentucky Warbler
Common Yellowthroat
Yellow Breasted Chat
Hooded Warbler
Canada Warbler
American Redstart
Northern Oriole
Common Grackle
Brown-headed Cowbird
Northern Cardinal
Rose-breasted Grosbeak
Indigo Bunting
Purple Finch
American Goldfinch
Rufous-sided Towhee
Northern Junco
Chipping Sparrow
Field Sparrow
White-throated Sparrow
Swamp Sparrow

REPTILES

Common Snapping Turtle
Wood Turtle
Eastern Box Turtle
Five-lined Skink
Coal Skink
Northern Water Snake
Northern Brown Snake
Northern Redbelly Snake
Eastern Garter Snake
Eastern Ribbon Snake
Northern Ringneck Snake
Northern Black Racer
Eastern Smooth Green Snake
Black Rat Snake
Eastern Milk Snake
Timber Rattlesnake

AMPHIBIANS

Jefferson Salamander
Blue-spotted Salamander
Spotted Salamander
Eastern Tiger Salamander
Red-spotted Newt
Northern Dusky Salamander
Mountain Dusky Salamander
Redback Salamander
Slimy Salamander
Four-toed Salamander
Northern Spring Salamander
Northern Red Salamander
Northern Two-Lined Salamander
American Toad
Bullfrog
Green Frog
Mink Frog
Wood Frog
Northern Leopard Frog
Southern Leopard Frog
Pickerel Frog

Source: Chambers, 1983.

SUCCESSIONAL OLD FIELD

EARLY STAGE

MAMMALS
Meadow Vole
Eastern Cottontail
New England Cottontail

BIRDS
Ruffed Grouse
Bobwhite Quail
American Woodcock
Mourning Dove
Yellow-billed Cuckoo
Black-billed Cuckoo
Eastern Kingbird
Eastern Phoebe
Willow Flycatcher
Alder Flycatcher
Northern Mockingbird
Gray Catbird
Brown Thrasher
Eastern Bluebird
Cedar Waxwing
Loggerhead Shrike
White-eyed Vireo
Golden-winged Warbler
Blue-winged Warbler
Tennessee Warbler
Nashville Warbler
Yellow Warbler
Magnolia Warbler
Bay-breasted Warbler
Chestnut-sided Warbler
Prairie Warbler
Mourning Warbler
Common Yellowthroat
Yellow Breasted Chat
Northern Cardinal
Indigo Bunting
American Goldfinch
Rufous-sided Towhee
Northern Junco
Chipping Sparrow
Field Sparrow
White-throated Sparrow
Swamp Sparrow
Song Sparrow

REPTILES
Bog Turtle

AMPHIBIANS
Gray Treefrog

Source: Chambers, 1983.

FRESHWATER STREAM HABITATS

Exhibit A

Soil Concentration Values Typically Used By NYSDEC

O'BRIEN & GERE ENGINEERS, INC.

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Thomas C. Jorling
Commissioner

FEB 19 1991

RECEIVED

FEB 19 1991

Mr. Robert J. Foresti
Project Hydrogeologist
O'Brien & Gere Engineers, Inc.
5000 Brittonfield Parkway
P.O. Box 4873
Syracuse, NY 13221

Re: Former Jarl Extrusions, Site # 828005 - Second Groundwater Sampling Series

Dear Mr. Foresti:

After reviewing the data generated from the first groundwater sampling series, this Department proposes that the second series of groundwater samples be analyzed for the following constituents:

Target Compound List (TCL) volatile organics
Chromium
Hexavalent Chromium
Cadmium
Copper
Lead
Iron
Mercury
Nickel
Zinc
Sulfate
* Sodium
* Fluoride
* Chloride

* The last three analytes were not included in your February 1 letter. The rationale for their inclusion is as follows:

Several exceedances of New York State groundwater standards for sodium are noted in the first round of analyses, and there is no reason at present to believe that this is a natural occurrence. Fluoride levels in well B-7S exceed the NYS groundwater standards. Chloride levels in this well also exceed NYS groundwater standards. In addition to this list of analytes, pH, temperature, turbidity, and specific conductance should be determined in the field. The results of these field analyses should be reported along with the lab analyses.

If the consultant plans to advance a hypothesis that landfill leachate is impacting groundwater quality on this site, then some chemical parameters which are clearly indicative of landfill leachate should be added to the analyte list. Three analytes that may prove useful in evaluating this possibility are nitrate, ammonia, and total kjeldahl nitrogen (TKN). The mere presence of other contaminants along the landfill boundary will not be sufficient to demonstrate that the landfill is the source because abundant evidence exists of past wastewater discharges from the Jarl site into the landfill.

The proposal to discontinue sampling of well B-7S cannot be evaluated without further data. Please provide the boring log and well completion diagram for this well. Although it is true that the very slow recharge rate casts some doubt on the validity of some groundwater data from this well, it is difficult to imagine how significant levels of inorganic contamination would be introduced because of the extended sampling procedure. The exceedance of fluoride and chloride standards in this well may indicate that this is an important sampling point which requires replacement rather than abandonment.

It should be reiterated that filtering of the groundwater for metals analysis will occur only if the turbidity of the water is greater than 50 NTU's. Furthermore, if filtering is necessary, both unfiltered and filtered samples should be collected and, at the same time, this office should be provided an outline for the filtering process prior to sampling. Finally, please contact this office if the scheduled February 25, 1991 sampling date cannot be met in order for the NYSDEC to reschedule oversight responsibilities. In conclusion, the analytical parameters (i.e. detection limits) for the second round must be approved by the NYSDEC prior to sample collection. Enclosed for your guidance is the preferred order of sample collection as seen by this Department.

On a final note, the Division of Hazardous Waste Remediation believes that O'Brien & Gere's typical soil concentration values are too broad and need to be more conservative. Typical values, currently used as a guidance by this Division, are enclosed for your reference.

If you have any questions regarding this letter, please feel free to call me at (518) 457-3373. Thank you for your time and attention.

Sincerely,

David J. Chiusano

David J. Chiusano
Environmental Engineer
Remedial Action Section C
Bureau of Western Remedial Action
Div. of Hazardous Waste Remediation

Enclosure
cc: G. Harris
G. Bailey
G. Cross
T. Caffoe
C. Amento
D. Napier
R. Elliot
P. Segretto, Alcan

c:\chiusano\2ndgwss.djc

The Preferred Order of Sample Collection is as follows:

1. In-situ measurements: temperature, pH, specific conductance, turbidity
2. Volatile organics (VOA)
3. Total metals
4. Dissolved metals
5. Phenols
6. Cyanide
7. Sulfate, Chloride, Fluoride, Sodium
8. Nitrate, Ammonia, Total Kjeldahl

Reference: USEPA Region II CERCLA Quality Assurance Manual
Rev. 0 3/88 pg. 47.

(ww #3, 41)

c:\chiusano\preorder. djc

Background concentrations of 20 elements in soils with special regard for New York State.

E. Carol McGovern
Fish and Wildlife Technician
Wildlife Pathology Unit
Wildlife Resources Center
New York State Department of
Environmental Conservation
Delmar, New York 12054

Introduction

The main source of elements in soils is from the parent material from which they were derived. Usually this material is weathered bedrock or overburden transported by wind, water or glaciation (Thornton, 1979). Climatic and biological factors as well as agricultural and industrial operations have a major effect on the concentration of elements in soils (Shacklette et al, 1971). Developed and developing countries have an ever increasing production and demand for elements. This increases the probability of their dispersal and contact in the environment. An element may be dispersed into the environment from the time it is mined until it becomes usuable as a finished product or ingredient of a product (Adriano, 1986). The long agricultural and industrial history of this country may have altered the "natural" background of some elements in some materials. The widespread atmospheric effects of leaded gasoline may have altered the lead content of soils far from any pollution sources. Likewise for any element entering the atmosphere from agricultural or industrial sources (Connor and Shacklette, 1974).

A natural background level for 20 elements; aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium and zinc is being established for New York State. A wide range of literature has been reviewed to obtain soil values of these elements from areas thought to be uncontaminated, undisturbed or areas far from pollution sources. All values are in ppm dry weight.

Aluminum

Jackson (1964) stated that aluminum makes up 2-12% (20,000 - 120,000 ppm) of soils. Vinogradov (1959) gave 71,300 ppm as the average for the concentration of aluminum in world soils. A cultivated soil profile 0-30 cm, from Eastham, MA, averaged 34,000 ppm aluminum (Laul, 1983). Holmes et al (1938) conducted a study on the chemical composition of soils and colloids of the Norfolk and related soil series. All of the soils that they studied were within a 15 mile radius of Kingston, NC. In a soil profile of the Orangeburg series, mostly consisting of sandy loams and loamy sands, the aluminum content from the A horizon was 9,800 ppm, from the B horizon 95,600 ppm and 51,200 ppm for the C. A soil profile from the Dunbar soil series, a sandy loam, from a heavily forested area revealed an aluminum concentration of 8,300 ppm in the A_1 horizon, 14,000 ppm in the A_2 horizon, 27,900 ppm for the B_1 and and 34,500 ppm for the B_2 horizon. A highly acidic, pH 4.3, fine sandy loam of the Coxville soil series provided a profile that contained 25,400 ppm aluminum in the A horizon, 54,600 in the B horizon and 69,700 ppm in the C.

Shacklette (1984) compiled samples of surficial material, that were unaltered or very little altered from their natural condition, of the United States to give estimates of the range of elemental abundance, with a total of 1,318 sampling sites. All samples were taken at a depth of 24 cm. Although many sites were within 100 m of roads, the roads contained only light vehicular traffic or were newly introduced interstates. The geometric mean of 450 samples of soils and other surficial materials lying east of the 97th meridian was 33,000 ppm aluminum, with a range of 7,000-100,000 ppm.

Arsenic

The average amount of arsenic found in soils is 5 ppm (Vinogradov, 1959; Reay, 1972; Peterson and Alloway, 1979; Miesch and Claude, 1972; Woolson, 1983). No clearly defined relationship exists between the arsenic content of soils and the parent material or the climate conditions under which the soils were formed. Walsh et al (1977) stated that arsenic in uncontaminated soils is usually found in the range of 0.2 - 40 ppm. For 195 U.S. soil samples the arsenic content ranged from 0.1 - 42 ppm (Vinogradov, 1959). From erosion experiment stations widely scattered throughout the midwest and south, covering 5 major soil types, the arsenic content fell in the range of 1 - 20 ppm (Mitchell, 1964). Greaves (1934) found arsenic in western virgin soils to the extent of 4 ppm. A study of virgin soils of Colorado in 1910 found arsenic in amounts of 2.5 - 5.0 ppm.

Frank et al (1976) sampled 296 agricultral fields throughout Ontario, Canada. For 207 samples from soils with no history of arsenic use, the arsenic concentration ranged from 1.1 - 16.7 ppm with an average of 6.27 ppm. The arsenic content of uncontaminated soils was slightly increased with increased clay content. Sandy soils averaged 5.84 ppm arsenic and 6.43 ppm was the average arsenic content for clay soils.

A profile from a Muskingum silt loam - a gray-brown podzolic soil, with an immature profile, from Zanesville, Ohio revealed 10 ppm arsenic in the 0 - 17.5 cm zone, 16 ppm in the 17.5 - 32.5 cm zone, 10 ppm in the 32.5 - 60 cm zone (Slater et al, 1937).

Chattopadhyay et al (1974) determined the mean arsenic content from a crop growing organic soil profile from a Holland marsh area near Toranto, Ontario to be 1.5 ppm.

In the Harrison Experiment Forest, near Saucier, Mississippi, having a strongly acidic, poarch fine sandy loam soil, the arsenic content for the 0 - 75 cm profile ranged from 0.6 - 1.4 ppm (DeGroot, 1979). In a sandy loam control plot the arsenic concentration averaged 7 ppm for 0 - 30 cm (Hiltbolt, 1975).

Walsh et al (1975) gave a range of 3 - 12 ppm for the arsenic content in uncontaminated New York State soils. The geometric mean content of arsenic in the surficial materials of the eastern United States was found to be 4.8 ppm, with a range of <0.1 - 73 ppm by Shacklette and Boerngen (1984).

Barium

Vinogradov (1959) quoted 500 ppm as the average amount of barium in world soils. For 40 various soil samples from the U.S. the barium content ranged from 10 - 3,000 ppm. In another study of 100 U.S. soil samples the barium level ranged from 60 - 800 ppm. Bowen (1979) stated 500 ppm as the average barium content in soils, with a range of

100 - 3,000 ppm. In 1910 the great plains soils were found to contain between 100 - 1,100 ppm barium (Slater et al, 1937).

The average barium content of a cultivated soil profile, 0 - 30 cm, from Eastham, MA was 180 ppm, with a range of 140 - 250 ppm (Laul, 1983).

From an organic crop growing soil profile from the Holland Marsh area near Toranto, Ontario the barium level in the surface$_1$ was found to be 285 ppm, in surface$_2$ it was 270 ppm. For a depth of 0 - 7.5 cm the barium content was 252 ppm, for 7.5 - 15 cm it was 293 ppm and 300 ppm for 15 - 22.5 cm (Chattopadhyay et al, 1974).

Shacklette and Boerngen (1984) found the geometric mean for 541 samples east of the 97th meridian in the U.S. to be 290 ppm, with a range of 10 - 1,500 ppm.

Beryllium

Beryllium is estimated to have a crustal abundance of 2 ppm (Tepper, 1980). Mitchell (1964) gave 0.3 - 10 ppm as the common range for beryllium in soils. Bowen (1979) gave 0.3 ppm as the average level of beryllium in soils with a range of 0.01 - 40 ppm. Adriano (1986) gave the range of 0.1 - 0.89 ppm for the concentration of beryllium in Canadian surface soils. Shacklette and Boerngen (1984) determined the geometric mean of beryllium in 169 soil samples of the eastern U.S. to be 0.55 ppm with a range of <1-7 ppm. The arithmetic mean was 0.85 ppm.

Cadmium

Vinogradov (1959) gave 0.5 ppm as the average amount of cadmium in world soils. Mitchell (1964) quoted 0.2 ppm as the average crustal abundance for cadmium. Peterson and Alloway (1979) stated that cadmium had an estimated crustal abundance of 0.15 - 0.20 ppm. Bowen (1979) gave an average of 0.35 ppm for world soil cadmium concentration, with a range of 0.01 - 2 ppm. Eisler (1985) stated that for soils of nonvolcanic origin the cadmium content ranged from 0.01 - 1.0 ppm and for soils of volcanic origin the cadmium concentration could be as high as 0.45 ppm. Based on the cadmium level found in common rocks it can be concluded that, on the average, soils derived from igneous rocks would contain the lowest total cadmium concentration, soils from metamorphic rocks intermediate and those derived from sedimentary rocks would contain the largest amounts of cadmium. Soils derived from igneous rocks range in cadmium concentration from 0.1 - 0.3 ppm, metamorphic soils 0.1 - 1.0 ppm and sedimentary soils 0.3- 11 ppm (Page and Bingham, 1973).

For 173 agricultural soils from New York State, removed from mobile and point source contamination, the mean cadmium content was 0.45 ppm. For 40 West Virginia agricultural soils the mean cadmium level was 0.32 ppm, for 81 crop growing soils from Ohio 0.38 ppm, for

57 Maryland farms 0.08 ppm, 0.17 ppm cadmium for 4 agricultural soils of Delaware, 0.17 ppm for 31 farms from Maine, and 0.21 ppm for 45 agricultural soils from Pennsylvania (Sommers, 1987).

Page et al (1987) gave a range of 0.1 - 1.0 ppm for non-contaminated agricultural soils of the U.S., except for a number of soils derived from parent materials high in cadmium. Organic soils (Histosols) tend to contain the highest total cadmium concentrations and highly weathered soils (Ultisols and Alfisols) contain the lowest cadmium levels.

An extensive study of 3,305 soil samples from crop-producing areas in 36 states, took great care to insure that these areas were free from any known source of contamination. The cadmium content from these soils ranged from 0.05 - 2.4 ppm with a mean and median values of 0.27 ppm and 0.20 ppm respectively. For 293 samples from the northeast, including 5 states, the Cd content ranged from 0.08 - 0.21 ppm with an average of 0.17 ppm.

Adriano (1986) reported that normal Canadian soils contain from 0.01 - 0.10 ppm total Cd with a mean of 0.07 ppm. Normal glacial tills and other glacial materials had a Cd concentration of 0.01 - 0.70 ppm with an average of 0.07 ppm.

Pierce et al (1982) sampled 16 Minnesota soils from 7 major materials to obtain a baseline for 6 metals. The average cadmium concentration, from a depth of 0 - 15 cm, was 0.39 ppm and ranged from 0.24 - 0.68 ppm. The highest Cd content was found in calcareous soils developed in the lacustrine sediment and DesMoines Lobe Till (prairie) and generally in surface soils and soils with free carbonates. The association of Cd with carbonates reflects it's ability to substitute for Cd^{+2} in the crystal lattice of calcite, due to similarities in ionic radii 1.03A and 1.06A respectively.

Luce (1985) quoted a range of 0.01 - 0.7 ppm and an average of 0.06 ppm for the cadmium content of soils. For 98 New York mineral soils used in the production of commercial fruits and vegetables the cadmium content averaged 0.21 ppm, with a maximum value of 0.67 ppm. For 63 New York State organic soils the average Cd content was 0.74, with a maximum value of 1.80 ppm.

A regional study of 15 benchmark or major soils of the Northeast containing 6 soils with a coarse - loamy texture had an average total Cd level of 0.22 ppm, the other 9 had a fine loamy to clayey texture contained 0.56 ppm cadmium on the average. The total Cd content of 26 Massachusetts surface soils (Ap or A horizons) averaged 0.2 ppm and ranged from 0.01 - 0.88 ppm.

Calcium

Mitchell (1964) stated that calcium makes up 3.6% (36,000 ppm) of the earth's crust by weight and 1.48% (14,800 ppm) by volume. Vinogradov (1959) gave 13,700 ppm as the average content of calcium in soils. Calcium makes up approximately 1% (10,000 ppm) of soils (Jackson, 1964). Bowen (1979) gave 15,000 ppm as the average amount of calcium to be found in soils.

In three experimental fields, in Illinois, the calcium content ranged from 450 - 2,170 ppm, for the profile of 0 - 72" (Snider, 1943). From a study by Holmes et al (1938) of Norfolk and related soil series, within a 15 mile radius of Kingston, NC, the A horizon of an Orangeburg fine sandy loam soil contained 6,100 ppm Ca, the B horizon 280 ppm Ca and the C 500 ppm Ca. A profile of a Dunbar fine sandy loam horizons; A_1, A_2, B_1 and B_2, all contained 70 ppm Ca. A profile of a Coxville fine sandy loam contained 640 ppm calcium in the A horizon, 357 ppm in the B and 100 ppm in the C. A profile of a Bladen loam soil contained 500 ppm Ca in A, B and C horizons.

Seventy residential soil samples from Grand Rapids, Michigan, taken from low density population areas and areas with substantial amounts of unimproved woodlands, averaged 2,300 ppm calcium. All samples were taken 30 - 50' from any road and usually taken from an established grassy area. Ninety one agricultural samples in the area contained 1,400 ppm calcium (Klein, 1972).

In 1979 approximately 20,000 field crop samples from approximately 200,000 acres were sampled from New York. The calcium content ranged from 778 - 3,532 ppm and averaged 1,651 ppm for 127 samples (Klausner and Reid, 1981). Shacklette and Boerngen (1984) gave the geometric mean of 3,400 ppm for the eastern U.S. with a range of 100 - 280,000 ppm.

Chromium

Chromium has an estimated crustal abundance of 100 ppm and an estimated mean soil content of 100 ppm (Peterson and Alloway, 1979). Vinogradov (1959) gave 20 ppm as the average chromium content of world soils. A study of 50 American soils by Slater, Holmes and Byers in 1937 gave a range of 2 - 270 ppm chromium. Cary (1982) gave an average of 43 ppm chromium for Canadian soils.

A profile of crop growing organic soils from the Holland Marsh area near Toronto, Ontario had an average of 24.6 ppm chromium (Chattopadhyay et al, 1974). For 12 organic soils from farmlands from throughout Ontario, Canada the average chromium content was 14.6 ppm, with a range of 4.1 - 39.0 ppm, 125 sandy soils had a mean chromium content of 10.0 ppm and ranged from 2.6 - 33.5 ppm, 98 loam soils ranged from 3.9 - 46.2 ppm and averaged 14.7 ppm, 60 clay soils had a range of 10.2 - 45.8 ppm chromium and a mean of 22.3 ppm. Samples having a chromium content over 35 ppm were mainly located on the Canadian shield or were soils high in clay content (Frank et al, 1976). Mills and Zwarich (1975) gave an average chromium content of 23 ppm for the A horizon of 16 agricultural soils from Manitoba, Canada and a mean of 16 ppm for the C horizon. The average chromium for 6 noncultivated fields was 22 ppm. Adriano (1986) reported a range of 20 - 125 ppm in Canadian soils and stated that the majority of U.S. soils contain between 20 - 75 ppm chromium.

A Rubicon sand from Muskegon Co., Michigan, sampled from the top 5-10 cm, contained <0.1 ppm chromium. The total chromium concentration from a Morley clay loam from Ionia Co., Michigan was 16 ppm (Grove and Ellis, 1980). Sixteen Minnesota soils derived from 7 major parent materials, from throughout the state, were tested to determine a baseline for 6 metals. The chromium content averaged 39 ppm for a depth of 0 - 75 cm and ranged 14 - 104 ppm. The three high concentrations of 104, 106 and 111 ppm were from a Rainy Lobe Till. If the Rainy Lobe Till values are excluded the range in chromium content would be 14 - 50 ppm (Pierce et al, 1982). A muskingum silt loam, a gray-brown podzolic soil with an immature profile from Zanesville, Ohio, had a mean chromium concentration of 3 ppm for the depth of 0 - 72", ranging from 2-4 ppm (Slater et al, 1937).

For 70 residential soil samples from Grand Rapids, Michigan the mean chromium level was 3.2 ppm and for 91 agricultural samples the mean was 4.6 ppm (Klein, 1972). Prince (1957) gave a range of 20-75 ppm chromium and an average of 38.5 ppm for 10 major agricultural soils from throughout New Jersey. The range in chromium concentration, in a poarch fine sandy loam of high acidity, from the Harrison Experiment Forest near Saucier, Mississippi was 3.8 - 9.2 ppm, for the depth of 0-62 cm (DeGroot et al, 1979).

Chromium extracted by 1M HCl, from a recent survey of Vermont soils, ranged from 0.1 - 18 ppm. Higher levels were associated with spodic horizons (Bartlette and Kimble, 1976). A cultivated soil profile from Eastham, MA contained an average of 120 ppm chromium, with a range of 90 - 140 ppm, for the depth of 0 - 30 cm (Laul, 1983). Luce (1985) quoted an average of 100 ppm for the chromium content in soils. For 6 major coarse loamy textured soils of the northeast the average total chromium concentration was 72 ppm. Nine other benchmark soils, loams to clays, averaged 93 ppm chromium. Uncultivated Elkton silt loam surface soils of Delaware average 65 ppm chromium.

Shacklette and Boerngen (1984) gave 33 ppm as the geometric mean content of chromium in 541 soils east of the 97th meridian, in the U.S., and a range of 1 - 1,000 ppm.

Cobalt

Vinogradov (1959) gave an average of 8 ppm for the concentration of cobalt in world soils. The cobalt content of 49 U.S. soils ranged from 0.1 - 2.4 ppm. Bowen (1979) also gave 8 ppm as the average content of cobalt in soils and a range of 0.05 - 65 ppm.

Virgin profiles of four major soil groups from eastern Canada had a range of 1.4 - 10.3 ppm for a podzol soil profile, 7.5 - 18.2 ppm for a brown podzol profile, 5.9 - 11.7 ppm for a gray-brown podzol and 7.3 - 11.3 ppm for a brown forest soil type (Wright et al, 1955). Agricultural soils from 296 farms from throughout Ontario had a range of 1.0 - 16.7 ppm cobalt and a mean of 4.4 ppm (Frank et al, 1976).

Ten important agricultural soil types from throughout New Jersey were sampled and ranged from 2 ppm - 18 ppm cobalt (Prince, 1957). For 70 residential soil samples, from the Grand Rapids, Michigan area, the cobalt level averaged 2.3 ppm and for 91 agricultural samples the cobalt content had a mean of 2.7 ppm (Klein, 1972). From a cultivated soil profile from Eastham, MA, 0 - 30 cm, the average cobalt content was 2.2 ppm with a range of 1.7 - 2.5 ppm (Laul, 1983).

Shacklette and Boerngen (1984) gave 5.9 ppm as the geometric mean for 403 samples from the eastern United States, with a range of <0.3 - 70 ppm.

Copper

Goldschmidt (1958) stated that copper in virgin soils, under humid conditions, usually ranges from 1-10 ppm and rarely exceeds 20 ppm. In arid regions 50 ppm copper have been reported. Vinogradov (1959) gives an average copper content in soils of 20 ppm. For 51 various U.S. soils sampled the copper content ranged from 1 - 34 ppm. Adriano (1986) gave a mean value of 25 ppm for the copper concentration in U.S. soils with a range of 5 - 50 ppm for Canadian soils with an average of 22 ppm.

Pierce et al (1982) sampled 16 Minnesota soils from 7 major parent materials to obtain baselines for 6 metals. The average copper content of surface soils was 23 ppm and ranged from 16 - 28 ppm. For 70 residential soil samples from the Grand Rapids, Michigan area the average copper content was 8.0. Ninety one agricultural soils had a mean copper content of 8.8 ppm (Klein, 1972).

Seven Atlantic Coastal Plain soil profiles, from within 15 miles of Kingston, NC all formed from essentially the same parent material and developed under similar climatic conditions were sampled. All 7 of these soil groups are severely weathered and leached. The average copper content was 16 ppm, through the varying depths, and ranged from 5 - 27 ppm. The copper concentration of alluvial soils, of eastern tributaries to the Mississippi River, ranged from 19-28 ppm with an average of 23 ppm. A Brasau sandy loam from Groton, NH developed from granitic and gneissic till ranged 13-28 ppm copper for a depth of 0-19". A Hermon sandy loam from Canaan, NH, developed from granitic and other coarse-grained gneissic materials, for a depth of 0-32" ranged 17-28 ppm copper (Holmes, 1943).

For 15 unimproved agricultural fields, from Ontario, Canada, the copper content averaged 23 ppm and ranged 7.3 - 36.7 ppm (Frank et al, 1976). Wright et al (1955) studied virgin profiles from four great soil groups of eastern Canada. The range in copper content for the brown forest soil type was 5 - 19 ppm, the brown podzolic ranged 4-23 ppm copper and 5-21 ppm was the range for the podzolic soil type.

For a Muskingum silt loam, a gray-brown podzolic soil, with an immature profile that grades into the weathered parent shale, from Zanesville, Ohio contained 18 ppm copper in the 0-7" zone, 27 ppm for 8-13", 28 ppm for 14-24", and 34 ppm copper from 25-46" (Slater et al, 1937). Prince (1957) studied 10 major agricultural soils throughout New Jersey, the copper content ranged from 9-61 ppm, with an average of 23 ppm.

For 173 agricultural soils, removed from mobile and point source contamination, from New York the copper content averaged 74.8 ppm. From 81 farms in Ohio the copper content averaged 28.1 ppm, for 57 agricultural soils from Maryland the mean copper concentration was 8.1 ppm, for 47 samples from Virginia 9.4 ppm copper were found, for 4 farms in Delaware the average copper content was 5.0 ppm, for 31 agricultural soils of Maine 0.7 ppm was the mean copper content and 5.3 ppm was the mean copper content for 45 agricultural soils from Pennsylvania (Sommers et al, 1987).

Luce (1985) stated that for 54 U.S. samples the average copper level was 24 ppm with a range of 9 - 57 ppm. Seven sandy soils from the Atlantic coastal plain ranged from 9 - 25 ppm in their copper content and averaged 16 ppm. Two virgin spodosols from NH contained 24 ppm copper in the surface mineral horizon. The range for 26 Mass. soils was 5 - 38 ppm copper and averaged 16 ppm. Uncultivated surface soils of Connecticut, formed from glacial sediments from gneiss and schist, averaged 13 ppm in their copper concentration and ranged 6 - 20 ppm. The average for surface soils formed in glacial sediment derived from trap rock was 9 ppm and ranged 5-21 ppm. Glacial sediment derived from arkose sandstone averaged 6 ppm with a range of 5-8 ppm. The A horizon of 13 NJ soils from the Appalachian Province averaged 26 ppm copper and ranged from 13 - 61 ppm. The B horizon of these soils ranged from 12 - 32 ppm in copper concentration with an average of 20 ppm. Seven surface soils from coastal plains province of NJ averaged 9 ppm copper with a range of 2 -19 ppm. Fifteen major soils of the northeast averaged 59 ppm copper.

Shacklette and Boerngen (1984) found the geometric average copper content of eastern United States soils to be 13 ppm with a range of <1-700, and an estimated arithmetic mean of 22 ppm.

Iron

Jackson (1964) stated that iron makes up 1-6% (10,000 - 60,000 ppm) of soils. Kraushopf (1972) gave 10,000 - 100,000 ppm for the range of iron concentration in soils. Bowen (1979) and Vinogradov (1959) gave 40,000 ppm and 38,000 ppm respectively as the average amount of iron to be found in soils.

For 296 farms throughout Ontario, Canada the iron content ranged from 2,560 - 38,900 ppm with a mean of 14,470 ppm. Sandy soils contained the lowest iron and the clays the highest. From 13 organic soil samples the iron content averaged 13,480 ppm with a range of 2,660 - 24,800 ppm. For the 125 sandy soils the iron content was 9,030 ppm and ranged from 2,650 - 25,300 ppm, 98 loam samples averaged 16,440 ppm iron and ranged 5,400 - 32,300 ppm, the 60 clay samples averaged 22,770 and ranged 9,900 - 38,900 ppm (Frank et al, 1976).

The iron content of a poarch fine sandy loam, a strongly acidic soil from the Harrison Experiment Forest of Saucier, Miss. ranged from 4,000 - 11,000 ppm in a 0-52" profile (DeGroot et al, 1979). For 70 residential soil samples from the Grand Rapids, Michigan area the iron concentration average 2,200 ppm and from 91 agricultural samples the iron content average was 2,600 (Klein, 1972).

Holmes et al (1938) studied the Norfolk and related soils all within a 15 mile radius of Kingston, NC. A profile of a Dunbar fine sandy loam contained 3,070 ppm iron in the A_1 horizon, 3,870 ppm in the A_2 horizon, 8,020 ppm in the B_1 and 54,700 ppm in the B_2 horizon. A profile from the Coxville fine sandy loam contained 5,760 ppm in the A horizon, 20,180 ppm in the B and 18,900 in the C horizon. A profile of the Bladen loam contained 3,870 ppm iron in the A horizon, 11,700 ppm in the B and 11,200 in the C horizon. The iron content of a cultivated soil profile from Eastham, MA ranged from 11,000 - 14,000 ppm with a mean of 13,000 ppm (Laul, 1983).

Shacklette and Boerngen (1984) determined the geometric mean content of iron of soils east of the 97th meridian in the continental U.S. to be 14,000 ppm with a range of 100 - 100,000 ppm for 539 samples, the estimated arithmetic mean was 25,000 ppm.

Lead

Miesch and Claude (1972) stated that the average concentration of lead in uncontaminated soils was 16 ppm and that 95% of soils in the U.S. contain between 4 and 61 ppm lead. Soils outside but adjacent to Helena Valley, Montana contained 15 ppm lead and surface soils remote from Helena Valley contaned 15 ppm lead. Peterson and Alloway (1979) and Vinogradov (1969) stated the average concentration of lead in soil was 10 ppm, with a range between 2-200 ppm. Bowen (1979) gave 12 ppm as the average soil content of lead. Nriagu (1978) gave a range of 10-37 ppm for lead in normal soils and an average of 20 ppm.

Mills and Zwarich (1975) studied the agricultural soils of southern and western Manitoba, Canada. The parent material of most mineral soils in the agricultural areas of Manitoba are Late-Wisconsin glacial deposits. The components of which are derived from the shales of the western uplands, the carbonate rocks of the lowlands and the igneous rocks of the Canadian shield. The A and C horizon of summer fallow fields, including a range of textures and parent material were sampled. The mean lead concentration for 16 agricultural soils of the A horizon was 17 ppm and 19 ppm for the C horizon. For 6 samples from uncultivated soils (pasture or hayland adjacent to cultivated fields) averaged 16 ppm lead.

For 15 unimproved soils from Ontario, Canada the average lead concentration was 12.5 ppm and ranged from 3.2 - 33.7 ppm (Frank et al, 1976).

The lead content of two virgin profiles of four major soil groups of eastern Canada was determined by Wright et al (1955). The brown forest soil type contained between 8-23 ppm lead, the gray-brown podzol 16-33 ppm, the brown podzolic 13-30 ppm and the podzolic 9-15 ppm.

Pierce et al (1982), in establishing baseline levels of 6 metals for 16 soil series in Minnesota, stated that the total lead for all soils was low, in all cases below the detectable limit of 25 ppm.

Adriano (1986) gave an average of 5-25 ppm as an average amount of lead in soils far from human activity. Background levels of lead in 173 samples from 53 soils widely dispersed in Canada averaged 20 ppm.

For 173 New York State agricultural soil samples, from sites removed from mobile and point source contamination, the mean lead content was 17 ppm, for 81 Ohio farm samples the average lead concentration was 19 ppm, for 57 agricultural soils from Maryland 11 ppm was the mean lead level, for 4 agricultural soils from Delaware 10 ppm was the average lead content, from 31 Maine farms 10 ppm was the mean lead concentration, and for 45 Pennsylvania agricultural sites the average lead content was 24 ppm (Sommers, 1987).

For 98 mineral soils from New York State, utilized in the production of commerical fruits and vegetables, contained 15 ppm lead, on the average, with a maximum value of 30 ppm. For 63 organic soils the lead content averaged 20 ppm, with a maximum of 36 ppm (Luce, 1985).

Shacklette and Boerngen (1984) determined the geometric mean for the lead content of soils found in the eastern U.S. to the 14 ppm and ranged from <10-300 ppm, for 422 samples.

Magnesium

Vinogradov (1959) stated the average content of magnesium in soils was 6,300 ppm. Bowen (1979) gave 5,000 ppm as the average content of magnesium in soils, with a range of 400-9,000 ppm.

Crop growing organic soils from the Holland Marsh area near Toronto, Ontario were found to contain 780 ppm and 765 ppm magnesium in two surface soil samples. A soil profile from 0 - 7.5 cm was found to contain 640 ppm, the depth 7.5 - 15 cm contained 420 ppm and from 15 - 22.5 cm 400 ppm magnesium were found (Chattopadhyay, 1974).

Holmes et al (1938) determined the chemical composition of soils and colloids of Norfolk and related soil series. For a Fuston fine sandy loam the magnesium content in the A horizon was 241 ppm in the B horizon 723 ppm and 543 ppm in the C horizon. The Dunbar fine sand loam profile revealed a magnesium content of 60 ppm in the A_1 horizon, 60 ppm in the A_2 horizon, 600 ppm in the B_1 horizon, and 180 ppm in the B_2. The chemical analysis of the Coxville fine sandy loam revealed 543 ppm magnesium in the A horizon, 663 ppm in the B and 543 ppm in the C.

Shacklette and Boerngen (1984) determined the geometric mean content of magnesium in soils and surficial materials to be 2,100 ppm in the eastern U.S. with a range of 50-50,000 ppm, for 528 samples.

Manganese

Vinogradov (1959) gave 850 ppm as the average amount of manganese to be found in soils. In 162 samples of New Jersey soils the manganese concentration ranged from 100-2,000 ppm. Bowen (1979) stated 1,000 ppm as the average amount of manganese to be found in soils. Goldschmidt (1958) stated that the manganese content in soils varies from 200-5,000 ppm. Adriano (1986) gives 850 ppm as the average manganese content of soils, with a range of 100-4,000 ppm.

Two virgin profiles were taken from four great soil types of eastern Canada. The manganese content ranged from 328-667 ppm in the podzol profile, 508-1,329 ppm in the brown podzolic, 358-1,088 ppm in the gray-brown podzolic and 406-1,380 ppm in the brown forest soil type (Wright et al, 1955). For 15 unimproved agricultural soils from throughout Ontario the average amount of manganese found was 490 ppm with a range of 91-1,190. For 13 organic agricultural soils the mean manganese content was 338 ppm, with a range of 240-540 ppm, for 125 sandy soils the average manganese content was 428 ppm with a range of 90 - 1,790 ppm, for 98 loam soils 606 ppm was the average manganese content with a range of 138-2,010 ppm, for 60 clay samples 662 ppm was the mean manganese content with a range of 140-3,000 ppm. For all 296 agricultural samples 530 ppm was the mean manganese content with a range of 90 - 3,000 ppm (Frank et al, 1976).

Blair and Prince (1936) determined the manganese content of virgin soils from Burlington, Co., New Jersey to be 46.5 ppm. In fields with no fertilizer treatment the manganese content ranged from 101-302 ppm. From some uncultivated soils of New Jersey the manganese content was found to range from 264-736 ppm. For ten major agricultural soils from throughout New Jersey the manganese content was found to be 130-1,560 ppm, with an average of 789 ppm (Prince, 1957). A control plot at Oklahoma State University contained 268 ppm manganese (Mortvedt, 1987). For a cultivated soil profile from Eastham, MA, 0-30 cm, the manganese content ranged from 340-350 ppm (Laul, 1983).

For 173 samples from 53 Canadian soils the manganese content ranged from 100-1,200 ppm with a mean of 520 ppm. The mean manganese content of Ontario soils was 530 ppm and ranged from 90-3,000 ppm (Adriano, 1986).

Shacklette and Boerngen (1984) gave the mean content of manganese in soils in the eastern U.S. to be 260 ppm with a range of <2 - 7,000 ppm for 537 samples.

Mercury

The average concentration of mercury in soil, according to Vinogradov (1959), is 0.01 ppm. Bowen (1979) gave 0.06 ppm as the average content of mercury in soils, with a range of 0.01 - 0.5 ppm. Dewey (1983) quoted 0.05 ppm as the average concentration of mercury in soils and rocks. Organic matter in soils may contain up to 1.0 ppm mercury. The upper limit of the mercury concentration in soils of the northeastern U.S. is 0.04 ppm.

Adriano (1986) gave 0.161 ppm as the average content of mercury in the A horizon of soils, with a range of 0.06 - 0.2 ppm. An average of 0.089 ppm for the B horizon ranging between 0.03 - 0.14 ppm and 0.096 ppm for the C horizon ranging between 0.025 - 0.15 ppm. A mean content of 0.013 ppm was given by Anderson (1979) for the mercury amount found in the sand fraction of soil, 0.029 ppm for silt and 0.094 ppm for clay. This indicates that the mercury concentration increases with increased surface area and increased alteration from the parent material.

For 17 samples of cultivated U.S. soils the average mercury content was 0.06 ppm, forest soils from the A_o horizon of Norway contained 0.02-0.15 ppm mercury, cultivated and uncultivated A horizon soils from Canada had a range of 0.005 - 0.036 ppm mercury for 27 samples, for 65 virgin Canadian soil samples the range in mercury concentration was <0.005 - 0.66 ppm with an average of 0.06 ppm (Anderson, 1979).

MacLean et (1973) stated that normal soils contain 0.07 ppm mercury. Sites on the Central Experiment Farm Ottawa, Ontario contained 0.05 ppm mercury. The average mercury level of 65 virgin soils of Canada 234 samples from various layers, was found to be 0.081 ppm by McKeague and Kloosterman (1974). Gracey and Stewart (1974) found a range of 0.005 - 0.057 ppm mercury in 9 uncultivated soil profiles, 3-6 samples were taken from each profile, from settled areas of Saskatchewan, Canada. For 15 samples from unimproved fields of Ontario the mercury content ranged from 0.03 - 0.49 ppm, with an average of 0.08 ppm (Frank et al, 1976).

Fifty agricultural soils from four areas throughout N. Dakota revealed a mean of 0.03 ppm mercury (Sell et al, 1975). A survey of farm soils from 16 major wheat-growing states of the U.S. revealed a geometric mean mercury concentration of 0.105 ppm, with a range of 0.05 - 0.36 ppm, for 24 samples. Agricultural surface soils from 29 eastern U.S. states gave a mean mercury content of 0.08 ppm for 275 samples and 0.07 ppm for 104 noncropland samples (Adriano, 1986).

Shacklette and Boerngen (1984) gave 0.081 ppm as the geometric mean for 534 samples from the eastern U.S., with a range of 0.01 - 3.4 ppm.

Nickel

Peterson and Alloway (1979) gave 40 ppm as the average content of nickel in soils, with a range of 10 - 1,000 ppm. Bowen (1979) gave 50 ppm for a mean value of nickel in soils and a range of 2 - 750 ppm. An average of 40 ppm was given by Vinogradov (1959). In 49 soils sampled in the U.S. the nickel concentration ranged from 0.5 - 23 ppm. The average nickel content for U.S. soils is 20 ppm and ranges from 5 - 50 ppm for Canadian soils (Adriano, 1986).

Sixteen agricultural soils from Manitoba on the average contained 42 ppm nickel in the A horizon, 39 ppm in the C horizon. For 6 noncultivated soil samples the nickel content averaged 39 ppm (Mills and Zwarich, 1975). Two surface soil samples, from crop growing organic soils from the Holland Marsh area near Toronto, Ontario, averaged 7.98 ppm nickel. From 0-7.5 cm the nickel concentration was 6.21 ppm, 6.64 ppm for 7.5 - 15 cm and for 15 - 22.5 cm it was 5.23 ppm (Chattopadhay et al, 1974).

For 17 organic agricultural soils from Ontario the nickel content averaged 28.6 ppm and ranged 6.6 - 119 ppm, for 125 sandy soils the nickel concentration averaged 7.6 ppm with a range of 1.3 - 34.2 ppm, for 97 loam samples the mean was 17.9 ppm, ranging from 3.0-97.5 ppm, 60 clay samples averaged 27.8 ppm, ranging 8.0 - 88.0 ppm. For all 293 agricultural samples the mean nickel level was 15.9 ppm and ranged from 1.3 - 119.0 ppm (Frank et al, 1976).

Sixteen Minnesota soils from 7 major parent materials were analyzed to obtain a baseline for 6 metals. The average nickel concentration from surface soils from throughout the state was 18 ppm, ranging from 7 - 39 ppm (Pierce et al, 1982). From 10 major agricultural soils from throughout New Jersey the nickel level ranged from 14 - 61 ppm with a mean of 27.3 ppm (Prince, 1957). A muskingum silt loam, a gray-brown podzolic soil from Zanesville, Ohio, had an average nickel content of 26 ppm from 0 - 72" (Slater et al, 1937).

For 26 Massachusetts soils the nickel content ranged from 6 - 41 ppm. With an average of 26 ppm. Thirteen surface soils (A or Ap horizon), of the Appalachian Province of N.J., ranged from 11 - 40 ppm in their nickel content with a mean of 20 ppm. The B horizon had on average of 22 ppm with a range of 14 - 41 ppm. Fifteen benchmark soils from the northeast averaged 37 ppm in their nickel content, these soils were found in Connecticut River Valley alluvium. An average nickel content of 23 ppm was determined for the Ap horizon of four Hadley Silt loam pedons sampled from Connecticut, the range was from 20 - 27 ppm (Luce, 1985).

The mean nickel content for 173 New York State agricultural soils sampled away from mobile and point source contamination was 19.5 ppm. For 40 W. Virginia agricultural samples the mean nickel concentration was 23.3 ppm, for 81 Ohio farm 28.2 ppm, for 57 Maryland agricultural soils 12.4 ppm, for 46 Virginia farms 22.3 ppm, for 31 Maine samples 41.5 ppm and for 45 Pennsylvania farms the mean nickel content was 10.4 ppm (Sommers et al, 1987).

Shacklette and Boerngen (1984) determined the geometric mean nickel content for 443 samples from the eastern U.S. to be 11 ppm, with a range of <5 - 700 ppm.

Potassium

Vinogradov (1959) gave 13,600 ppm as the average amount of potassium in soils. Bowen (1979) gave 14,000 ppm as the mean content of potassium in soils with a range of 80 - 37,000 ppm. Jackson (1964) stated that potassium made up 0.05-3.5% (500-35,000 ppm) of mineral soils and that agricultural soils of the U.S. contain between 1-2% (10,000 - 20,000 ppm) potassium.

Holmes et al (1938) studied the chemical composition of the Norfolk and related soil series. The potassium content in an Orangeburg fine sandy loam was 249 ppm in the A horizon, 995 ppm in the B and 912 ppm in the C horizon. A profile from the Dunbar fine sandy loam revealed a potassium content of 83 ppm in the A_1 horizon, 83 ppm in the A_2, 497 ppm in the B_1 and 249 ppm in the B_2. In the Coxville fine sand loam 1,244 ppm potassium were found in the A horizon, and 2,736 ppm in both the B and C horizons.

From a cultivated soil sample from Eastham, MA, 0-30 cm, the potassium concentration averaged 11,000 ppm (Laul, 1983).

In 1979 Klausner and Reid (1981) compiled 20,000 field samples covering roughly 200,000 acres of New York State. The potassium ranged from 47.5 - 117.5 ppm for 127 samples with an average of 79.6 ppm.

Shacklette and Boerngen (1984) gave the geometric mean of the potassium level in soils of the eastern U.S. to be 12,000 ppm for 537 samples with a range of 50 - 37,000 ppm.

Selenium

Peterson and Alloway (1979) stated that 0.05 ppm was the average crustal abundance of selenium. The estimated average soil concentration of selenium was 0.2 ppm with a range of 0.01 - 2 ppm. Eisler (1985) gave 0.2 ppm as the average soil content of selenium. Vinogradov (1959) stated that 0.01 ppm was the mean selenium content of soils. From a study conducted in 1936 of 1,406 plains soil samples the selenium content ranged from 0.2 - 140 ppm. Bowen (1979) gave 0.4 ppm as the average content of selenium in soils with a range of 0.01 - 12 ppm.

Levesque (1974) obtained 54 soil samples from 4 soil types and 6 horizon layers from the northwest territories of Canada, chosen for remoteness. The selenium concentration ranged from 0.073 - 2.090 ppm. Two surface soil samples from crop growing organic soils, from the Holland Marsh area near Toronto, Ontario, contained 1.10 and 1.43 ppm selenium. A profile of this soil contined 1.22 ppm from 0-7.5 cm, 0.81 ppm from 7.5 - 15.0 cm and 0.62 ppm selenium from 15 - 22.5 cm and 0.62 ppm selenium from 15 - 22.5 cm (Chattopadhyay et al, 1974).

A cultivated soil profile, 0 - 30 cm, from Eastham, MA had a range in selenium content from 2.4 - 5.1 with an average of 3.5 ppm (Laul, 1983). A soil profile, 0.72", was taken from a muskingum silt loam, a gray-brown podzolic soil, from Zanesville, Ohio had an average selenium content of 0.25 ppm with a range of 0.02 - 0.5 ppm (Slater et al, 1937).

Shacklette and Boerngen (1984) found the geometric mean content of selenium in soils of the eastern U.S. to be 0.3 ppm with a range of <0.1 - 3.9 ppm for 449 samples.

Sodium

Vinogradov (1959) gave 6,300 ppm as the average concentration of sodium in soils. Jackson (1964) stated that sodium makes up between 0.1 - 1% (1,000 - 10,000 ppm) of soils. Bowen (1979) quoted 5,000 ppm as the mean concentration of sodium in soil with a range of 150 - 25,000 ppm.

Holmes et al (1938) studied the chemical make up of the Norfolk and related soils. The B horizon of the Orangeburg fine sandy loam contained 223 ppm sodium and the C horizon 74 ppm sodium. A profile of the Ruston fine sandy loam revealed 1,261 ppm sodium in the A horizon, 223 ppm in the B and 445 ppm in the C. A profile of the Dunbar fine sandy loam contained 816 ppm sodium in the A_1 horizon, 74 ppm in the A_2, 446 ppm in the B_1 and 74 ppm in the B_2.

A profile from a cultivated soil sample from Eastham, MA from 0-30 cm, on the average contained 4,300 ppm sodium and ranged from 3,900 - 4,800 ppm (Laul, 1983).

Shacklette and Boerngen (1984) determined the geometric mean for 363 soil samples from the eastern U.S. to be 2,500 ppm, with a range of 500 - 50,000 ppm.

Vanadium

Vinogradov (1959) gave 100 ppm as the average content of vanadium in soils. For 50 various U.S. soils the vanadium concentration ranged from 2 - 270 ppm. Bowen (1979) gave 90 ppm as the mean concentration of vanadium in soils.

Adriano (1986) stated that the vanadium content in igneous rocks, shale, sandstone and limestone of the U.S. was 135 ppm, 130 ppm, 20 ppm and 20 ppm respectively. Soils from sandstone and limestone contain lower amounts of vanadium than soils developed from shales and igneous rocks.

Prince (1957) found the vanadium content of 10 major agricultural soils from throughout New Jersey to range from 11-119 ppm with an average of 53.6 ppm. A profile of a crop growing organic soil from the Holland Marsh area near Toronto, Ontario revealed a vanadium content of 11.0 ppm in the surface, 15.2 ppm 0-7.5 cm, 21.4 ppm 7.5-15.0 cm, and 26.1 ppm from 15-22.5 cm (Chattopadhyay et al, 1974).

A soil profile of a muskingum silt loam, a gray-brown podzolic soil from Zanesville, Ohio, had a mean vanadium content of 72 ppm for 0-72", with a range of 20-96 ppm (Slater et al, 1937).

The geometric mean content of vanadium in the superficial materials of the eastern U.S. was found to be 43 ppm by Shacklette and Boerngen (1984) with a range of <7-300 ppm for 516 samples.

Zinc

The average concentration of zinc in soils is 50 ppm (Vinogradov, 1959; Peterson and Alloway, 1979; Schroeder, 1967). Miesch and Claude (1972) gave 44 ppm as the average zinc content in soils. The zinc content of soils often ranges from 10 - 300 ppm (Peterson and Alloway, 1979; Schroeder et al, 1967).

Four great soil groups, all developed on glacial till and all well drained, from eastern Canada had two virgin profiles analyzed. The range in zinc content for the podzolic profile, 0-30", the zinc range was from 53-150 ppm, for the gray-brown podzolic 62-87 ppm and for the brown forest soil 36-74 ppm (Wright et al, 1955). For 15 unimproved fields in Ontario the average zinc content was 48.5 ppm, ranging from 5.3 - 116 ppm (Frank et al, 1976). The mean zinc concentration from the A horizon of 16 agricultural soils of Manitoba, Canada was 116 ppm, and 66 ppm for the C horizon of these soils. For 6 noncultivated soil samples the average zinc content was 119 ppm (Mills and Zwarich, 1975).

Various soils and horizons from the U.S. Erosion Experiment Stations revealed a range of 3-147 ppm for acid soluble zinc (Goldschmidt, 1958). Sixteen Minnesota soils from 7 major parent materials zinc concentration ranged from 40-74 ppm for 0-15 cm, with an average of 60 ppm (Pierce et al, 1982). For 70 residential soil samples the mean zinc content was 21.1 ppm from the Grand Rapids, Michigan area. And for 91 agricultural samples from this area revealed a mean zinc content of 22.1 ppm (Klein, 1972).

Holmes (1943) gave a range of 59-97 ppm zinc, from a depth of 0-12", for the eastern tributaries to the Mississippi River. A Brasau sandy loam from Groton, NH, from 0-20", had a zinc content of 27-42 ppm. A Hermon sandy loam from Canaan Ctr. NH, from 0-32", had a range in zinc content from 26-40 ppm.

The mean zinc content for a soil profile from a muskingum silt loam a gray-brown podzolic soil, from Zanesville, Ohio was 7 ppm for 0-72" (Slater et al, 1937). For ten agricultural soils from throughout NJ the zinc concentration ranged from 21-180 ppm with an average of 82.7 ppm (Prince, 1957). A soil profile, 0-30 cm, from Eastham, MA had an average zinc concentration of 33 ppm with a range of 30-40 ppm (Laul, 1983).

From 173 agricultural soils from New York State, removed from mobile and point source contamination, the zinc content averaged 64 ppm. For 40 agricultural soils from W. Virginia the zinc content averaged 84 ppm, for 81 Ohio farms the zinc mean concentration was 89 ppm, for 57 Maryland agricultural soils 31 ppm, for 4 Delaware farms 25 ppm, 46 Virginia soils 56 ppm, for 31 Maine agricultural soils 74 ppm and 45 Pennsylvania farms the zinc content averaged 30 ppm (Sommers et al, 1987).

Two virgin spodzols from NH contained 28 ppm zinc. For 6 coarse-loamy textured soils of the northeast the mean zinc content was 53 ppm, while 9 fine-loamy to clayey soils averaged 86 ppm zinc.

Twenty five Mass. soils ranged from 15 - 104 ppm zinc and averaged 62 ppm (Luce, 1985).

Shacklette and Boerngen (1984) have determined the geometric mean of 473 samples from the eastern U.S. to be 40 ppm, with a range of <5-2,900 ppm.

AVERAGES AND RANGES OF THE CONCENTRATION OF SOME ELEMENTS IN UNCONTAMINATED SOILS
All values in ppm, dry weight

	Average Conc. of Element Found in Uncontaminated Soils	References for Averages	Conc. Range of Element Found in Uncontaminated Soils	References for Ranges
Aluminum	Eastern U.S.* 33,000	8, 43	Albany, NY Area 1,000 - 25,000	8, 43
	Agricultural Soil 0 - 30 cm Eastham, MA 34,000	24		
Arsenic	5	5, 8, 16, 29, 36, 40, 43, 44, 50, 53	U.S. Range 0.1 - 45	1, 5, 29, 36, 50, 52 53
			NYS 3-12	52
			Albany Area <0.1-6.5	43
Barium	Average abundance in earth's crust 430	31	NYS 15-600	43, 44
	Eastern U.S.* 290	8, 43	Albany Area 250-350	43
	Eastham, MA Soil 180	24		
Beryllium	All Soils 0.3	5	All Soils 0.1-10	31, 50
	Eastern U.S.* 0.6	8, 43, 44	Canadian Surface Soils 0.1 - 0.89	1
			NYS 0 - 1.75 (except for 1 sample 1.75-7)	43, 44
			Albany Area 0 - 0.9	43, 44
Cadmium	Average abundance in earths crust 0.15-0.2	31, 36	0.01 - 2	5
	26 MA soils and 15 northeastern soils 0.2	13, 26	0.0001 - 1.0	26, 35, 36, 41, 47
			soils of nonvolcanic origin 0.01-1.0	11
	0.35	5	soils of volcanic origin up to 0.45	11
	98 NYS mineral agricultural soils 0.21	26	26 MA soils 0.01 - 0.88	26

	Average Conc. of Element Found in Uncontaminated Soils	References for Averages	Conc. Range of Element Found in Uncontaminated Soils	References for Ranges
Calcium	Eastern U.S.* 3,400	8, 23	Eastern U.S.* 100-28,000	43
	70 Residential Soils, Mich. 2,300	22	Eastern U.S.* 100-16,000	8
	91 Agricultural Soils, Mich. 1,400	22	NYS 130-35,000	43
	127 NYS Agricultural Soils 1,651	21	Albany Area 150-5,000	44
			Albany Area 2,900-6,500	43
Chromium	Canadian soils 43	6	Most U.S. soils 25-85	1
	World soils 20	50	Eastern U.S.* 1-100	8
	Eastern U.S.* 33	8,43	10 NJ soils 20-75	39
			NYS 1.5-40	8
			Albany Area 1.5-25	8, 43
Cobalt	All soils 7	5, 8, 31, 36, 50	0.1-40	14, 36
	Eastern U.S.* 5.9	43	NJ Agr. Soils 2-18	39
			NYS 2.5-60	8, 43
			Albany Area 2.5-6	43
Copper	All soils 30	26	2-250	5, 36
	All soils 20	36, 49, 50	10-80	23
	10 NJ Agr. Soils 23	39	1-10 under humid conditions	14
	Eastern U.S.* 13	8.43	up to 50 in arid conditions	14
			26 MA Soils 5-38	26
			Albany Area <1-15	8, 43

	Average Conc. of Element Found in Uncontaminated Soils	References for Averages	Conc. Range of Element Found in Uncontaminated Soils	References for Ranges
Iron	Eastern U.S.* 14,000	8, 43	2,000 - 550,000	5
	Eastham MA Agr. Soil 13,000	24	700 - 100,000	23, 43
			Eastham, MA 11,000-14,000	24
			Albany Area 17,500 - 25,000	8, 43
Lead	All soils 10	5, 36, 50	Range in "normal" soils 10-37	1, 33
	Eastern U.S.* 14	8, 29, 33, 43	95% of U.S. soils 4-61	29
	98 NJ agr. soils mineral 15, organic 20	26	Albany Area 1 - 12.5	8, 43
	173 NY agr. soils 17	47		
Magnesium	All soils 6,300	50	400 - 9,000	5
	Eastern U.S.* 2,300 2,100	8 43	100 - 5,000	8, 43
			Albany Area 2,500 - 6,000 1,700 - 4,000	 8 43
Manganese	All soils 850	1, 50	100 - 4,000	1
	Eastern U.S.* 285 260	8 43	10 Agr. NJ soils 130-1,560	39
	10 Agr. NJ Soils 789	38	NJ Cultivated Soils 264-736	4
	Eastham, MA Agr. Soil 345	24	NYS 50-5,000	8, 43
			Albany Area 400-600	8, 43
Mercury	All Soils 0.06	1, 2, 5	0.001 - 0.2	2, 13, 28, 50
	Eastern U.S.* 0.081	43	Albany Area 0.042 - 0.066	43

	Average Conc. of Element Found in Uncontaminated Soils	References for Averages	Conc. Range of Element Found in Uncontaminated Soils	References for Ranges
inc	50	26, 36, 41, 50	All Soils 10-300	26, 36, 41
	Eastern U.S.* 40	8, 24, 29, 43	9-50	31
	173 NY Agr. Soils 64	47	Albany Area 37-60	43

Eastern U.S. Soil values are the geometric mean element concentration from a depth of 24 cm, in soils east of the 97th meridian.

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Attachment A

Waste Disposal Documentation

O'BRIEN & GERE
ENGINEERS, INC.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

GENERATOR FORM
PART - I

50 WOLF ROAD
ALBANY, NEW YORK 12233

HAZARDOUS WASTE DISPOSAL QUESTIONNAIRE

PLEASE COMPLETE AND RETURN TO THE ABOVE ADDRESS, ATTENTION: RTK PROCESSING UNIT, ROOM 525

ICS #: 8177489

JARL EXTRUSIONS INC.
860 LINDEN AVE.
E. ROCHESTER NY 14445

ICS CODE
EPA ID NUMBER NYD002209625

CITY	STATE	ZIP CODE

PLANT

CONTACT NAME	TELEPHONE
Philip Aldrich	(716)586-2660

PLANT ADDRESS (if different) STREET	CITY	STATE	ZIP CODE

PRINCIPAL BUSINESS OF PLANT
Aluminum Extrusions

PLEASE ANSWER THE FOLLOWING QUESTIONS: — CHECK ONE

1. SINCE JANUARY 1, 1952 THRU DECEMBER 31, 1981, HAVE YOU OR ANY PREVIOUS OWNERS/OPERATORS OF THIS FACILITY GENERATED ANY HAZARDOUS WASTE (SEE INSTRUCTIONS) AT YOUR PRESENT FACILITY, PLANT, PROPERTY, ETC?

☒ YES
☐ NO

IF THE ANSWER IS YES COMPLETE QUESTIONS 1, 2, 3, 4 AND GENERATOR FORM PART - II
IF THE ANSWER IS NO COMPLETE QUESTIONS 1 AND 4 AND RETURN THIS FORM

2. HAS THE FACILITY AT THIS LOCATION CHANGED ITS NAME OR IDENTIFICATION BECAUSE THERE WAS A CHANGE IN OWNERSHIP, CORPORATE NAME OR OPERATOR NAME, ETC. IF YES LIST THE NAMES BY WHICH THIS FACILITY HAS BEEN IDENTIFIED SINCE JANUARY 1, 1952 TO THE PRESENT.

☐ YES
☒ NO

NAME, ADDRESSES, AND TELEPHONE NUMBERS	DATES

3. DESCRIBE THE DOCUMENTS FROM WHICH DATA THAT IS INCLUDED ON PART-II WAS OBTAINED (SEE INSTRUCTIONS).

DOCUMENT DESCRIPTION	DATES
CECOS purchase order and manifest	9/03/80
Chem-trol/SCA invoices	7/76 to 12/78
Abondoned waste lagoon study - LaBella Assoc.	7/82

4. I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT INFORMATION SUPPLIED IS TRUE AND COMPLETE. FALSE STATEMENTS SUBMITTED ON THIS DOCUMENT ARE PUNISHABLE PURSUANT TO SECTION 210.45 OF THE PENAL LAW.

NAME OF OWNER/OPERATOR, PARTNER OFFICER OR AUTHORIZED REPRESENTATIVE	TITLE	DATE
Philip Aldrich	Plant Manager	9/30/84

Philip Aldrich (716)586-2660

NAME	ICS NUMBER - EPA ID NUMBER	
ADDRESS		
CITY	STATE	ZIP

RECEIVED
APR 03 1984
Jarl Extrusions, Inc.

GENERATOR FORM
PART - II

G

DATE 9/30/84

This information is based upon a review of internal reports, studies and documents relating to Jarl's waste disposal practices.

1. HAZARDOUS WASTE DISPOSAL SITE (SEE INSTRUCTIONS)	2. DESCRIPTION OF HAZARDOUS WASTES DEPOSITED AT THIS LOCATION (SEE INSTRUCTIONS)	3. EPA WASTE CODE	4. WASTE DISPOSED OF QUANTITY OF WASTE (TONS)	FORM: LIQUID	FORM: SOLID	FORM: DRUMS	5. WASTE DISPOSAL DATES	6. TRANSPORTER OF HAZARDOUS WASTE (SEE INSTRUCTIONS)
CECOS International, Inc. Niagara Falls Landfill 56th Street & Pine Avenue Niagara Falls, NY	Sludge containing Trivalent Chromium (semi-solid)	D007	4.4			X	9/80	D & J Transportation Specialist 107 7th North Street Liverpool, NY
Chem-trol Pollution Services, Inc.* P.O. Box 200 Model City, NY 14107 (landfilled)	Sludge containing Trivalent Chromium (semi-solid)	D007	2104			X	7/76 to 11/78	Chem-trol Pollution Services, Inc.* P.O. Box 200 Model City, NY 14107
Chem-trol Pollution Services, Inc.* (same as above address)	Chromate Solution	D007	20.6	X			4/78 to 12/78	Chem-trol Pollution Services, Inc.* P.O. Box 200 Model City, NY 14107
Chem-trol Pollution Services, Inc.* (same as above address)	Spent die cleaning solution (high PH)	D002	90.4	X			7/76 to 9/76	Chem-trol Pollution Services, Inc.* P.O. Box 200 Model City, NY 14107
Jarl Extrusions, Inc. 860 Linden Avenue E. Rochester, NY 14445 (lagoons)**	Wastewater from Aluminum forming operations (may not have been hazardous)	D002/ D007	800 Tons/year (rough estimate may not have been hazardous)	X			1963 until 1976	None

NOTE: Since the CECOS and Chem-trol/SCA sites are widely known commercial waste sites in New York, no location maps are included for these facilities.

** All evidence indicates that this wastewater, if generated today, would not be classified as a hazardous waste. Soil borings have indicated that the soil in the former lagoon area is not hazardous.

* Changed its corporate name to SCA Chemical Waste Services, Inc. during the time-frame it received Jarl's waste.

ATTACHMENT 1

CONTRACT FOR REMOVAL, DISPOSAL OR TREATMENT OF WASTE

BMN

Chem-Trol Pollution Services, Inc.
P.O. BOX 200 • MODEL CITY, NEW YORK 14107

DATE: July 23, 1976

CUSTOMER Jarl Extrusions

ADDRESS 860 Linden Avenue, East Rochester, NY 14445

ATTENTION: Attention: Mr. Philip Aldrich

Chem-Trol Pollution Services, Inc., hereinafter referred to as "Chem-Trol," and the abovenamed customer hereby agree that the following materials will be removed, disposed of, treated and/or sold on the terms and conditions hereinafter provided.

	DESCRIPTION AND/OR COMPOSITION OF MATERIAL	PROCESSING CHARGE OR PRICE	APPROXIMATE VOLUME
1609-A	Aluminum Hydroxide Sludge cloudy gray/opaque bilayered liquid 10% top aqueous layer 90% bottom sludge layer Sp. Gr. - 1.02 pH - 7.0 no flash point, no cyanides 10 - 15% $Al(OH)_3$	\$14.50/55 gal. dr.	310 gal./day
1609-B	Chromium Hydroxide Sludge opaque, gray/green sludge no layers Sp. Gr. - 0.90 pH - 7.0 no flash point, no cyanide 10 - 15% $Cr(OH)_3$ no Hexavalent chrome	\$14.50/55 gal. dr.	165 gal./day
1609-C	Spent Die Cleaning Sol. medium viscosity liquid with no liquid layers	\$.115/gal. or \$11.00/dr.	165 gal./day

LOCATION(S) AT WHICH DESCRIBED MATERIALS WILL BE GENERATED:

East Rochester, NY

TRANSPORTATION METHOD AND CHARGE (Subject to change on notification)
*(See page 2 for alternate method of transportation.)
Above Prices are F.O.B. Model City, NY Transportation can be provided by Chem-Trol at \$298.00 per 80 drum (40,000 lb. max.) closed van load including two hours loading time. Additional loading time - \$5.00/15 min.

METHOD OF DISPOSAL OR TREATMENT. Processing using Chem-Trol's Closed Loop System In accordance with State & Federal Pollution Control Regulations.

TERM OF AGREEMENT:

One year agreement - July 25, 1976 to July 24, 1977

VOLUME OF WASTE MATERIALS: Although Customer does not guarantee any specific volume of waste materials, Customer agrees to deliver to Chem-Trol, during the term and any extended term of this Contract, all waste products of the composition herein above described generated at the location(s) described above.

PRICE ADJUSTMENT: During the term and any extended term of this contract, the processing charge or price stated on the face of this Contract may be increased by Chem-Trol upon not less than 30 days' written notice to the customer.

PAYMENT TERMS: Net 30 Days after Date of Invoice — U.S. Funds - Plus Applicable Sales Tax

This agreement is subject to all of the terms and conditions on the face and reverse side hereof. It shall become a binding contract only when signed and delivered by the customer to Chem-Trol and accepted by an officer of Chem-Trol in writing and a copy of said written acceptance is mailed or delivered to the customer.

	ACCEPTED BY:
CUSTOMER'S SIGNATURE	CHEM-TROL POLLUTION SERVICES, INC.
BY ______	
Office or Position: ______	BY: ______
DATE ______	DATE ______

CONTRACT FOR REMOVAL, DISPOSAL OR TREATMENT OF WASTE

Chem-Trol Pollution Services, Inc.
P.O. BOX 200 • MODEL CITY, NEW YORK 14107

DVM

DATE: August 21, 1978

CUSTOMER JARL EXTRUSIONS, INCORPORATED

ADDRESS 860 Linden Avenue, EAST Rochester, NY 14445

ATTENTION:

Chem-Trol Pollution Services, Inc., hereinafter referred to as "Chem-Trol," and the abovenamed customer. hereby agree that the following materials will be removed, disposed of, treated and/or sold on the terms and conditions hereinafter provided.

DESCRIPTION AND/OR COMPOSITION OF MATERIAL	PROCESSING CHARGE FOB MODEL CITY	APPROXIMATE VOLUME
1609-B-TRIVALENT CHROMIUM SLUDGE	\$16.50/55 gal. drum	60 drums/year

- semisolid composed of:
  - -chromiumhydroxide sludge with sodium chloride and sulfate present
  - -balance water
- sp.g. 1.0-1.4
- organic Cl, S - none
- No Flash Point
- pH 7±1
- no Cyanides
- free liquid less than 15% by volume.

60 × 55 = 3300 gallons
≅ 500 gallons/hr
= 300 gal
$Cr(OH)_3$

LOCATION(S) OF WASTE PRODUCT.

TRANSPORTATION (Rates, subject to change on notice): Rates quoted herein apply only to pick-ups using Chem-Trol owned and operated equipment. If another carrier must be provided, such charges are to be billed directly to the customer by the other carrier. Transportation can be provided by Chem-Trol for \$............/ tank truck including one hour loading time and/or \$............/ 80 drum closed van including two hours loading time. Additional loading time \$............ per 15 minutes; pump charge \$............; scale charge \$............; hose in excess of 40 feet \$............/foot.

METHOD OF DISPOSAL OR TREATMENT: Processing using Chem-Trol's Closed Loop System in accordance with State & Federal Pollution Control Regulations.

TERM OF AGREEMENT

8/1/78 - 7/31/79

VOLUME OF WASTE MATERIALS: Although Customer does not guarantee any specific volume of waste materials, Customer agrees to deliver to Chem-Trol, during the term and any extended term of this Contract, all waste products of the composition herein above described generated at the location(s) described above.

PRICE ADJUSTMENT: During the term and any extended term of this contract, the processing charge or price stated on the face of this Contract may be increased by Chem-Trol upon not less than 30 days' written notice to the customer.

PAYMENT TERMS: Net 30 Days after Date of Invoice — U.S. Funds - Plus Applicable Sales Tax
This agreement is subject to all of the terms and conditions on the face and reverse side hereof. It shall become a binding contract only when signed and delivered by the customer to Chem-Trol and accepted by an officer of Chem-Trol in writing and a copy of said written acceptance is mailed or delivered to the customer.

	ACCEPTED BY:
CUSTOMER'S SIGNATURE	**CHEM-TROL POLLUTION SERVICES, INC.**
BY ______________	
Office or Position: ______________	**BY:** ______________
DATE ______________	**DATE** ______________

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