12/10-30-95 JS(1)

Supplemental Site Inspection for Air Force Plant 59, Johnson City, New York

Volume 2: Appendices A – E

**Energy Systems Division
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Director, Energy Systems Division
Argonne National Laboratory
Argonne, Illinois 60439-4815
Telephone (708) 252-3724

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Supplemental Site Inspection for Air Force Plant 59, Johnson City, New York

Volume 2: Appendices A – E

by B. Nashold,* D. Rosenblatt, J. Hau,* D. Tomasko,* L. Durham,* W. Harrison,
L. Shepard, L. Reed, E. Schug, and T. Sydelko

Energy Systems Division,
Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439

August 1995

MASTER

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**Nashold is affiliated with the Environmental Research Division; Tomasko and Durham, with the Environmental Assessment Division; and Hau, with Hydro-Terra, Inc., Columbia, Md.*

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Appendix A:

Data Validation and Usability

Appendix A-1: Data Validation

Appendix A-2: Data Usability

DATA VALIDATION

This appendix consists of a series of validation reports from ECHEM Inc. regarding Galson Laboratory data for AFP-59. These reports were used by Gradient Corporation during its data usability study (Appendix B-2). The reports are numbered for presentation here according to sample delivery group number (SDG) and analytical type as follows. The number of the report on a specific sample may be determined by first determining the samples SDG number using the cross-index provided in Appendix G-3.

Report	Date	SDG	Analysis*
1	25 FEB 92	1	VOC
2	26 FEB 92	1	SVOC
3	25 FEB 92	1	P/P
4	26 FEB 92	1	MET
5	26 FEB 92	2	VOC
6	26 FEB 92	2	SVOC
7	26 FEB 92	2	P/P
8	26 FEB 92	2	MET
9	17 MAR 92	3	VOC
10	16 MAR 92	3	SVOC
11	17 MAR 92	3	P/P
12	17 MAR 92	3	MET
13	13 MAR 92	5	VOC
14	14 MAR 92	5	SVOC
15	13 MAR 92	5	P/P
16	16 MAR 92	5	MET
17	25 MAR 92	6	VOC
18	25 MAR 92	6	SVOC
19	25 MAR 92	6	P/P
20	25 MAR 92	6	MET
21	24 MAR 92	7	VOC
22	24 MAR 92	7	SVOC
23	25 MAR 92	7	P/P
24	25 MAR 92	7	MET

* MET=inorganics
P/P=PCB's and pesticides

SVOC=semi-volatile compounds
VOC=volatile organic compounds

Appendix A-1: Data Validation

Report 1

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1310
 #32 Route 35
 Sebago Common
 Windham, Maine 04062
 (207) 892-0002
 FAX (207) 892-7499

25 February 1992

Dr. A. Dallas Wait
 Senior Environmental Chemist
 Gradient Corporation
 44 Brattle Street
 Cambridge, MA 02138

Re: Air Force Plant 59
 Laboratory: Galson Laboratories
 Case No: NONE
 SDG No: 1-5554

Volatiles:	JCCNSCS	JCDW1AS	JCDW1BS	JCDW1CS
	JCDW3AS	JCDW3BS	JCSD1AS	JCSD2AS
	JCSW4AS	JCSW4BS	JCSW4CS	JCSW5AS
	JCSW5BS	JCSW6AS	JCSW6BS	JCSW8AS
	JCSW8BS	JCQC1TW	JCQC2BW	JCQC3XW
	TRIP BLANK1	TRIP BLANK2		
	TRIP BLANK3	TRIP BLANK6		
	TRIP BLANK8			

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
- * - matrix spike/matrix spike duplicate/matrix spike blank
- blanks
- GC/MS tuning
- * - calibration
- * - internal standards performance
- * - field duplicates
- * - TCL compound identification
- * - tentatively identified compounds

- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

BLANKS:

Positive blank results and associated action levels calculated in accordance with the USEPA Functional Guidelines are tabulated below:

<u>BLANK ID.</u>	<u>COMPOUND</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>
JCQCITW	acetone	11	110
	1,1,1-trichloroethane	5	25
JCQC2BW	acetone	11	110
	1,1,1-trichloroethane	2	10
JCQC3XW	acetone	12	120
	1,1,1-trichloroethane	4	20

*Method blank levels below upper limit established by NYSDEC CLP (Vol. VIII, E-27).

Associated samples with positive values reported below the action level are:

<u>RINSATE BLANK ID.</u>	<u>ASSOCIATED SAMPLES</u>
JCQCITW JCQC2BW	JCDW1CS JCSW4CS JCSW8AS JCSW8BS

Action:

- o associated sample results $\geq$ CRQL and $<$ action level (flagged B) are flagged as not detected at the sample value (U)

NOTE: Blank action levels were corrected for associated sample dilution factors, where necessary, prior to validation qualifications.

GC/MS TUNING:

Form 5A for Instrument B(#2) tune performed on 11/13/91 at 08:02 has incorrect relative abundance data and calculation errors. A review of raw data indicates that the tune was compliant, therefore, no action was taken.

Sincerely,

ECHEM INC.

Bruce K. Wallin, Ph.D.
Vice President

enclosures

Air Force Plant 59
Case No. NONE

Table I. Validation Action Summary

<u>Sample No.</u>	<u>VOA</u>
JCCNSCS	
JCDW1AS	
JCDW1BS	
JCDW1CS	A1
JCDW3AS	
JCDW3BS	
JCSD1AS	
JCSD2AS	
JCSW4AS	
JCSW4BS	
JCSW4CS	A1
JCSW5AS	
JCSW5BS	
JCSW6AS	
JCSW6BS	
JCSW8AS	A1
JCSW8BS	A1

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for acetone or 1,1,1-trichloroethane to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability

- J7 - estimate positive values (J) for () due to non-compliant internal standard stability
- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability

EICHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argonne Nat'l Labs
GASE NO. _____

SDG NO. 15554

SITE: Air Force Plant 59
ANALYTICAL FRACTION: Volatiles

CLIENT SAMPLE ID	EPA SAMPLE NO.	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE ANALYZED	HOLD TIME COLLECT	HOLD TIME RECEIPT
TCCNSCS		5832-007	Soil	11-20-91	11-21-91	11-28-91	8	7
TCDW1AS		5832-008		11-21-91	11-21-91	11-28-91	7	7
TCDW1BS		5832-009		11-21-91	11-21-91	11-28-91	7	7
TCDW1CS		5832-010		11-21-91	11-21-91	11-28-91	7	7
TCDW3AS		5602-001		11-05-91	11-05-91	11-08-91	3	3
TCDW3BS		5602-002		11-05-91	11-05-91	11-08-91	3	3
TCSW1AS		5770-006		11-17-91	11-18-91	11-22-91	5	4
TCSW2AS		5770-004		11-17-91	11-18-91	11-22-91	5	4
TCSW4AS		5909-001		11-26-91	11-26-91	11-30-91	4	4
TCSW4BS		5909-002		11-26-91	11-26-91	11-30-91	4	4
TCSW4CS		5909-003		11-26-91	11-26-91	11-28-91	2	2
TCSW5AS		5832-001		11-20-91	11-21-91	11-28-91	8	7
TCSW5BS		5832-002		11-20-91	11-21-91	11-28-91	8	7
TCSW6AS		5770-001		11-16-91	11-18-91	11-22-91	6	4
TCSW6BS		5770-002		11-16-91	11-18-91	11-22-91	6	4
TCSW8AS		5554-001		11-04-91	11-05-91	11-08-91	4	3
TCSW8BS		5554-002		11-04-91	11-05-91	11-09-91	5	4
TCC21TW		5602-003		11-06-91	11-06-91	11-08-91	2	3
TCC22BW		5602-004		11-06-91	11-07-91	11-09-91	3	2
TCC3XW		5680-001		11-07-91	11-08-91	11-09-91	2	1
TRIP BLANK 1		5554-003		11-04-91	11-05-91	11-08-91	4	3
TRIP BLANK 2		5602-005		11-06-91	11-06-91	11-08-91	2	2
TRIP BLANK 3		5680-002		11-07-91	11-08-91	11-09-91	2	1
TRIP BLANK 6		5832-011		11-21-91	11-21-91	11-28-91	7	7
TRIP BLANK 8		5909-004		11-26-91	11-26-91	11-28-91	2	2

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

ECHEM INC.

Appendix A-1:

Report 2

**ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS**

P.O. Box 1510

#32 Route 35
Sebâgo Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

26 February 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 1-5554

Semivolatiles:	JCCNSCS	JCDW1AS	JCDW1BS	JCDWICS
	JCDW3AS	JCDW3BS	JCQCITW	JCQC2BW
	JCQC3XW	JCSD1AS	JCSD2AS	JCSW4AS
	JCSW4BS	JCSW5AS	JCSW5BS	JCSW6AS
	JCSW4CS	JCSW8AS	JCSW8BS	JCSW6BS

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- surrogate recovery
- * - matrix spike/matrix spike duplicate/matrix spike blank
- blanks
- * - GC/NS tuning
- calibration
- * - internal standards performance
- * - field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision # 7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

HOLDING TIMES:

Samples with extraction holding times exceeding the NYSDEC CLP 5 day requirement (Vol. VIII) are itemized below.

<u>SAMPLE</u>	<u>HOLDING TIME (DAYS) FROM</u>	
	<u>SAMPLE COLLECTION</u>	<u>RECEIPT BY LAB</u>
JCCNSCSRE	24	23

Action:

- o for holding time exceedences >14 days, detection limit values (CRQL U) are flagged as unusable (R)

SURROGATE RECOVERY:

Samples with two or more surrogate recoveries from either the base/neutral or acid fraction which were >10% but did not meet the criteria specified in NYSDEC CLP (Vol. VIII, E-54), and samples with one or more surrogate recoveries <10% as specified in the Functional Guidelines are summarized below:

<u>SAMPLE</u>	<u>PERCENT RECOVERIES</u>					
	<u>BASE-NEUTRAL FRACTION</u>			<u>ACID FRACTION</u>		
	<u>NBZ</u>	<u>FBP</u>	<u>TPH</u>	<u>PHL</u>	<u>2FP</u>	<u>TBP</u>
JCSW4CS				21	11	
JCCNSCS	7	9	10	8	8	7

Action:

- o recoveries >10%; sample results for the associated fraction are flagged as estimated (J)

- o recoveries <10%; sample results for the associated fraction $\geq$ CRQL are flagged as estimated (J), and detection limit values (CRQL U) are flagged as unusable (R)

Comments:

For sample JCSW4CS the reanalysis surrogate recoveries were compliant, however, it was extracted beyond the hold time resulting in more extensively qualified results. For sample JCCNSCS the reanalysis surrogate results were compliant, however, the hold time was substantially exceeded. As a result, both data sets are equally qualified.

BLANKS:

The method blanks as well as most associated samples contained a TIC (likely an aldol condensation product) eluting at approximately 10 minutes. The associated sample results for this TIC were flagged as unusable (R). Sample JCQC3XW and its associated method blank (0059) contained two TIC's eluting in the 30 minute range. The sample results for these TIC's were flagged as unusable (R).

CALIBRATION:

Calibration linearity, sensitivity and stability criteria specified in the NYSDEC CLP (Vol. VIII, E-48-51), or federal criteria (*), are tabulated below.

CONTINUING CALIBRATION CRITERIA

<u>COMPOUND</u>	<u>%D (max.)</u>	<u>RRF (min.)</u>
SPCC	20	0.05
all other TCL compounds	20	0.05*

Deviations from the above calibration criteria are tabulated below.

CONTINUING CALIBRATION

<u>INSTR.</u>	<u>DATE/TIME</u>	<u>COMPOUND</u>	<u>%D</u>	<u>RRF</u>
GCMSD(#4)	11-15-91/16:28	bis(2-chloroisopropyl) ether	25	
		hexachlorocyclopentadiene	21	
		2-nitroaniline	23	
		3-nitroaniline	24	

<u>INSTR.</u>	<u>DATE/TIME</u>	<u>COMPOUND</u>	<u>%D</u>	<u>RRF</u>
GCMSD(#4)	11-19-91/13 : 40	bis(2-chloroisopropyl) ether	23	
		bis (2-chloroethyl) ether	23	
		hexachloroethane	24	
		hexachlorocyclopentadiene		24
		hexachlorobenzene	24	
		pentachlorophenol	23	
		3,3'-dichlorobenzidine	22	
		bis (2-ethylhexyl) phthalate	22	
		di-n-octylphthalate	22	
	11-20-91/09:47	1, 2-dichlorobenzene	23	
		hexachloroethane	23	
		hexachlorobutadiene	21	
		hexachlorocyclopentadiene	24	
		3-nitroaniline	22	
		hexachlorobenzene	24	
		pentachlorophenol	23	
		butylbenzylphthalate	25	
		bis (2-ethylhexyl) phthalate	22	
	12-14-91/13:26	bis(2-chloroethyl) ether	21	
		4-nitroaniline	25	
		di-n-butylphthalate	23	
	12-16-91/16:23	di-n-butylphthalate	22	

Associated samples:

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>SAMPLE NO.</u>
GCMSD(#4)	11-15-91/16:28	JCSW8BS JCDW3AS JCDW3 BS
	11-19-91/13 :40	JCSW8AS
	11-20-91/09:47	JCQC1TW JCQC2BW
	12-14-91/13:26	JCSW6AS JCDW1AS JCDWIBS JCDW1CS
GCMSD(#4)	12-16-91/16:23	JCSW4AS JCCNSCS JCSW4BS JCSW4CS

Action:

o none, associated sample results reported as either <CRQL J or CRQL U

Sincerely,
ECHEM INC.

Bruce K. Wallin, Ph.D.
Vice President

enclosures

Air Force Plant 59

Case No. NONE

Table I. Validation Action Summary

<u>Sample No.</u>	<u>SVOA</u>
JCDW1BS	R2, (RI)
JCCNSCS(RE)	
JCDW1CS	
JCDW3AS	
JCDW3BS	
JCQCITW	
JCQC2BW	
JCQC3XW	J3
JCSD1AS	
JCSD2AS	
JCSW4AS	
JCSW4BS	
JCSW5AS	
JCSW5BS	
JCSW6AS	
JCSW4CS	
JCSW8AS	
JCSW8BS	
JCSW6BS	

If the field is blank, no qualifiers were necessary.

- Al - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability

- J7 - estimate positive values (J) for () due to non-compliant internal standard stability
- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%

ECHEM INC.
ORGANICS

COMPLETENESS LOG

SITE: Air Force Plant 59

CLIENT: Argonne Nat'l Labs

CASE

8DG# 1-5554

[illegible]

- ✓ Quant Reports
- ✓ MASS SPECS
- ✓ TIC Compounds
- ✓ Laboratory Blank (Form 1's)
- ✓ MS/MSD (Forms 1's)
- Total Solids Log (if applicable)
- Injection Log
- ✓ Chain of Custody
- ✓ Case Narrative

REV. 391

EICHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDC

SITE: Air Force Plant 59

SDG NO. 1-5554

CLIENT: Argonne Nat'l Labs
CASE NO.

CASE NO.

CLIENT	EPA	LAB	SAMPLE	ID	SAMPLE NO.	MATRIX	DATE	COLLECTED	RECEIVED	DATE	EXTRACTED	COLLECT	HOLD TIME	TO EXTRACTION	RECEIPT
SCN5CS	583A-007	583A-007	50.1	11-20-91	11-21-91	11-21-91	11-26-91	11-26-91	11-21-91	11-21-91	11-26-91	6	5	5	5
SCN1A5	583A-008	11-21-91	11-21-91	11-21-91	11-21-91	11-21-91	11-26-91	11-26-91	11-21-91	11-21-91	11-26-91	5	5	5	5
SCN1A5	583A-009	11-21-91	11-21-91	11-21-91	11-21-91	11-21-91	11-26-91	11-26-91	11-21-91	11-21-91	11-26-91	5	5	5	5
SCN1CS	583A-010	11-21-91	11-21-91	11-21-91	11-21-91	11-21-91	11-26-91	11-26-91	11-21-91	11-21-91	11-26-91	5	5	5	5
SCN1A5	583A-001	11-05-91	11-05-91	11-05-91	11-05-91	11-05-91	11-08-91	11-08-91	11-07-91	11-07-91	11-08-91	3	1	1	1
SCN1A5	583A-002	11-05-91	11-05-91	11-05-91	11-05-91	11-05-91	11-08-91	11-08-91	11-07-91	11-07-91	11-08-91	3	1	1	1
SCN1A5	583A-003	11-06-91	11-06-91	11-06-91	11-06-91	11-06-91	11-11-91	11-11-91	11-10-91	11-10-91	11-11-91	4	4	4	4
SCN1A5	583A-004	11-06-91	11-06-91	11-06-91	11-06-91	11-06-91	11-11-91	11-11-91	11-10-91	11-10-91	11-11-91	5	4	4	4
SCN1A5	583A-001	11-07-91	11-07-91	11-07-91	11-07-91	11-07-91	11-11-91	11-11-91	11-08-91	11-08-91	11-11-91	4	3	3	3
SCN1A5	583A-006	11-17-91	11-17-91	11-17-91	11-17-91	11-17-91	11-21-91	11-21-91	11-18-91	11-18-91	11-21-91	4	3	3	3
SCN1A5	583A-004	11-17-91	11-17-91	11-17-91	11-17-91	11-17-91	11-21-91	11-21-91	11-18-91	11-18-91	11-21-91	4	3	3	3
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-002	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-003	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-004	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26-91	6	4	4	4
SCN1A5	583A-001	11-20-91	11-20-91	11-20-91	11-20-91	11-20-91	11-26-91	11-26-91	11-20-91	11-20-91	11-26				

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

REV 31

Appendix A-1:

Report 3

**ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS**

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

25 February 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 1-5554

Pesticides/PCB's:	JCCNSCS	JCDW1AS	JCDWICS	JCDW3AS
	JCDW3BS	JCQC2BW	JCQCITW	JCQC3XW
	JCSD1AS	JCSD2AS	JCSW4AS	JCSW4BS
	JCSW4CS	JCSW5AS	JCSW5BS	JCSW6AS
	JCSW6BS	JCSW8BS	JCSW8AS	

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- surrogate recovery
- matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - calibration
- * - pesticide instrument performance
- * - field duplicates
- * - TCL compound identification
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7 and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

SURROGATE RECOVERY:

Samples with surrogate recoveries that were not diluted out and did not meet the criteria specified in NYSDEC CLP (Vol. VIII, E-69) are Summarized below:

<u>SAMPLE</u>	<u>DBC RECOVERY (%)</u>
JCSW6AS	163

Action:

- o for recovery not within criteria, sample results >CRQL are flagged as estimated (J)

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet the criteria specified in the NYSDEC CLP (Vol. VII, E-73) are Summarized below:

<u>SAMPLE</u>	<u>LIN</u>	<u>HEP</u>	<u>RECOVERY (%)</u>		<u>END</u>	<u>DDT</u>
Q1-0058 (MSB)			<u>ALQ</u>	<u>DIEL</u>	140/136	

Action:

- o none, sample results reported as CRQL U

Sincerely,

Bruce K. Wallin, Ph.D.
Vice President

enclosures

U.S. Steel Site
Case 1-5554

Table I. Validation Action Summary

<u>SAMPLE NO.</u>	<u>Pesticide/PCB</u>
JCCNSCS	
JCDW1AS	
JCDW1CS	
JCDW3AS	
JCDW3BS	
JCQC2BW	
JCQC1TW	
JCQC3XW	
JCSD1AS	
JCSD2AS	
JCSW4AS	
JCSW4BS	
JCSW4CS	
JCSW5AS	
JCSW5BS	
JCSW6AS	J2
JCSW6BS	
JCSW8BS	
JCSW8AS	

If the field is blank, no qualifiers were necessary.

- AI - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) due to non-compliant surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
- J7 - estimate positive values (J) for () due to non-compliant internal standard stability

- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (JR) due to holding time exceedences reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50*2

SDG NO. 1-5554

REV. 301

ECHEN INC.
ORGANICS

COMPLETENESS LOG

SITE: Air Force Plant 59

CLIENT: Argonne Nat'l Labs

CASE #

8DG# 1-5554

[illegible]

Quant Reports

MA88 SPECS

TIC Compounds

Laboratory Blank (Form 1's)

MS/MSD (Forms 1's)

Total Solids Log (if applicable)

Injection Log

Chain of Custody

Case Narrative

REV. 391

Appendix A-1:

Report 4

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

26 February 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 1-5554

TAL Inorganics:	JCSW6AS	JCSW8BS	JCCNSCS	JCDW1AS
	JCDW1BS	JCDW1CS	JCDW3AS	JCDW3BS
	JCQC1TW	JCQC2BW	JCQC3XW	JCSD1AS
	JCSW4AS	JCSW4BS	JCSW4CS	JCSW5AS
	JCSW5BS	JCSW6BS	JCSW8AS	JCSD2AS

Dear Dr. Wait:

Validation was performed on the inorganic analytical data from the samples referenced above. The data were evaluated, based on the following parameters:

- * - data completeness
- * - holding times
- * - calibrations
- blanks
- * - ICP interference check sample analysis
- matrix spike analysis
- * - duplicate sample analysis
- * - laboratory control sample analysis
- furnace atomic absorption results
- ICP serial dilution results
- * - detection limits
- * - sample result verification
- * - sample result verification

* All criteria were met for this parameter.

Table I Summarizes the validation actions, which were in accordance with USEPA Region II Evaluation of Inorganic Data for the Contract Laboratory Program, February 1990, SOP No. HW-2, Revision X, and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis Summaries.

1. Positive Blanks

Blanks providing results $\geq$ IDL and their associated action levels are tabulated below:

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>	
			<u>WATER</u>	<u>SOIL</u>
CCB2	beryllium	4		4
	sodium	412		412
CCB3	beryllium	3		3
	sodium	395		395
CCB4	beryllium	3		3

Associated samples with positive values reported below the action level are tabulated below:

<u>CAL BLANK ID</u>	<u>PARAMETER</u>	<u>SAMPLE NO.</u>
CCB2	beryllium	JCSW8AS
	sodium	JCSW8AS
		JC5W8BS
CCB3	beryllium	JCSW5A5
		JCCNSCS
		JCSW5BS
		JCDW1AS
		JCDW1BS
		JCSW4AS
		JCSW4BS

<u>CAL BLANK ID</u>	<u>PARAMETER</u>	<u>SAMPLE NO.</u>
CCB3	sodium	JCCNSCS JCSW5BS JCDW1AS JCDW1BS JCSW4AS JCSW4BS
CCB4	beryllium	JCSW4CS

Action:

- o associated sample results >IDL but <action level are flagged as not detected at the sample value (U)

2. Negative Blanks

Blanks that provided results <-2IDL are tabulated below:

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>CONCENTRATION</u>
CCB1	calcium	-93
	magnesium	-272
CCB2	antimony	-4.6
	magnesium	-122
CCB3	calcium	-71
	copper	-9
	magnesium	-240
CCB4	calcium	-77
	magnesium	-234
	manganese	-4
CCB5	antimony	-4.5
	calcium	-59
	magnesium	-242

Associated samples with results reported <10IDL: NONE

MATRIX SPIKE ANALYSIS:

Samples providing matrix spike recoveries not within 75-125% that also contain native analyze reported at <4X the spiking level as specified in the NYSDEC CLP (Vol. VIII, E-111) are tabulated below:

<u>SAMPLE</u>	<u>ELEMENT</u>	<u>% RECOVERY</u>
JCSW5BSMS	antimony	26
	arsenic	66
	thallium	66

Action:

- o for recoveries <30%, results $\geq$ IDL are flagged as estimated (J) detection limit values (IDL U) are flagged as unusable (R)
- o for recoveries from 30-74%, results are flagged as estimated (J)

Comments:

The above actions are applied to ALL samples of the same matrix associated with this SDG.

FURNACE ATOMIC ABSORPTION RESULTS:

1. Post-digestion spike

Samples with post-digestion spike recoveries $\geq 40\%$ but not within 85-115%, and also having native analyze sample absorbance <50% of the spiked sample value, and samples with post-digestion spike recoveries reported at <40% that were diluted 5-10 fold and recoveries repeated at <40% or that were not within 85-115%, and also having native sample absorbance <50% of the spiked sample value, as specified in the NYSDEC CLP (Vol. VIII, E-118-119) are tabulated below:

<u>SAMPLE</u>	<u>ELEMENT</u>	<u>% RECOVERY</u>
JCDW1CS	selenium	76
JCDW3AS	selenium	81
JCSW6AS	selenium	65
JCSW6BS	selenium	82
JCSD1AS	selenium	75
JCSD2AS	selenium	80
JCSW5AS	selenium	77
JCDW1BS	selenium	83
JCSW4AS	selenium	73
JCSW4BS	selenium	81
JCSW4CS	selenium	75

Action:

- o for spike recoveries >10%, but not within 85-115%, sample results $\geq$ IDL are flagged as estimated (J)

- o for spike recoveries >10% but <85%, sample detection limit values (IDL U) are flagged as estimated (J)

ICP SERIAL DILUTION RESULTS:

Serial dilution results for elements reported present in the undiluted sample at >50IDL that providing serial dilution reproducibility (%D) of >10% specified by the NYSDEC clp (Vol. VIII, E-116) are tabulated below:

<u>SAMPLE</u>	<u>ELEMENT</u>	<u>%D</u>
JCSW5BS	zinc	12.4

Action:

- o results are flagged as estimated (J)

Comments:

The above actions are applied to ALL samples of the same matrix associated with this SDG.

Sincerely,
ECHEM INC.

Bruce K. Wallin, Ph.D.
Vice President

enclosures

Air Force Plant 59

Case No. NONE

Table I. Validation Action Summary

Aluminum		Magnesium	
Antimony	J4	Manganese	
Arsenic	J4	Mercury	
Barium		Nickel	
Beryllium	A1	Potassium	
Cadmium		Selenium	J7
Calcium		Silver	
Chromium		Sodium	A1
Cobalt		Thallium	J4
Copper		Vanadium	
Iron		Zinc	J9
Lead		Cyanide	

If an element has no entry, no qualifications were necessary.

- A1 - Accept data, raise the sample detection limit(s) due to blank contamination.
- J1 - Estimate (J) positive values and (UJ) detection limit results due to hold time exceedences.
- J2 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant calibrations.
- J3 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant linearity near the CRDL.
- J4 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant matrix spike recoveries.
- J5 - Estimate (J) positive values due to non-compliant duplicate precision.

- J6 - Estimate (J) positive values and (UJ) detection limit results due non-compliant laboratory control sample results.
- J7 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant analytical precision and/or accuracy.
- J8 - Estimate (J) positive values due to non-compliant method of standard additions linearity.
- J9 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant serial dilution reproduceability.

CLIENT: Argonne Nat'l Labs

SDG# 1-5554

[illegible]

- ☐ Standardization Report for ICP
- ☐ Analysis Report for each calibration, blank, sample
- ☐ Copies of printer tapes for each AAS element
- ☒ Mercury Analysis Sheet
- ☒ Cyanide Analysis Sheet
- ☒ Total Solids Log (if applicable)
- ☒ Metals Digestion Log
- ☒ Mercury Digestion Log
- ☒ Cyanide Distillation Log
- ☒ Chain of Custody
- ☒ Case Narrative

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argonne Nat'l Labs
CASE NO. _____

SDG NO. 1-5554

SITE: Air Force Plant 59
ANALYTICAL FRACTION: Mercury

CLIENT SAMPLE ID	EPA SAMPLE NO.	LAB. SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE ANALYZED	HOLD TIME COLLECT	RECEIPT
TCSW6AS		5770-001	Soil	11-16-91	11-18-91	11-25-91	9	7
TCSW8BS ✓		5554-002		11-04-91	11-05-91	11-13-91	9	8
TCCN5CS ✓		5832-007		11-20-91	11-21-91	12-04-91	14	13
TCDW1AS ✓		5832-008		11-21-91	11-21-91	12-04-91	13	13
TCDW1BS		5832-009		11-21-91	11-21-91	12-04-91	13	13
TCDW1CS		5832-010		11-21-91	11-21-91	12-04-91	13	13
TCDW3AS ✓		5602-001	↓	11-05-91	11-07-91	11-13-91	8	6
TCDW3BS		5602-002	Soil	11-05-91	11-07-91	11-13-91	8	6
TCDW3TW		5602-003	Water	11-06-91	11-07-91	11-13-91	7	6
TCDW3RW ✓		5602-004	Water	11-06-91	11-07-91	11-13-91	7	6
TCDW3XW		5630-001	Water	11-07-91	11-07-91	11-13-91	6	6
TCDW1AS		5770-006	Soil	11-17-91	11-18-91	11-25-91	8	7
TCDW2AS ✓		5770-004		11-17-91	11-18-91	11-25-91	8	7
TCSW4AS		5909-001		11-26-91	11-26-91	12-04-91	8	8
TCSW4BS ✓		5909-002		11-26-91	11-26-91	12-04-91	8	8
TCSW4CS ✓		5909-003		11-26-91	11-26-91	12-04-91	8	8
TCSW5AS		5832-001		11-20-91	11-21-91	12-04-91	14	13
TCSW5BS ✓		5832-002		11-20-91	11-21-91	12-04-91	14	13
TCSW6BS ✓		5770-002		11-16-91	11-18-91	11-25-91	9	7
TCSW8AS ✓		5554-001	↓	11-04-91	11-05-91	11-13-91	4	8

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

REV. 301

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argonne Nat'l Labs

CASE NO.

SDG NO. 1-5554

SITE: Air Force Plant 59

ANALYTICAL FRACTION: Cyanide

CLIENT SAMPLE ID	ERA SAMPLE NO.	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE ANALYZED	HOLD TIME	
							COLLECT	RECEIPT
JCSW6AS		5770-001	Soil	11-16-91	11-18-91	11-21-91	5	3
JCSW8AS		5554-002		11-04-91	11-05-91	11-13-91	9	8
TCCN3CS		5832-007		11-20-91	11-21-91	11-27-91	7	6
TCDW1AS		5832-008		11-21-91	11-21-91	11-27-91	6	6
TCDW1BS		5832-009		11-21-91	11-21-91	11-27-91	6	6
TCDW1CS		5832-010		11-21-91	11-21-91	11-27-91	6	6
TCDW3AS		5602-001		11-05-91	11-07-91	11-27-91	2	20
TCDW3BS		5602-002	Soil	11-05-91	11-07-91	11-13-91	8	6
TCC21TW		5602-003	WATER	11-06-91	11-07-91	11-13-91	7	6
TCC2XW		5630-001	WATER	11-08-91	11-07-91	11-13-91	6	6
JCS21AS		5770-006	Soil	11-09-91	11-18-91	11-21-91	4	3
JCS22AS		5770-004		11-09-91	11-18-91	11-21-91	4	3
JCSW4AS		5909-001		11-26-91	11-26-91	12-06-91	10	10
JCSW4BS		5909-002		11-26-91	11-26-91	12-06-91	10	10
JCSW4CS		5909-003		11-26-91	11-26-91	12-06-91	10	10
JCSW5AS		5832-001		11-20-91	11-21-91	11-27-91	7	6
JCSW5BS		5832-002		11-20-91	11-21-91	11-27-91	7	6
JCSW6BS		5770-002		11-26-91	11-18-91	11-21-91	5	3
JCSW8AS		5554-001	Soil	11-04-91	11-05-91	11-13-91	9	8
TCC22BW		5602-004	WATER	11-08-91	11-07-91	11-13-91	7	6

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

REV 301

Appendix A-1:

Report 5

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 33
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

26 February 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 2-5807

Volatiles:	JCCNCAW	JCCW1AW	JCCW2AW
(USEPA 524.2)	JCOF1AW	JCOF2AW	TRIP BLANK4
	TRIP BLANK5	TRIP BLANK7	

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters in accordance with the specifications set forth in USEPA Method No. 524.2, Revision 3 and the Quality Assurance Project Plan for Air Force Plant 59, Johnson City, New York, Revision 2, December 19, 1991.

- * - data completeness
- * - holding times
 - surrogate recovery
 - matrix spike/matrix spike duplicate
 - laboratory fortified blank
 - blanks
- * - GC/MS tuning
 - calibration
- * - internal standards performance
 - field duplicates
- * - TCL compound identification
- * - tentatively identified compounds

- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

SURROGATE RECOVERY:

Samples with surrogate recoveries which did not meet the criteria specified-in the NYSDEC ASP are summarized below:

<u>SAMPLE</u>	<u>PERCENT RECOVERIES</u>		
	<u>D4DCE</u>	<u>D8T</u>	<u>BFB</u>
JCCW2AW	121		
JCCW1AW	126		
JCOF2AW	123		

Action:

- o for sample JCOF2AW recovery $\geq 10\%$; sample results $\geq$ MDL are flagged as estimated (J)
- o for samples JCCW2AW and JCCW1AW none, results reported as MLD U

MATRIX SPIKE/MATRIX SPIKE DUPLICATE:

Samples with MS and/or MSD recoveries not within recovery range specified in the NYSDEC ASP are tabulated below:

<u>SAMPLE</u>	<u>DCE</u>	<u>TCE</u>	<u>RECOVERY (%)</u>		<u>CLB</u>
			<u>BENZ</u>	<u>TOL</u>	
JCOF2AW		30			

Action:

- o sample results $>$ MDL for the compound are flagged as estimated (J)

Samples with MS/MSD relative percent differences (RPD) greater than the limits specified in the NYSDEC ASP are tabulated below:

<u>SAMPLE</u>	<u>DCE</u>	<u>TCE</u>	<u>BENZ</u>	RPD (%) <u>TOL</u>	<u>CLB</u>
JCOF2AW		102			

Action:

- o sample results >MDL for the compound are flagged as estimated (J)

LABORATORY FORTIFIED BLANK:

Compounds not within the recovery limits specified in the NYSDEC ASP are tabulated below:

<u>COMPOUND</u>	<u>% RECOVERY</u>
cis-1, 3-dichloropropene	82
dibromochloromethane	84
1,1, 2-trichloroethane	86

Action:

- o none, sample results are reported as MDL U

Positive blank results and associated action levels are tabulated below:

<u>BLANK ID.</u>	<u>COMPOUND</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>
TRIP BLANK4	methylene chloride	0.9	9.0
	chloroform	0.6	3.0
TRIP BLANKS	methylene chloride	1	10
TRIP BLANK7	methylene chloride	1	10

* Method blank levels below the NYSDEC ASP requirements.

Associated samples with positive values reported below the action level are:

<u>TRIP BLANK ID.</u>	<u>ASSOCIATED SAMPLES</u>
TRIP BLANK4	JCCW1AW
	JCCW2AW
TRIP BLANK7	JCOFLAW
	JCOF2AW

Action:

- o associated sample results <EL (flagged J); changed to EL (U)
- o associated sample results >MDL and <action level (flagged B) Are flagged as not detected at the sample value (U)

NOTE: Blank action levels were corrected for associated sample dilution factors, where necessary, prior to validation qualifications.

CALIBRATION:

A. Initial calibration:

SPCC compounds with average relative response factors (AVG RRF) below the limits and all others £0.10 or percent relative standard deviations (%RSD) >30% for CCC compounds and >35% for all other compounds as specified in the NYSDEC ASP are tabulated below:

<u>INSTR.</u>	<u>CAL DATE</u>	<u>COMPOUND</u>	<u>AVG RRF</u>	<u>%RSD</u>
C	11-19-90	2-butanone	0.031	
		1,1,2,2-tetrachloroethane	0.241	
		2-hexanone	0.073	

Associated samples:

<u>INSTRUMENT</u>	<u>CAL DATE</u>	<u>SAMPLE NO.</u>
C	11-19-90	JCCNCAW JCCW1AW
		JCCW2AW JCOF1AW
		JCOF2AW
		TRIP BLANK4
		TRIP BLANK5
		TRIP BLANK7

Action:

- o for AVG PULP, <0 a 10, results >MDL for the compound are flagged as estimated (J) and detection limit values (MDL U) are flagged a; unusable (R)
- o none, sample results reported as MDL U

Comments:

- a. The lower specific response for the SPCC compound 1,1,2,2-tetrachloroethane is most likely due to the increased purge volume rather than methodology problems. All samples were reported MDL U, the validation concludes that the specific response was sufficient to achieve the MDL reported, therefore, no action was taken.
- b. For 2-butanone, 2-hexanone and 4-methyl-2-pentanone the detection limits provided for this SDG are probably valid, even though they have been flagged in accordance with the specifications for initial and/or continuing calibration. This conclusion is based on the following observations:
 - o The specific response for the 2 µg/l initial calibration standard are consistent with the AVG. RRF's and the continuing calibration RRF's, and
 - o the recoveries provided for the 5 µg/l QC check standard are reasonable.

B. Continuing calibration:

SPCC compounds with relative response factors (RRF) below the limits and all others ≤ 0.10 or percent difference between initial and continuing calibration (%D) $> 25\%$ for CCC compounds and $> 35\%$ for all other compounds as specified in the NYSDEC ASP are tabulated below:

<u>INSTR.</u>	<u>CAL DATE-TIME</u>	<u>COMPOUND</u>	<u>RRF</u>	<u>%D</u>
C	11-21-91/23:52	2-butanone	0.035	
		1,1,2,2-tetrachloroethane	0.230	
		4-methyl-2-pentanone	0.089	
		2-hexanone	0.063	
B	11-22-91/16:28	2-butanone	0.022	
		1,1,2,2-tetrachloroethane	0.226	
		4-methyl-2-pentanone	0.094	
		2-hexanone	0.070	
C	11-27-91/13:47	2-butanone	0.033	
		1,1,2,2-tetrachloroethane	0.218	
		4-methyl-2-pentanone	0.078	
		2-hexanone	0.058	

<u>INSTR.</u>	<u>CAL DATE/TIME</u>	<u>COMPOUND</u>	<u>RRF</u>	<u>%D</u>
C	11-30-91/12:40	2-butanone	0.029	
		1,1,2,2-tetrachloroethane	0.237	
		2-hexanone	0.077	

Associated samples:

<u>INSTRUMENT</u>	<u>CAL DATE/TIME</u>	<u>SAMPLE NO.</u>
C	11-21-91/23:52	JCCW2AW JCCWIAW
	11-27-91/13:47	JCOFIAW JCOF2AW
	11-30-90/12:40	TRIP BLANK7
B	11-22-91/16:28	JCCNCAW TRIP BLANK5 TRIP BLANK4

Action:

- o for RRF, ≤ 0.10 , results $\geq$ MDL for the compound are flagged as estimated (J) and detection limit values (MDL U) are flagged as unusable (R)
- o none, sample results reported as MDL U

Comments:

See above comments for initial calibration.

FIELD DUPLICATES:

No field duplicates were identified for this SDG.

Sincerely,
ECHEM INC.

Bruce K. Wallin, Ph.D.
Vice President

enclosures

Air Force Plant 59

Case No NONE

Table I. Validation Action Summary

<u>Sample No.</u>	<u>VOA</u>
JCCNCAW	R4
JCCW1AW	A1,R4
JCCW2AW	A1,R4
JCOF1AW	A1,R4
JCOF2AW	J2,J4,R4
TRIP BLANK4	R4
TRIP BLANK5	R4
TRIP BLANK7	R4

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for chloroform and methylene chloride to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for trichloroethene due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
- J7 - estimate positive values (J) for () due to non-compliant internal standard stability
- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries

- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for 2-butanone, 2-hexanone and 4-methyl-2-pentanone due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability

SITE: Air Force Plant 59
CASE # _____

CLIENT: Argonne Nat'l Labs
BDG# 2-5807

- ☒ Quant Reports
- ☒ MASS SPECS
- ☒ TIC Compounds
- ☒ Laboratory Blank (Form 1's)
- ☒ MS/MSD (Forms 1's)
- ☒ N.B. Total Solids Log (if applicable)
- ☒ Injection Log
- ☒ Chain of Custody
- ☒ Case Narrative

ECHEM INC.

CLIENT: Argonne Nat'l Labs

SITE: Air Force Plant 59

[illegible]

NOTE: UNITS ARE DEFINED AS WATER/SOIL (E.G., 5/8) INCLUDING BLANKS

COMMENTS: SAS for this project Include:

Turnaround time for these cases is:

standard = 30 days
last = 14 days

Appendix A-I:

Report 6

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207)892-0002
FAX (207) 892-7499

26 February 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 2-5807

Semivolatiles:	JCCNCAW	JCCW1AW	JCOF1AW
	JCOF2AW	JCCW2AW	

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
- matrix spike/matrix spike duplicate/matrix spike blank
- blanks
- * - GC/MS tuning
- calibration
- * - internal standards performance
- field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I Summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-E, Revision # 7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet The criteria specified in The NYSDEC CLP (Vol. VIII, E-41) are summarized below.

<u>SAMPLE</u>	<u>PHE</u>	<u>CLPH</u>	<u>DCB</u>	<u>DNP</u>	<u>TCB</u>	<u>CRE</u>	<u>RECOVERY (%)</u>			<u>PCP</u>	<u>PYR</u>
							<u>ACE</u>	<u>NPH</u>	<u>DNT</u>		
JC0F2AW					110	110	130	99	130	130	149

Action:

- o none, sample results reported as <CRQL J or CRQL U

BLANKS:

For sample JC0F1AW a TIC was reported that was also present in the associated method blank, therefore, the sample results was flagged as unusable (R).

CALIBRATION:

Calibration linearity, sensitivity and stability criteria specified in the NYSDEC CLP (Vol. VIII, E-48-51), or federal criteria (*), are tabulated below.

CONTINUING CALIBRATION CRITERIA

<u>COMPOUND</u>	<u>%D (max.)</u>	<u>RRF (min.)</u>
SPCC	20	0.05
all other TCL compounds	20	0.05*

Deviations from the above calibration criteria are tabulated below.

CONTINUING CALIBRATION

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>COMPOUND</u>	<u>%D</u>	<u>RRF</u>
GCMSD(#4)	12-16-91/16:23	di-n-butylphthalate	22	
	12-17-91/08:07	2,4-dinitrophenol	21	
		4-nitroaniline	24	
GCMSD (#4)	12-16-91/16:23	di-n-butylphthalate	24	
		fluoranthene	21	
	12-18-91/07:25	benzoic acid	22	
		4-nitroaniline	21	
		di-n-butylphthalate	23	
		fluoranthene	24	

Associated samples:

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>SAMPLE NO.</u>
GCMSD(#4)	12-16-91/16:23	NONE
	12-17-91/08 : 07	JCCW2AW JCCWIAW JCCNCAW
	12-18-91/07:25	JC0F1AW JC0F2AW

Action:

- o none, associated sample results reported as either <CRQL J or CRQL U

FIELD DUPLICATES:

No field duplicates were identified for this SDG.

Sincerely,
ECHEM INC.

Bruce K. Wallin, Ph.D.
Vice President

enclosures

Air Force Plant 59
Case No. NONE

Table I. Validation Action Summary

Sample No.
JCCNCAW
JC0F1AW
JC0F2AW
JCCW2AW

SVOA

J8

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
- J7 - estimate positive values (J) for () due to non-compliant internal standard stability
- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- RI - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries

- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in The internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%
- R8 - TIC's identified in associated method blank, result flagged as unusable (R)

SDG NO. 2-5807

SITE: Air Force Plant 59

CLIENT: Argonne Nat'l Labs

AFP59S-2

6

ECHEM INC.

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE EXTRACTED

NEW, 2011

CLIENT	SAMPLE ID	EPA SAMPLE NO.	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE EXTRACTED	HOLD TIME	TO EXTRACTION	RECEIPT
JSCNCAW		5808-001	WATER	11-18-91	11-18-91	11-21-91	3			
JSCNCAW		5807-002	WATER	11-17-91	11-18-91	11-21-91	4			
JSCNCAW		5808-001	WATER	11-23-91	11-24-91	11-26-91	3			
JSCNCAW		5808-001	WATER	11-23-91	11-24-91	11-26-91	3			
JSCNCAW		5808-002	WATER	11-23-91	11-24-91	11-26-91	3			
JSCNCAW		5807-001	WATER	11-17-91	11-18-91	11-21-91	4			
JSCNCAW		5807-001	WATER	11-17-91	11-18-91	11-21-91	4			
JSCNCAW		5807-001	WATER	11-17-91	11-18-91	11-21-91	3			

Appendix A-1:

Report 7

A-72

**ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS**

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

26 February 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 2-5807

Pesticides/PCB's:	JCCNCAW	JCCW1AW	JCCW2AW
	JCOF1AW	JCOF2AW	

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
 - matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - calibration
- * - pesticide instrument performance
 - field duplicates
- * - TCL compound identification
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7 and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet the criteria specified in the NYSDEC CLP (Vol. VII, E-73) are summarized below.

<u>SAMPLE</u>	<u>LIN</u>	<u>HEP</u>	<u>RECOVERY (%)</u>		<u>END</u>	<u>DDT</u>
			<u>ALD</u>	<u>DIEL</u>		
MSB-0064					128	

Action:

- o none, sample results reported as CRQL U

FIELD DUPLICATES:

No field duplicates were identified for this SDG.

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
Case No. NONE

Table I. Validation Action Summary

<u>Sample No.</u>	<u>Pesticide/PCB</u>
JCCNCAW	
JCCW1AW	
JCCW2AW	
JCOF1AW	
JCOF2AW	

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
- J7 - estimate positive values (J) for () due to non-compliant internal standard stability
- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries

- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%

EICHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDC

SITE: Alis Force Plant 59
ANALYTICAL FRACTION: Pesticide/PCBs

SDG NO. 2-5807

CLIENT: Argonne Nat'l Labs
CASE NO.

CLIENT SAMPLE ID	EPA SAMPLE NO.	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE EXTRACTED	HOLD TIME TO EXTRACTION	RECEIPT
JCCNICRU	5808-001	WATER	11-18-91	11-18-91	11-19-91	11-22-91	4	3
JCCUABU	5807-002	WATER	11-17-91	11-17-91	11-18-91	11-22-91	5	4
JCCUABU	5807-001	WATER	11-17-91	11-17-91	11-18-91	11-22-91	5	4
JCCOFIAB	5868-001	WATER	11-23-91	11-23-91	11-23-91	11-27-91	4	4
JCCOF&AW	5868-002	WATER	11-23-91	11-23-91	11-23-91	11-27-91	4	4

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE EXTRACTED
HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

REV. 01

COMPLETENESS LOG

SITE: Air Force Plant 59 ^{COMPLETE}
CASE #

CLIENT: Argonne Nat'l Labs
SDG# 2-5807

[illegible]

- ☐ Quant Reports
- ☐ MASS SPECS
- ☐ TIC Compounds
- ☒ Laboratory Blank (Form 1's)
- ☒ MS/MSD (Forms 1's)
- ☒ N/A Total Solids Log (if applicable)
- ☐ Injection Log
- ☒ Chain of Custody
- ☒ Case Narrative

REV. 391

Appendix A-1:

Report 8

**ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS**

P.O. Box 1310
#32 Route 33
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

26 February 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 2-5807

TAL Inorganics:	JCCNCAW	JCCW1AW
	JCCW2AW	JCOF1AW
	JCOF2AW	

Dear Dr. Wait:

Validation was performed on the inorganic analytical data from the samples referenced above. The data were evaluated, based on the following parameters:

- * - data completeness
 - holding times
 - calibrations
 - blanks
 - ICP interference check sample analysis
- * - matrix spike analysis
 - duplicate sample analysis
- * - laboratory control sample analysis
 - furnace atomic absorption results
- * - ICP serial dilution results
- * - detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II Evaluation of Inorganic Data for the Contract Laboratory Program, February 1990, SOP No. HW-2, Revision X, and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

HOLDING TIMES:

Cyanide

Samples with holding times that exceeded the 12 days specified by the NYSDEC CLP (Vol. VIII) are tabulated below:

<u>SAMPLE</u>	<u>HOLDING TIME (DAYS) FROM</u> <u>COLLECTION</u>	<u>RECEIPT BY LABORATORY</u>
JC0F2AW	14	14

Action:

- o sample results are flagged as estimated (J)

CALIBRATIONS:

1. ICP and furnace AA Elements

- a. Initial and/or continuing calibration verifications that were not within 90-110% of the true value as specified by the NYSDEC CLP (Vol. VIII, E-106) are tabulated below:

<u>CALIBRATION DATE-TIME</u>	<u>INSTRUMENT</u>	<u>ELEMENT</u>	<u>% OF TRUE</u>
12-17-91/08:30	F1	antimony	111

Associated samples: NONE

BLANKS:

1. Positive Blanks

Blanks providing results $\geq$ IDL and their associated action levels are tabulated below:

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>	
			<u>WATER</u>	<u>SOIL</u>
CCB6	barium	15	75	
	calcium	33	165	
	copper	8	40	
	manganese	1	5	
	nickel	7	35	
	zinc	7	35	
	barium	13	65	
	calcium	31	155	
	copper	10	50	
	iron	6	30	
	manganese	2	10	
	nickel	8	40	
	vanadium	5	25	
	zinc	15	75	
	barium	17	85	
CCB8	cadmium	5	25	
	calcium	87	435	
	copper	7	35	
	iron	20	100	
	magnesium	62	310	
	manganese	3	15	
	nickel	6	30	
	vanadium	4	20	
	zinc	8	40	

Associated samples with positive values reported below the action level are tabulated below:

<u>CAL BLANK ID</u>	<u>PARAMETER</u>	<u>SAMPLE NO.</u>
CCB6	barium	JCCW1AW
	copper	JCCW2AW
	zinc	
CCB7	vanadium	JCCW2AW
	barium	JCOF2AW
	copper	JCOF1AW
	nickel	JCOF2AW
	vanadium	
CCB7	zinc	JCOF1AW
CCB8	barium	JCCNCAW

Action:

- o associated sample results >IDL but <action level are flagged as not detected at the sample value (U)

2. Negative Blanks

Blanks that provided results <-2IDL are tabulated below:

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>CONCENTRATION</u>
ICH1	calcium	
	iron	-15
CCH1	calcium	-60
CCH2	antimony	-4.6
	calcium	-93
	iron	-24
	vanadium	-10
CCH3	iron	-13
CCB5	antimony	-4.5
	calcium	-48
CCB7	antimony	-4.1
CCB11	zinc	-19
PB1	calcium	-41

Associated samples with results reported <10IDL: NONE

DUPLICATE SAMPLE ANALYSIS:

Field duplicates:

No field duplicates were identified for this SDG.

FURNACE ATOMIC ABSORPTION RESULTS:

Post-digestion spike

Samples with post-digestion spike recoveries $\geq 40\%$ but not within 85-115%, and also having native analyte sample absorbance <50% of the spiked sample value, and samples with post-digestion spike recoveries reported at <40% that were diluted 5-10 fold and recoveries repeated at <40% or that were not within 85-115%, and also having native sample absorbance <50% of the spiked sample value, as specified in the NYSDEC CLP (Vol. VIII, E-118-119) are tabulated below:

<u>SAMPLE</u>	<u>ELEMENT</u>	<u>% RECOVERY</u>
JCCW1AW	arsenic	117
JCOF2AW	arsenic	118

Action:

- o none, sample results reported as IDL U

Sincerely,
ECHEM INC.

Bruce K. Wallin, Ph.D.
Vice President

enclosures

Air Force Plant 59
Case No. NONE

Table I. Validation Action Summary

Aluminum		Magnesium	
Antimony		Manganese	
Arsenic		Mercury	
Atrium	A1	Nickel	A1
Beryllium		Potassium	
Cadmium		Selenium	
Calcium		Silver	
Chromium		Sodium	
Cobalt		Thallium	
Copper	A1	Vanadium	A1
Iron		Zinc	A1
Lead		Cyanide	J1

If an element has no entry, no qualifications were necessary.

- A1 - Accept data, raise the sample detection limit(s) due to & blank contamination.
- J1 - Estimate (J) positive values and (UJ) detection limit results due to hold time exceedences.
- J2 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant calibrations.
- J3 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant linearity near the CRDL.
- J4 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant matrix spike recoveries.
- J5 - Estimate (J) positive values due to non-compliant duplicate precision.

- J6 - Estimate (J) positive values and (UJ) detection limit results due non-compliant laboratory control sample results.
- J7 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant analytical precision and/or accuracy.
- J8 - Estimate (J) positive values due to non-compliant method of standard additions linearity.
- J9 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant serial dilution reproducibility.

SITE: Air Force Plant 59
ANALYTICAL FRACTION: Mercury

SDG NO. 2-5807[illegible]

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

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[illegible]

- ☐ Standardization Report for ICP
- ☐ Analysis Report for each calibration, blank, sample
- ☐ Copies of printer tapes for each AAS element
- ☒ Mercury Analysis Sheet
- ☒ Cyanide Analysis Sheet
- ☐ N.A. Total Solids Log (if applicable)
- ☒ Metals Digestion Log
- ☒ Mercury Digestion Log
- ☒ Cyanide Distillation Log
- ☒ Chain of Custody
- ☒ Case Narrative

Appendix A-1:

Report 9

**ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS**

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

17 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 3-5983

Volatiles:	JCBG1AS	JCSW7AS	JCSW7BS	JCSW9AS
	JCSW9BS	JC1H1AS	JC1H1CS	JC3H1AS
	JC4K1AS	JC4H2AS	JCGH1AS	
	TRIP BLANK9	HOLD BLANK10		
	HOLD BLANK11	TRIP BLANK9		
	TRIP BLANK10	TRIP BLANK11		

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- surrogate recovery
- matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - GC/MS tuning
- * - calibration
- * - internal standards performance
- * - field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance

- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7 and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

LABORATORY FORTIFIED BLANK:

Compounds not within the recovery limits specified in the NYSDEC ASP are tabulated below:

<u>COMPOUND</u>	<u>% RECOVERY</u>
1,1,2-trichloroethane	95
toluene	95
chlorobenzene	95
ethylbenzene	95

Action:

- o none, sample results for the compounds reported as CRQL U

CALIBRATION:

Calibration linearity, sensitivity and stability criteria specified in the NYSDEC CLP (Vol. VIII, E-23-26), or federal criteria (*), are tabulated below.

INITIAL CALIBRATION CRITERIA

<u>COMPOUND</u>	<u>%RSD (max.)</u>	<u>AVG RRF (min.)</u>
CCC	30	0.05*
SPCC (except bromoform)	35	0.300
bromoform	35	0.250
all other TCL compounds	35	0.05*

Deviations from the above calibration criteria are tabulated below.

CONTINUING CALIBRATION

<u>INSTRUMENT</u>	<u>DATE</u>	<u>COMPOUND</u>	<u>%RSD</u>	<u>AVE. RRF</u>
B#2	12-10-91	2-BUTANONE		.069

Associated samples:

<u>INSTRUMENT</u>	<u>DATE</u>	<u>SAMPLE NO.</u>
B#2	12-10-91	JC1H1CS

Action:

- o for AVG RRF <0.05; detection limit values (CRQL U) are flagged as unusable (R)

Sincerely,

Bruce K. Wallin, Ph.D.
Vice President

enclosures

Air Force Plant 59
SDG No. 3-5983

Table I. Validation Action Summary

<u>Sample No.</u>	<u>VOA</u>
JCBG1AS	
JCSW7AS	
JC5W7BS	
JCSW9As	
JCSW9BS	
JC1H1AS	
JC1N1CS	R4
JC3H1AS	
JC4H1AS	
JC4H2AS	
JC6E1AS	
HOLD BLANK10	
HOLD BLANK11	
TRIP BLANK10	
TRIP BLANK11	

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-Compliant calibration stability
- J7 - estimate positive values (UR) for () due to non-compliant internal standard stability

- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for 2-butanone due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - TIC's identified in associated method blank, results flagged as unusable (R)

FOR NYSDEC

CLIENT: Argonne. Nat'l Lab.

CASE NO. TASK NO: 6044 / 000A / 6007 / 5983 SDG NO: 3 - 5983

SITE: IRR Supplemental S.I.

ANALYTICAL FRACTION: Volatiles

[illegible]

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

Appendix A-1:

Report 10

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

16 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 3-5983

Semivolatiles:	JC1H1AS	JC1H1CS	JC3H1AS	JC4H1AS
	JC4H2AS	JC6H1AS	JCBG1AS	JCSW7AS
	JCSW7BS	JCSW9AS	JCSW9BS	

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
 - matrix spike/matrix spike duplicate/matrix spike blank
 - blanks
- * - GC/MS tuning
 - calibration
- * - internal standards performance
- * - field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision # 7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet the criteria specified in the NYSDEC CLP (Vol. VIII, E-41) are summarized below.

<u>SAMPLE</u>	<u>PHE</u>	<u>CLPH</u>	<u>DCB</u>	<u>DNP</u>	<u>TCB</u>	<u>RECOVERY (%)</u>		<u>NPH</u>	<u>DNT</u>	<u>PCP</u>	<u>PYR</u>
						<u>CRE</u>	<u>ACE</u>				
JCSW9BS					114				105	125	
Q1-0081										114	

Action:

- o none, sample results reported as CRQL U

Samples with MS/MSD relative percent difference (RPD) not within the criteria specified in the USEPA Functional Guidelines are tabulated below:

<u>SAMPLE</u>	<u>PHE</u>	<u>CLPH</u>	<u>DCB</u>	<u>DNP</u>	<u>TCB</u>	<u>RPD (%)</u>		<u>NPH</u>	<u>DNT</u>	<u>PCP</u>	<u>PYR</u>
						<u>CRE</u>	<u>ACE</u>				
JCSW9BS					31					58	

Action:

- o none, sample results reported as CRQL U

BLANKS:

Several TIC's were identified in some samples as well as their associated method blanks. These results were flagged as unusable (R).

CALIBRATION:

Calibration linearity, sensitivity and stability criteria specified in the NYSDEC CLP (Vol. VIII, E-48-51), or federal criteria (*), are tabulated below.

CONTINUING CALIBRATION CRITERIA

<u>COMPOUND</u>	<u>%D (max.)</u>	<u>RRF (min.)</u>
SPCC	20	0.05
all other TCL compounds	20	0.05*

Deviations from the above calibration criteria are tabulated below.

CONTINUING CALIBRATION

<u>INSTR.</u>	<u>DATE/TIME</u>	<u>COMPOUND</u>	<u>%D</u>	<u>RRF</u>
GCMSD#4	12-19-91/08:37	N-nitroso-di-n-propylamine	21	
	12-20-91/08:34	bis(2-chloroisopropyl) ether	25	
		2,4-dinitrophenol	22	
		fluoranthene	22	
		indeno(1,2,3-cd)pyrene	23	
		dibenz(a,h)anthracene	23	
		benzo(g,h,i)perylene	26	
	12-23-91/11:00	2, 4-dinitrophenol	22	
		4-nitroaniline	21	
		di-n-butylphthalate	25	
		fluoranthene	24	
		bis(2-ethylhexyl) phthalate	21	

Associated samples:

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>SAMPLE NO.</u>
GCMSD#4	12-19-91/08:37	JC4H1AS
		JC4H2AS
		JC1H1CS
		JC1H1AS

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>SAMPLE NO.</u>
GCMSD#4	12-20-91/08:37	JC6H1AS
		JCSW7AS
		JCSW7BS
		JCBG1AS
	12-23-91/11:00	JC3H1AS
		JCSW9AS
		JCSW9BS

Action:

- o for %D <50%; results $\geq$ CRQL for the compound are flagged as estimated (J)

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 3-5983

Table I. Validation Action Summary

<u>Sample No.</u>	<u>SVOA</u>
JC1H1AS	
JC1H1CS	
JC3H1AS	J6
JC4H1AS	R8
JC4H2AS	R8
JC6H1AS	J6, R8
JCBG1AS	J6
JCSW7AS	J6
JCSW7BS	
JCSW9AS	J6, R8
JCSW9BS	R8

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for di-n-butylphthalate, benzo(g,h,i)perylene, bis(2-ethylhexyl) phthalate, fluoranthene and dibenz(a,h)anthracene due to non-compliant calibration stability
- J7 - estimate positive values (J) for () due to non-compliant internal standard stability
- J8 - estimate positive values (J) due to non-compliant field duplicate precision

- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%
- R8 - TIC's identified in associated method blank, results flagged as unusable (R)

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
 FOR NYSDC

SITE: IRR Supply to S.I.
ANALYTICAL FRACTION: Semivolatiles

CLIENT: Argentine Nat'l Lab
CASE NO.

SDG NO. 3-5983

CLIENT SAMPLE ID	EPA SAMPLE NO	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE EXTRACTED	HOLD TIME TO EXTRACTION	RECEIPT
JC1H1AS	6007-001	6007-001	Soil	12-04-91	12-05-91	12-06-91	2	1
JC1H1CS	6007-002	6007-003		12-04-91	12-05-91	12-06-91	2	1
JC3H1AS	6007-003			12-04-91	12-05-91	12-06-91	2	1
JC4H1AS	5983-001			12-03-91	12-04-91	12-05-91	2	1
JC4H2AS	5983-002			12-03-91	12-04-91	12-05-91	2	1
JC6H1AS	6007-004			12-03-91	12-05-91	12-06-91	2	1
JC6H1AS	6044-003			12-06-91	12-09-91	12-10-91	4	1
JC5W7AS	6044-001			12-06-91	12-09-91	12-10-91	4	1
JC5W7BS	6044-002			12-06-91	12-09-91	12-10-91	4	1
JC5W9AS	6069-001			12-10-91	12-10-91	12-15-91	5	5
JC5W9BS	6069-002			12-10-91	12-10-91	12-15-91	5	5

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE EXTRACTED
HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

REV. 01

APP5983S

7

ECHEM INC.

Appendix A-1:

Report 11

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1310
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

16 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 3-5983

Pesticides/PCB's:	JCBG1AS	JCSW7AS	JCSW7BS	JCSW9AS
	JCSW9BS	JC1H1AS	JC1H1CS	JC3H1AS
	JC4H1AS	JC6H1AS	JC4H2AS	

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
- matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - calibration
- * - pesticide instrument performance
- * - field duplicates
- * - TCL compound identification
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7 and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet the criteria specified in the NYSDEC CLP (Vol. VII, E-73) are summarized below.

<u>SAMPLE</u> JCSW9BS	<u>LIN</u>	<u>HEP</u>	<u>RECOVERY (%)</u>				<u>DDT</u>
			<u>ALD</u>	<u>DIEL</u>	<u>END</u>		
			138	142	164		

Action:

- o none, sample results reported as CRQL U

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 3-5983

Table I. Validation Action Summary

Sample No.
JCSW7AS
JCSW7BS
JCSW9AS
JC5W9BS
JC1H1AS
JC1H1C5
JC3H1AS
JC4H1AS
JC6H1AS
JC4H2AS

Pesticide/PCB

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
- J7 - estimate positive values (J) for () due to non-compliant internal standard stability
- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries

- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%

ECHM INC.

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

[illegible]

REV. 201

[illegible]

- ECHEM INC.

Appendix A-1:

Report 12

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

17 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 3-5983

TAL Inorganics:	JCBG1AS	JCSW7AS	JCSW7BS	JCSW9AS
	JCSW9BS	JC1H1CS	JC3H1AS	JC4H2AS
	JC4H1AS	JC6H1AS		

Dear Dr. Wait:

Validation was performed on the inorganic analytical data from the samples referenced above. The data were evaluated, based on the following parameters:

- * - data completeness
- * - holding times
- * - calibrations
- blanks
- * - ICP interference check sample analysis
- matrix spike analysis
- duplicate sample analysis
- * - laboratory control sample analysis
- furnace atomic absorption results
- * - ICP serial dilution results
- * - detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II Evaluation of Inorganic Data for the Contract Laboratory Program, February 1990, SOP No. HW-2, Revision X, and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

BLANKS

1. Positive Blanks

Blanks providing results $\geq$ IDL and their associated action levels are tabulated below:

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>	
			<u>WATER</u>	<u>SOIL</u>
CCB3	barium	12		12
	cadmium	3		3
	calcium	124		124
	cobalt	7		7
	copper	5		5
	iron	47		47
	magnesium	100		100
	manganese	4		4
	nickel	8		8
	vanadium	16		16
	zinc	9		9
CCB4	barium	19		19
	cadmium	5		5
	calcium	112		112
	chromium	5		5
	copper	4		4
	iron	20		20
	magnesium	54		54
	manganese	2		2
	nickel	10		10
	vanadium	5		5
	zinc	8		8

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>	
			<u>WATER</u>	<u>SOIL</u>
CCB7	barium	56		56
	beryllium	1		1
	cadmium	3		3
	calcium	200		200
	chromium	4		4
	cobalt	9		9
	copper	10		10
	iron	80		80
	magnesium	102		102
	manganese	12		12
	nickel	12		12
	potassium	199		199
	zinc	4		4

Associated samples with positive values reported below the action level are tabulated below:

<u>CAL BLANK ID</u>	<u>PARAMETER</u>	<u>SAMPLE NO.</u>
CCB3	cadmium	JC4H1AS
	cobalt	
	vanadium	
	cadmium	JC4H2AS
	vanadium	
CCB4	cadmium	JC3H1AS
		JC1H1CS
	nickel	JCSW7BS
CCB7	barium	JCSW9AS
	cadmium	JCSW9BS
	cobalt	

Action:

- o associated sample results $\geq$ IDL but $<$ action level are flagged as not detected at the sample value (U)

MATRIX SPIKE ANALYSIS:

Samples providing matrix spike recoveries not within 75-125% that also contain native analyte reported at $<4X$ the spiking level as specified in the NYSDEC CLP (Vol. VIII, E-111) are tabulated below:

<u>SAMPLE</u>	<u>ELEMENT</u>	<u>% RECOVERY</u>
JCSW9BS	antimony.	69
	lead	1
	selenium	64

Action:

- o for recoveries <30%, results $\geq$ IDL are flagged as estimated (J) and detection limit values (IDL U) are flagged as unusable (R)
- o for recoveries from 30-74%, results are flagged as estimated (J)

Comments:

The above actions are applied to all samples of the same matrix associated with this SDG.

DUPLICATE SAMPLE ANALYSIS:

1. Laboratory replicates:

Laboratory replicate results for samples containing >5 CRDL with RPD's that exceed 20% and for samples containing <5 CRDL that exceed the +CRDL specified in the NYSDEC CLP (Vol. VIII, E-114) are as follows:

<u>SAMPLE NO.</u>	<u>ELEMENT</u>	<u>RPD %</u>	<u>CRDL</u>	<u>S - D</u>
JCSW9BS	lead	37		

Action:

- o results are flagged as estimated (J)

Comments:

The above actions are applied to all samples of the same matrix associated with this SDG.

FURNACE ATOMIC ABSORPTION RESULTS:

1. Duplicate injections:

Samples with concentrations reported >CRDL or post-digestion spikes providing duplicate injection coefficient of variation (CV) 20% as specified by the NYSDEC CLP (Vol. VIII, E-118) are tabulated below:

<u>SAMPLE ID</u>	<u>ELEMENT</u>	<u>CV</u>
JCBG1AS	selenium	35

Action:

- o sample results are flagged as estimated (J)

2. Method of Standard Additions:

Samples analyzed by MSA that provided replicated linearity coefficients (r) of <0.995 as specified in the NYSDEC CLP (Vol. VIII, E-120) are tabulated below:

<u>SAMPLE</u>	<u>ELEMENT</u>	<u>r</u>
JCSW7BS	arsenic	0.9936

Action:

- o sample results >IDL are flagged as estimated (J)

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 3-5983

Table I. Validation Action Summary

Aluminum		Magnesium	
Antimony	J4	Manganese	
Arsenic	J8	Mercury	
Barium	A1	Nickel	A1
Beryllium		Potassium	
Cadmium	A1	Selenium	J4
Calcium		Silver	
Chromium		Sodium	
Cobalt	A1	Thallium	
Copper		Vanadium	A1
Iron		Zinc	
Lead	J4, J5	Cyanide	

If an element has no entry, no qualifications were necessary.

- A1 - Accept data, raise the sample detection limit(s) due to blank contamination.
- J1 - Estimate (J) positive values and (UJ) detection limit results due to hold time exceedences.
- J2 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant calibrations.
- J3 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant linearity near the CRDL.
- J4 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant matrix spike recoveries.
- J5 - Estimate (J) positive values due to non-compliant duplicate precision.

- J6 - Estimate (J) positive values and (UJ) detection limit results due non-compliant laboratory control sample results.
- J7 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant analytical precision and/or accuracy.
- J8 - Estimate (J) positive values due to non-compliant method of standard additions linearity.
- J9 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant serial dilution reproducibility.

[illegible]

- ☐ Standardization Report for ICP
- ☐ Analysis Report for each calibration, blank, sample
- ☐ Copies of printer tapes for each AAS element
- ☒ Mercury Analysis Sheet
- ☒ Cyanide Analysis Sheet
- ☒ Total Solids Log (if applicable)
- ☒ Metals Digestion Log
- ☒ Mercury Digestion Log
- ☒ Cyanide Distillation Log
- ☒ Chain of Custody
- ☒ Case Narrative

EICHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

SITE: *IRP Supplemental S.I.*
ANALYTICAL FRACTION: Mercury

SDG NO. 8-5983

CLIENT: Argonne Nat'l Lab
CASE NO. _____

CASE NO.

CLIENT SAMPLE ID	EPA SAMPLE NO	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE ANALYZED	HOLD TIME COLLECT	RECEIPT
5651AS		6044-003	Soil	12-06-91	12-09-91	12-16-91	10	7
56507AS		6044-001		12-06-91	12-09-91		10	7
565070S		6044-002		12-06-91	12-09-91		10	7
56509AS		6069-001		12-10-91	12-10-91		6	6
56509BS		6069-002		12-10-91	12-10-91		6	6
56510S		6007-002		12-04-91	12-05-91		12	11
56511AS		6007-003		12-04-91	12-05-91		12	11
56512AS		5983-001		12-03-91	12-04-91		13	12
56512BS		5983-002		12-03-91	12-04-91		13	12
56512CS		6007-004		12-04-91	12-05-91		12	11
56512DS		6007-005		12-04-91	12-05-91		12	11
56512ES		6007-006		12-04-91	12-05-91		12	11
56512FS		6007-007		12-04-91	12-05-91		12	11
56512GS		6007-008		12-04-91	12-05-91		12	11
56512HS		6007-009		12-04-91	12-05-91		12	11

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

COMMENTS:

REV. 01/11

A-130

Appendix A-1:

Report 13

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

13 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 5-6384

Volatiles:	JCBG2BW	JCDPWA	JCDW1AW	JCDW3AW
(USEPA 524.2)	JCDW4AW	JCDW5AW	JCDW6AW	JCDW8AW
	JCDW8RW	JCDW9AW	JCSW1AW	JCSW3AW
	JCSW4AW	JCSW5AW	JCSW6AW	JCSW7AW
	JCSW8AW	TRIP BLANK13	TRIP BLANK14	JCSW9AW
		TRIP BLANK15	HOLD BLANK13	
		HOLD BLANK14	HOLD BLANK15	

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters in accordance with the specifications set forth in USEPA Method No. 524.2, Revision 3 and the Quality Assurance Project Plan for Air Force Plant 59, Johnson City, New York, Revision 2, December 19, 1991.

- * - data completeness
- * - holding times
- surrogate recovery
- * - matrix spike/matrix spike duplicate
- laboratory fortified blank
- blanks
- * GC/MS tuning
- calibration

- * - internal standards performance
- * - field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

SURROGATE RECOVERY:

Samples with surrogate recoveries which did not meet the criteria specified in the NYSDEC ASP are summarized below:

<u>SAMPLE</u>	<u>PERCENT RECOVERIES</u>		
	<u>D4DCE</u>	<u>D8T</u>	<u>BFB</u>
JCBG2BW			86
JCSW3AW			86
JCDW9AW			86

Action:

- o recovery $\geq 10\%$; sample results $> \text{MDL}$ are flagged as estimated (J)

LABORATORY FORTIFIED BLANK:

Compounds not within the recovery limits specified in the NYSDEC ASP are tabulated below:

<u>COMPOUND</u>	<u>% RECOVERY</u>
1, 2-dichloroethene (total)	80
cis-1, 3-dichloropropene	84
benzene	86
styrene	86

Action:

- o for recovery >10% but below limit, detection limit values for the compound are flagged as estimated (J)

Comments:

The above actions are applied to all samples of the same matrix associated with this SDG.

BLANKS:

Positive blank results and associated action levels are tabulated below:

<u>BLANK ID.</u>	<u>COMPOUND</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>
TRIP BLANK14	methylene chloride	0.2	2.0
TRIP BLANK15	methylene chloride	1.0	10.0

* Method blank levels below the NYSDEC ASP requirements.

Associated samples with positive values reported below the action level are: NONE

CALIBRATION:

A. Initial calibration:

SPCC compounds with average relative response factors (AVG RRF) below the limits and all others ≤ 0.10 or percent relative standard deviations (%RSD) >30% for CCC compounds and >35% for all other compounds as specified in the NYSDEC ASP are tabulated below:

<u>INSTRUMENT</u>	<u>CAL DATE</u>	<u>COMPOUND</u>	<u>AVG RRF</u>	<u>%RSD</u>
C	01-03-92	2-butanone	.030	
		vinyl acetate	.028	
		2-hexanone	.075	
C	01-13-92	2-butanone	.041	
		vinyl acetate	.027	
		2-hexanone	.098	

Associated samples:

<u>INSTRUMENT</u>	<u>CAL DATE</u>	<u>SAMPLE NO.</u>	
C	01-03-92	HOLD BLANK13	TRIP BLANK13
		JCDW1AW	JCSW1AW
		JCDW5AW	JCDW3AW
		JCDW6AW	JCSW3AW

<u>INSTRUMENT</u>	<u>CAL DATE</u>	<u>SAMPLE NO.</u>	
C	01-03-92	JCSW6AW JCSW5AW JCBG2BW	JCDW9AW JCDW4AW
	01-13-92	HOLD BLANK14 JCSW9AW JCSW7AW JCSW8AW TRIP BLANK15	TRIP BLANK14 JCSW4AW JCDW8RW HOLD BLANK15 JCDPWA

Action:

- o for AVG RRF ≤ 0.10 , results $\geq$ MDL for the compound are flagged as estimated (J) and detection limit values (MDL U) are flagged as unusable (R)

B. Continuing calibration:

SPCC compounds with relative response factors (RRF) below the limits and all others ≤ 0.10 or percent difference between initial and continuing calibration (%D) $> 25\%$ for CCC compounds and $> 35\%$ for all other compounds as specified in the NYSDEC ASP are tabulated below:

<u>INSTRUMENT</u>	<u>CAL DATE/TIME</u>	<u>COMPOUND</u>	<u>RRF</u>	<u>%D</u>
C	01-07-92/08:42	2-butanone	.039	
		vinyl acetate	.025	
		2-hexanone	.089	
	01-08-92/10:17	2-butanone	.032	
		vinyl acetate	.034	
		2-hexanone	.082	
	01-09-92/09:58	2-butanone	.035	
		vinyl acetate	.035	
		2-hexanone	.094	
	01-10-92/08:55	2-butanone	.030	
		vinyl acetate	.027	
		2-hexanone	.081	
	01-14-92/05:43	2-butanone	.044	
		vinyl acetate	.030	
		2-hexanone	.104	

<u>INSTRUMENT</u>	<u>CAL DATE/TIME</u>	<u>COMPOUND</u>	<u>RRF</u>	<u>%D</u>
C	01-15-92/05:46	2-butanone	.041	
		vinyl acetate	.031	
		2-hexanone	.100	
	01-16-92/01:40	2-butanone	.041	
		vinyl acetate	.031	
		2-hexanone	.103	

Associated samples:

<u>INSTRUMENT</u>	<u>CAL DATE</u>	<u>SAMPLE NO.</u>	
C	01-07-92/08:42	HOLD BLANK13 TRIP BLANK13	JCDW1AW JCSW1AW
	01-08-92/10:17	JCDW5AW JCSW3AW	JCSW5AW JCDW9AW
	01-09-92/09:58	JCBG2BW JCSW3AW	JCDW3AW JCDW9AW
	01-10-92/08 : 55	JCDW4AW	
	01-14-92/05:43	HOLD BLANK14 TRIP BLANK14 JCSW7AW	JCSW9AW JCSW4AW JCDW8RW
	01-15-92/05:46	HOLD BLANK15	JCSW8AW
	01-16-92/01:40	JCSW8AW TRIP BLANK15	JCDPWAU

Action:

- o for $RAE \leq 0.10$, results $\geq MDL$ for the compound are flagged as estimated (J) and detection limit values (MDL U) are flagged as unusable (R)

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 5-6384

Table I. Validation Action Summary

<u>Sample No.</u>	<u>VOA</u>
JCBG2BW	J2, R4, J9
JCDPWA	R4, J9
JCDW1AW	R4, J9
JCDW3AW	R4, J9
JCDW4AW	R4, J9
JCDW5AW	R4, J9
JCDW6AW	R4, J9
JCDW8AW	R4, J9
JCDW8RW	R4, J9
JCDW9AW	J2, R4, J9
JCSW1AW	R4, J9
JCSW3AW	J2, R4, J9
JCSW4AW	R4, J9
JCSW5AW	R4, J9
JCSW6AW	R4, J9
JCSW7AW	R4, J9
JCSW8AW	R4, J9
JCSW9AW	R4, J9
TRIP BLANK13	R4, J9
TRIP BLANK14	R4, J9
TRIP BLANK15	R4, J9
HOLD BLANK13	R4, J9
HOLD BLANK14	R4, J9
HOLD BLANK15	R4, J9

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria

- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
- J7 - estimate positive values (J) for () due to non-compliant internal standard stability
- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- J9 - estimate detection limit value (UJ) for 1,2-dichloroethene, cis-1,3-dichloropropene, benzene and styrene due to non-compliant check standard results
- RI - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for 2-butanone, 2-hexanone and vinyl acetate due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argonne Nat'l Lab
CASE NO.

SDG NO. 5-6384

SITE: IRP Supplemental S.I.
ANALYTICAL FRACTION: Volatiles

CLIENT SAMPLE ID	EPA SAMPLE NO.	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE ANALYZED	HOLD TIME COLLECT	HOLD TIME RECEIPT
JCBQ2AW		6415-001	WATER	1-7-92	1-8-92	1-9-92	2	1
JCDPWAW		6446-004		1-9-92	1-10-92	1-16-92	7	6
JCDW1AW		6384-001		1-5-92	1-6-92	1-7-92	2	1
JCDW3AW		6415-002		1-7-92	1-8-92	1-9-92	2	1
JCDW4AW		6415-006		1-8-92	1-8-92	1-10-92	2	2
JCDW5AW		6384-003		1-5-92	1-6-92	1-8-92	3	2
JCDW6AW		6384-005		1-6-92	1-6-92	1-8-92	2	2
JCDW8AW		6446-001		1-9-92	1-10-92	1-15-92	6	5
JCDW8RW		6446-002		1-9-92	1-8-92	1-14-92	5	6
JCDW9AW		6415-004		1-7-92	1-8-92	1-9-92	2	1
JCSW1AW		6384-002		1-5-92	1-6-92	1-7-92	2	1
JCSW3AW		6415-003		1-7-92	1-8-92	1-9-92	2	1
JCSW4AW		6415-009		1-8-92	1-8-92	1-14-92	6	6
JCSW5AW		6384-004		1-5-92	1-6-92	1-8-92	3	2
JCSW6AW		6384-006		1-6-92	1-6-92	1-8-92	2	2
JCSW7AW		6415-010		1-8-92	1-8-92	1-14-92	6	6
JCSW8AW		6446-003		1-8-92	1-10-92	1-16-92	8	6
JCSW9AW		6415-005		1-7-92	1-8-92	1-14-92	7	6
TRIP BLANK 13		6384-007		1-6-92	1-6-92	1-7-92	1	1
TRIP BLANK 14		6415-011		1-8-92	1-8-92	1-14-92	6	6
TRIP BLANK 15		6446-005		1-10-92	1-10-92	1-16-92	6	6
HOLD BLANK 13		6384-008		N.A.	1-6-92	1-7-92		
HOLD BLANK 14		6415-012		N.A.	1-8-92	1-14-92		
HOLD BLANK 15		6446-006		N.A.	1-10-92	1-15-92		

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

*Note: The correct date
received is 1-10-92
according to field records.
BWM (ANL) 15 JUL 92

Appendix A-1:

Report 14

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

16 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 5-6384

Semivolatiles:	JCBG2BW	JCDPWA	JCDW1AW	JCDW3AW
	JCDW4AW	JCDW5AW	JCDW6AW	JCDW8AW
	JCDW8RW	JCDW9AW	JCSW1AW	JCSW3AW
	JCSW4AW	JCSW5AW	JCSW6AW	JCSW7AW
	JCSW8AW	JCSW9AW		

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
- matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - GC/MS tuning
- calibration
- * - internal standards performance
- * - field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision # 7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet the criteria specified in the NYSDEC CLP (Vol. VIII, E-41) are summarized below.

<u>SAMPLE</u>	<u>PHE</u>	<u>CLPH</u>	<u>DCB</u>	<u>DNP</u>	<u>TCB</u>	<u>RECOVERY (%)</u>					<u>PCP</u>	<u>PYR</u>
						<u>CRE</u>	<u>ACE</u>	<u>NPH</u>	<u>DNT</u>			
QI-0086	73	74	71		73	73						

Action:

- o none, sample results reported as CRQL U

CALIBRATION:

Calibration linearity, sensitivity and stability criteria specified in the NYSDEC clap (Vol. VIII, E-48-51), or federal criteria (*), are tabulated below.

CONTINUING CALIBRATION CRITERIA

<u>COMPOUND</u>	<u>%D (max.)</u>	<u>RRF (min.)</u>
SPCC	20	0.05
all other TCL compounds	20	0.05*

Deviations from the above calibration criteria are tabulated below.

CONTINUING CALIBRATION

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>COMPOUND</u>	<u>%D</u>	<u>RRF</u>
GCMSD#4	01-30-92/10:25	naphthalene	21	
		di-n-butylphthalate	22	
	01-30-92/22:33	di-n-butylphthalate	22	

Associated samples:

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>SAMPLE NO.</u>	
GCMSD#4	01-30-92/10:25	JCSWSAW	JCSW6AW
		JCSW3AW	JCDW6AW
		JCDW3AW	JCDW9AW
		JCBG2BW	
	01-30-92/22:33	JCDW4AW	JCDW8AW
		JCDW8RW	JCSW4AW
		JCSW7AW	JCSW8AW
		JCSW9AW	JCDPWA

Action:

o none, sample results reported as CRQL U

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 5-6384

Table I. Validation Action Summary

Sample No.SVOA

JCBG2BW
JCDPWA
JCDW1AW
JCDW3AW
JCDW4AW
JCDW5AW
JCDW6AW
JCDW8AW
JCDW8RW
JCDW9AW
JCSW1AW
JCSW3AW
JCSW4AW
JCSWSAW
JCSW6AW
JCSW7AW
JCSW8AW
JCSW9AW

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
- J7 - estimate positive values (J) for () due to non-compliant internal standard stability

- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%
- R8 - TIC's identified in associated method blank, results flagged as unusable (R)

EICHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

FOR NYSDEC

CLIENT: Argonne Nat'l Lab

CASE NO. _____

SDG NO. 5-6384

SITE: TRP Supplemental S.I.

ANALYTICAL FRACTION: Semivolatiles

ANALYTICAL FRACTION: Semivolatiles

[illegible]

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

REV. 3-61

Appendix A-1:

Report 15

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

13 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 5-6384

Pesticides/PCB's:	JCBG2BW	JCDPWA	JCDW1AW	JCDW3AW
	JCDW4AW	JCDW5AW	JCDW6AW	JCDW8AW
	JCDW8RW	JCDW9AW	JCSW1AW	JCSW3AW
	JCSW4AW	JCSW5AW	JCSW6AW	JCSW7AW
	JCSW8AW	JCSW9AW		

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
- matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - calibration
- * - pesticide instrument performance
- * - field duplicates
- * - TCL compound identification
- * - compound quantitation and reported detection limits sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7 and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet the criteria specified in the NYSDEC CLP (Vol. VII, 2-73) are summarized below.

<u>SAMPLE</u>	<u>LIN</u>	<u>HEP</u>	<u>RECOVERY (%)</u>			<u>DDT</u>
			<u>ALD</u>	<u>DIEL</u>	<u>END</u>	
JCDW4AW					128/126	

Action:

- o none, sample results reported as CRQL U

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 5-6384

Table I. Validation Action Summary

<u>Sample No.</u>	<u>Pesticide/PCB</u>
JCBG2BW	
JCDPWA	
JCDW1AW	
JCDW3AW	
JCDW4AW	
JCDW5AW	
JCDW6AW	
JCDW8AW	
JCDW8RW	
JCDW9AW	
JCSW1AW	
JCSW3AW	
JCSW4AW	
JCSW5AW	
JCSW6AW	
JCSW7AW	
JCSW8AW	
JCSW9AW	

If the field is blank, no qualifiers were necessary.

A1	-	change positive values for () to revised detection limit due to blank contamination
J1	-	estimate positive values (J) and detection limit values (UJ) due to holding time violations
J2	-	estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
J3	-	estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
J4	-	estimate positive values (J) for () due to non-compliant matrix spike recoveries
J5	-	estimate positive values (J) for () due to calibration not meeting minimum RF criteria
J6	-	estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
J7	-	estimate positive values (J) for () due to non-compliant internal standard stability

- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argonne Nat'l Lab

CASE NO.

SDG NO. 5-6384SITE: IRP Supplemental S.I.ANALYTICAL FRACTION: Pesticide/PCBs

CLIENT SAMPLE ID	EPA SAMPLE NO.	LAB. SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE EXTRACTED	HOLD TIME TO EXTRACTION	
							COLLECT	RECEIPT
JCBG2BW		6415-001	WATER	1-7-92	1-08-92	1-13-92	6	5
JCDPNAW		6446-004		1-9-92	1-10-92	1-13-92	4	3
JCDWIAW		6384-001		1-5-92	1-06-92	1-08-92	3	2
JCDW3AW		6415-002		1-7-92	1-08-92	1-13-92	6	5
JCDW4AW		6415-006		1-8-92	1-08-92	1-13-92	5	5
JCDW5AW		6384-003		1-5-92	1-06-92	1-08-92	3	2
JCDW6AW		6384-005		1-6-92	1-06-92	1-08-92	2	2
JCDW8AW		6446-001		1-9-92	1-10-92	1-13-92	4	3
JCDW8RW		6446-002		1-9-92	1-08-92	1-13-92	4	5
JCDW9AW		6415-004		1-7-92	1-06-92	1-08-92	1	2
JCSW1AW		6384-002		1-5-92	1-06-92	1-08-92	3	2
JCSW3AW		6415-003		1-7-92	1-08-92	1-13-92	6	5
JCSW4AW		6415-009		1-8-92	1-08-92	1-13-92	5	5
JCSW5AW		6384-004		1-5-92	1-06-92	1-08-92	3	2
JCSW6AW		6384-006		1-6-92	1-06-92	1-08-92	2	2
JCSW7AW		6415-010		1-8-92	1-08-92	1-13-92	5	5
JCSW8AW		6446-003		1-9-92	1-10-92	1-13-92	4	3
JCSW9AW		6415-005		1-7-92	1-08-92	1-13-92	6	5

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

REV. 001

ECHEM INC.
ORGANICS
COMPLETENESS LOG

SITE: TRP Supplemental S.I. CLIENT: Argonne Nat'l Lab
 TASK CASE # 6384/6415/6446 SDG# 5-6384

	8 A M P E R	ICRGABW	ICDPW1AW	ICDPW1BW	ICDPW3AW	ICDPW4AW	ICDPW5AW	ICDPW6AW	ICDPW8AW	ICDPW9AW	ICSW1AW	ICSW3AW	ICSW4AW	ICSW5AW	ICSW6AW	ICSW7AW	ICSW8AW	ICSW9AW	TRIP BLANK1	TRIP BLANK2	TRIP BLANK3	HOLD BLANK1	HOLD BLANK2	HOLD BLANK3
1A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
1B		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2B																								
3A	VOA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
3B																								
4A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
7A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8A		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
1B		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
1C		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
1F		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
2C		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
2D																								
3C		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
3D																								
4B	BVOA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
5B		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
6B		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
6C		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
7B		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
7C		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
8B		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
8C		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
1D		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
2E		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
2F																								
3E		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
3F	PEST																							
4C		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
8D		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
8E		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
9		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
10		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						

- ☒ Quant Reports
- ☒ MASS SPECS
- ☒ TIC Compounds
- ☒ Laboratory Blank (Form 1's)
- ☒ MS/MSD (Forms 1's)
- ☒ Total Solids Log (if applicable)
- ☒ Injection Log
- ☒ Chain of Custody
- ☒ Case Narrative

REV. 391

Appendix A-1:

Report 16

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

16 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 5-6384

TAL Inorganics:	JCBG2BW	JCDPWA	JCDW1AW	JCDW3AW
	JCDW4AW	JCDW5AW	JCDW6AW	JCDW8AW
	JCDW8RW	JCDW9AW	JCSW1AW	JCSW3AW
	JCSW4AW	JCSW5AW	JCSW6AW	JCSW7AW
	JCSW8AW	JCSW9AW		

Dear Dr. Wait:

Validation was performed on the inorganic analytical data from the samples referenced above. The data were evaluated, based on the following parameters:

- * - data completeness
- * - holding times
- * - calibrations
- blanks
- * - ICP interference check sample analysis
- matrix spike analysis
- * - duplicate sample analysis
- laboratory control sample analysis furnace atomic absorption results
- * - ICP serial dilution results
- * - detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II Evaluation of Inorganic Data for the Contract Laboratory Program, February 1990, SOP No. HW-2, Revision X, and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

BLANKS:

1. Positive Blanks

Blanks providing results $\geq$ IDL and their associated action levels are tabulated below:

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>	
			<u>WATER</u>	<u>SOIL</u>
CCB2	vanadium	23	115	
CCB3	beryllium	1	5	
	cadmium	4	20	
	nickel	7	35	
	vanadium	24	120	
PB	calcium	17	85	
	iron	9	45	
	nickel	6	30	
	vanadium	9	45	
	zinc	3	15	
CCB4	beryllium	2	10	
	calcium	22	110	
	vanadium	4	20	
CCB5	copper	8	40	
CCB8	zinc	4	20	

Associated samples with positive values reported below the action level are tabulated below:

<u>CAL BLANK ID</u>	<u>PARAMETER</u>	<u>SAMPLE NO.</u>
CCB2	vanadium	JCDW1AW
		JCDW5AW
		JCDW6AW
CCB3	beryllium vanadium	JCSW9AW
		JCBG2BW
	nickel vanadium	JCDW3AW JCDW9AW
CCB4	vanadium	JCDW4AW
		JCSW4AW
		JCSW7AW
CCB5	copper	JCDW4AW
		JCSW4AW
		JCSW7AW
CCB8	zinc	JCDPWAU
<u>PREP BLANK ID</u>	<u>PARAMETER</u>	<u>SAMPLE NO.</u>
PBW	iron nickel	JCBG2BW
		JCSW7AW
		JCDW8AW
		JCSW1AW
		JCSW4AW
		JCDPWAU
		JCDW1AW
		JCDW4AW
		JCDW5AW
		JCDW6AW
		JCSW1AW
PEW	nickel vanadium	JCSW3AW
		JCSW6AW
	vanadium	JCSW5AW JCSW8AW

Action:

- o associated sample results $\geq$ IDL but $<$ action level are flagged as not detected at the sample value (U)

2. Negative Blanks

Blanks that provided results $<-2IDL$ are tabulated below:

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>CONCENTRATION</u>
CCB2	zinc	-12
CCB3	zinc	-11
CCB4	zinc	-7
CCB6	zinc	-9
CCB8	vanadium	-10

Associated samples with results reported $<10IDL$:

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>ASSOCIATED SAMPLES</u>
CCB2	zinc	JCDW6AW
CCB3	zinc	JCBG2BW JCDW3AW
CCB4	zinc	JCDW4AW
CCB8	vanadium	JCSW8AW JCDPWAU JCDW8AW JCDW8RW

Action:

- o associated sample results $\geq IDL$ are flagged as estimated (J)
- o associated sample detection limit values (IDL U) are flagged as unusable (R)

MATRIX SPIKE ANALYSIS:

Samples providing matrix spike recoveries not within 75-125% that also contain native analyte reported at $<4X$ the spiking level as specified in the NYSDEC CLP (Vol. VIII, E-111) are tabulated below:

<u>SAMPLE ID</u>	<u>ELEMENT</u>	<u>% RECOVERY</u>
JCDW4AW	antimony	69

Action:

- o for recoveries from 30-74%, results are flagged as estimated (J)

Comments:

The above actions are applied to all samples of the same matrix associated with this SDG.

LABORATORY CONTROL SAMPLE ANALYSIS:

1. Aqueous.

Values that were not reported within 80-120% of the certified concentration as specified by the NYSDEC CLP (Vol. VIII, E-115) are tabulated below:

<u>ELEMENT</u>	<u>% RECOVERY</u>
mercury	123

Action:

- o for recoveries >120%, results $\geq$ IDL are flagged as estimated (J)

Comments:

The above actions are applied to all samples of the same matrix associated with this SDG.

FURNACE ATOMIC ABSORPTION RESULTS:

1. Duplicate injections:

Samples with concentrations reported >CRDL or post-digestion spikes providing duplicate injection coefficient of variation (CV) 20% as specified by the NYSDEC CLP (Vol. VIII, E-118) are tabulated below:

<u>SAMPLE ID</u>	<u>ELEMENT</u>	<u>CV</u>
JCDPWA	selenium	28

Action:

- o sample results are flagged as estimated (J)

2. Post-digestion spike

Samples with post-digestion spike recoveries $\geq 40\%$ but not within 85-115%, and also having native analyte sample absorbance $< 50\%$ of the spiked sample value, and samples with post-digestion spike recoveries reported at $< 40\%$ that were diluted 5-10 fold and recoveries repeated at $< 40\%$ or that were not within 85-115%, and also having native sample absorbance $< 50\%$ of the spiked sample value, as specified in the NYSDEC CLP (Vol. VIII, E-118-119) are tabulated below:

<u>SAMPLE</u>	<u>ELEMENT</u>	<u>% RECOVERY</u>
JCSW7AW	lead	79
JCDW8RW	lead	83
JCDW4AW	lead	82
JCDPWAU	lead	84
JCDPWAU	selenium	77
JCSW1AU	lead	84
JCDW8AU	lead	76
JCDW9AU	lead	82
JCBG2BW	thallium	80
JCDW1AU	thallium	67
JCDW9AU	thallium	79
JCSW1AU	thallium	58
JCSW3AU	thallium	80
JCSW5AU	thallium	67
JCSW6AU	thallium	81
JCSW8AU	thallium	132
JCSW9AU	thallium	83

Action:

- o for spike recoveries $> 10\%$, but not within 85-115%, sample results $\geq$ IDL are flagged as estimated (J)
- o for spike recoveries $> 10\%$ but $< 85\%$, sample detection limit values (IDL U) are flagged as estimated (J)

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 5-6384

Table I. Validation Action Summary

Aluminum		Magnesium	
Antimony	J4	Manganese	
Arsenic		Mercury	J6
Barium		Nickel	A1
Beryllium	A1	Potassium	
Cadmium		Selenium	J7
Calcium		Silver	
Chromium		Sodium	
Cobalt		Thallium	J7
Copper	A1	Vanadium	A1, J3
Iron	A1	Zinc	A1, J3
Lead	J7	Cyanide	

If an element has no entry, no qualifications were necessary.

- A1 - Accept data, raise the sample detection limit(s) due to blank contamination.
- J1 - Estimate (J) positive values and (UJ) detection limit results due to hold time exceedences.
- J2 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant calibrations.
- J3 - Estimate (J) positive results due to non-compliant linearity near the CRDL.
- J4 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant matrix spike recoveries.
- J5 - Estimate (J) positive values due to non-compliant duplicate precision.

- J6 - Estimate (J) positive values due non-compliant laboratory control sample results.
- J7 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant analytical precision and/or accuracy.
- J8 - Estimate (J) positive values due to non-compliant method of standard additions linearity.
- J9 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant serial dilution reproducibility
- R1 - Reject detection limit values (UR) due to negative blank drift.

ECHEM INC.
DATA VALIDATION LOG

SITE: Air Force Plant 59

[illegible]

CLIENT: Argonne Nat'l

NOTE: UNITS ARE DEFINED AS WATER/SOIL (E.G., 5/6) INCLUDING BLANKS

COMMENTS: SAS for this project include:

Turnaround time for these cases is:

standard = 30 days
fast = 14 days

last = 14 days

EICHEM INC.
INORGANICS
COMPLETENESS LOG

SITE: ICP Supplemental S.I. CLIENT: Argonne Nat'l Lab
CAGE # BDG# 5-6384

#	INORGANICS	1	2A	2B	3	4	5A	5B	6	7	8	9	10	11A	11B	12	13	14
1	ICR22BW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	ICDPWAW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	ICDW1AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	ICDW5AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	ICDW6AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	ICDW7AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	ICDW8AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	ICDW9AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	ICDW10AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	ICDW11AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	ICDW12AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	ICDW13AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	ICDW14AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	ICDW15AW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Standardization Report for ICP
Analysis Report for each calibration, blank, sample
Copies of printer tapes for each AAS element
Mercury Analysis sheet
Cyanide Analysis sheet
Total Solids Log (if applicable)
Metals Digestion Log
Mercury Digestion Log
Cyanide Distillation Log
Chain of Custody
Case Narrative

REV. 391

AFP6384I

10

EICHEM INC.

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argonne Nat'l Lab
TRACE NO. 6384/6415/6446

SDG NO. 5-6384

SITE: IRP Supplemental S.I.
ANALYTICAL FRACTION: Cyanide

CLIENT SAMPLE ID	EPA SAMPLE NO.	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE ANALYZED	HOLD TIME COLLECT	RECEIPT
JCBG13W		6415-001	WATER	1-7-92	1-8-92	1-10-92	3	2
JCDPW1AW		6446-004		1-9-92	1-10-92	1-16-92	7	6
JCDW1AW		6384-001		1-5-92	1-6-92	1-10-92	5	4
JCDW3AW		6415-002		1-7-92	1-8-92	1-10-92	3	2
JCDW4AW		6415-006		1-8-92	1-8-92	1-10-92	2	2
JCDW5AW		6384-003		1-5-92	1-6-92	1-10-92	5	4
JCDW6AW		6384-005		1-6-92	1-6-92	1-10-92	4	4
JCDW8AW		6446-002		1-9-92	1-10-92	1-10-92	1	1
JCDW9AW		6415-004		1-7-92	1-8-92	1-10-92	3	2
JCSW1AW		6384-002		1-5-92	1-6-92	1-10-92	5	4
JCSW3AW		6415-003		1-7-92	1-8-92	1-10-92	3	2
JCSW4AW		6415-009		1-8-92	1-8-92	1-10-92	2	2
JCSW5AW		6384-004		1-5-92	1-6-92	1-10-92	5	4
JCSW6AW		6384-006		1-6-92	1-6-92	1-10-92	4	4
JCSW7AW		6415-010		1-8-92	1-8-92	1-10-92	2	2
JCSW8AW		6446-003		1-9-92	1-10-92	1-16-92	7	6
JCSW9AW		6415-005		1-7-92	1-8-92	1-10-92	3	2
JCDW8RW		6446-002	↓	1-9-92	1-10-92	1-16-92	7	6

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

REV 201

SITE: TRF Supplement 1 S.I.
ANALYTICAL FRACTION: Mercury

EICHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

SDG NO. 5-6384

CLIENT: Airborne
Lab 1/ab
TRF CASE NO. 10384/10415/10446

CLIENT SAMPLE ID	EPA SAMPLE NO.	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE ANALYZED	HOLD TIME COLLECT	HOLD TIME RECEIPT
JCBGABW	6415-001	6446-004	WATER	1-7-92	1-8-92	1-13-92	6	5
JCPW1HW	10384-001	10384-001		1-5-92	1-6-92	1-13-92	8	7
JCPW3AW	6415-002	6415-002		1-7-92	1-8-92	1-13-92	6	5
JCPW4AW	6415-006	6415-006		1-7-92	1-8-92	1-13-92	6	5
JCPW5AW	6384-003	6384-003		1-5-92	1-6-92	1-13-92	8	7
JCPW6AW	6384-005	6384-005		1-6-92	1-6-92	1-13-92	7	3
JCPW8AW	6446-001	6446-001		1-9-92	1-10-92	1-13-92	4	3
JCPW8RW	6446-002	6446-002		1-9-92	1-10-92	1-13-92	4	3
JCPW9AW	6415-004	6415-004		1-7-92	1-8-92	1-13-92	6	5
JCPW1AW	6384-002	6384-002		1-5-92	1-6-92	1-13-92	8	7
JCPW3AW	6415-003	6415-003		1-7-92	1-8-92	1-13-92	6	5
JCPW4AW	6415-008	6415-008		1-8-92	1-8-92	1-13-92	5	5
JCPW5AW	6384-004	6384-004		1-5-92	1-6-92	1-13-92	8	7
JCPW6AW	6384-006	6384-006		1-6-92	1-6-92	1-13-92	7	3
JCPW7AW	6415-010	6415-010		1-8-92	1-8-92	1-13-92	5	5
JCPW8AW	6446-003	6446-003		1-9-92	1-10-92	1-13-92	4	3
JCPW9AW	6415-005	6415-005		1-7-92	1-8-92	1-13-92	6	5

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED
HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

Appendix A-1:

Report 17

A-172

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
 #32 Route 35
 Sebago Common
 Windham, Maine 04062
 (207) 892-0002
 FAX (207) 892-7499

25 March 1992

Dr. A. Dallas Wait
 Senior Environmental Chemist
 Gradient Corporation
 44 Brattle Street
 Cambridge, MA 02138

Re: Air Force Plant 59
 Laboratory: Galson Laboratories
 Case No: NONE
 SDG No: 6-6703

Volatiles:	JCDPWBW	JCDW1BW	JCDW3BW	JCDW4BW	JCDW5BW
(USEPA 524.2)	JCDW6BW	JCDW8BW	JCDW9BW	JCDW3RW	JCSW1BW
	JC5W3BW	JCSW4BW	JCSW5BW	JCSW6BW	JCSW7BW
	JCSW8BW	JCSW9BW	JCQC4WW	JCQC5XW	
	TRIP BLANK16		TRIP BLANK17		
	TRIP BLANK18		HOLD BLANK16		
	HOLD BLANK17		HOLD BLANK18		

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters in accordance with the specifications set forth in USEPA Method No. 524.2, Revision 3 and the Quality Assurance Project Plan for Air Force Plant 59, Johnson City, New York, Revision 2, December 19, 1991.

- * - data completeness
- * - holding times
- * - surrogate recovery
- * - matrix spike/matrix spike duplicate
- laboratory fortified blank
- blanks
- * - GC/MS tuning
- calibration

- * - internal standards performance
- * - field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

LABORATORY FORTIFIED BLANK:

Compounds not within the recovery limits specified in the NYSDEC ASP are tabulated below:

<u>COMPOUND</u>	<u>% RECOVERY</u>
bromomethane	64
vinyl chloride	46

Action:

- o none, sample results for the compounds reported as CRQL U

BLANKS:

Positive blank results and associated action levels are tabulated below:

<u>BLANK ID.</u>	<u>COMPOUND</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>
TRIP BLANK16	methylene chloride	0.6	6
TRIP BLANK17	methylene chloride	3	30
	1,1,1-trichloroethane	3	15
	benzene	1	5
	toluene	0.2	2
HOLD BLANK17	methylene chloride	0.3	3

<u>BLANK ID.</u>	<u>COMPOUND</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>
VBLK5	methylene chloride	0.6	6
VBLK6	methylene chloride	0.4	4

* Method blank levels below the NYSDEC ASP minimum requirement.

Associated samples with positive values reported below the action level are:

<u>METHOD BLANK ID.</u>	<u>ASSOCIATED SAMPLES</u>
VBLK5	JCSW5BW JCSW1BW JCDW3BW JCDW3RW

VBLK6	JCSW3BW
-------	---------

<u>TRIP BLANK ID.</u>	<u>ASSOCIATED SAMPLES</u>
TRIP BLANK17	JCSW3BW JCDW9BW

<u>FIELD BLANK ID.</u>	<u>ASSOCIATED SAMPLES</u>
HOLD BLANK17	JCSW3BW

Action:

- o associated sample results <MDL (flagged J); changed to EL (U)
- o associated sample results ≥MDL and <action level (flagged B) are flagged as not detected at the sample value (U)

TIC's identified as freons eluting at approximately 10.6 and 12.7 minutes were identified in several samples as well as the trip blanks. The environmental sample results for these TIC's were flagged as unusable (R).

CALIBRATION:

A. Initial calibration:

SPCC compounds with average relative response factors (AVG RRF) below the limits and all others ≤0.10 or percent relative standard deviations (%RSD) >30% for CCC compounds and >35% for all other compounds as specified in the NYSDEC ASP are tabulated below:

<u>INSTR.</u>	<u>CAL DATE</u>	<u>COMPOUND</u>	<u>AVG RRF</u>	<u>%RSD</u>
C(#3)	01-13-92	2-butanone	.041	
		vinyl acetate	.027	
		2-hexanone	.098	
		1, 1, 2, 2-tetrachloroethane	.230	

Associated samples:

<u>INSTRUMENT</u>	<u>CAL DATE</u>	<u>SAMPLE NO.</u>
C(#3)	01-13-92	ALL SAMPLES

Action:

- o for AVG RRF ≤ 0.10 , results $\geq$ MDL for the compound are flagged as estimated (J) and detection limit values (MDL U) are flagged as unusable (R)

B. Continuing calibration:

SPCC compounds with relative response factors (RRF) below the limits and all others ≤ 0.10 or percent difference between initial and continuing calibration (%D) $> 25\%$ for CCC compounds and $> 35\%$ for all other compounds as specified in the NYSDEC ASP are tabulated below:

<u>INSTR.</u>	<u>CAL DATE/TIME</u>	<u>COMPOUND</u>	<u>RRF</u>	<u>%D</u>
C(#3)	02-03-92/08:37	2-butanone	.036	
		vinyl acetate	.031	
		1,1,2, 2-tetrachloroethane	.233	
	02-04-92/15:46	2-butanone	.037	
		vinyl acetate	.030	
		2-hexanone	.093	
		1,1,2, 2-tetrachloroethane	.227	
	02-05-92/04:35	2-butanone	.034	
		vinyl acetate	.027	
		2-hexanone	.082	
		1,1,2, 2-tetrachloroethane	.223	
	02-05-92/19:25	2-butanone.	.031	
		vinyl acetate	.024	
		2-hexanone	.095	
		1,1,2, 2-tetrachloroethane	.217	
	02-06-92/08:24	2-butanone	.040	
		vinyl acetate	.036	
		1, 1,2, 2-tetrachloroethane	.253	

<u>INSTR.</u>	<u>CAL DATE/TIME</u>	<u>COMPOUND</u>	<u>RRF</u>	<u>%D</u>
	02-07-92/06:28	2-butanone	.038	
		vinyl acetate	.032	
		1, 1, 2, 2-tetrachloroethane	.250	
	02-10-92/15:04	2-butanone	.042	
		vinyl acetate	.030	
		1, 1, 2, 2-tetrachloroethane	.277	

Associated samples:

<u>INSTR.</u>	<u>CAL DATE/TIME</u>	<u>SAMPLE NO.</u>	
<u>C(#3)</u>	02-03-92/08:37	JCQC4WW	JCQC5XW
	02-04-92/15:46	JCDW4BW	JCSW4BW
		JCDW8BW	JCSW8BW
		JCSW7BW	
	02-05-92/04:35	TRIP BLANK16	HOLD BLANK16
	02-05-92/19:25	JCDW5BW	
	02-06-92/08:24	JCSW5BW	JCDW6BW
		JCSW6BW	JCDW1BW
		JCSW1BW	JCDW3BW
		JCDW3RW	
	02-07-92/06:28	TRIP BLANK17	HOLD BLANK17
		JCSW3BW	JCDW9BW
	02-10-92/15:04	JCSW9BW	JCDPWBW
		HOLD BLANK18	TRIP BLANK18

Action:

- o for RRF ≤ 0.10 , results $\geq$ MDL for the compound are flagged as estimated (J) and detection limit values (MDL U) are flagged as unusable (R)

Comments:

- a.) The lowered specific response for the SPCC compound 1, 1, 2, 2-tetrachloroethane is likely due to reduced purging efficiency at the higher sample volume used. No action was taken for this compound since: 1) the IC specific responses were stable, 2) the QC check sample recovery was 98% and 3) the compound was not reported present in any environmental sample.

- b.) Although detection limits for 2-butanone, vinyl acetate and 2-hexanone were rejected in accordance with the validation guidelines, they are probably reasonable since; 1) the IC specific responses were stable at low levels, and 2) QC check standard recoveries at 5 ug/l were within established limits.

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 6-6703

Table I. Validation Action Summary

<u>Sample No.</u>	<u>VOA</u>
JCDW8BW	R4
JCDW3BW	A1, R4
JCDW3RW	A1, R4
JCSW1BW	A1, R4
JCSW3BW	A1, R4
JCSW5BW	A1, R4
JCDW9BW	A1, R4, R6
JCDPWBW	R4, R6
JCDW1BW	R4
JCDW4BW	R4, R6
JCDW5BW	R4
JCDW6BW	R4
JCSW4BW	R4, R6
JCSW6BW	R4
JCSW7BW	R4
JCSW8BW	R4
JCSW9BW	R4, R6
JCQC4WW	R4
JCQC5XW	R4
TRIP BLANK16	R4
TRIP BLANK17	R4
TRIP BLANK18	R4
HOLD BLANK16	R4
HOLD BLANK17	R4
HOLD BLANK18	R4

If the field is blank, no qualifiers were necessary.

- A1 - change positive values as necessary, for toluene, methylene chloride, and 1,1,1-trichloroethane to revised detection limit due to blank contamination
- J1 . - estimate positive values (J) and detection limit values (UJ) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J4 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria

- J5 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
- J6 - estimate positive values (J) for () due to non-compliant internal standard stability
- J7 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for 2-hexanone, vinyl acetate, and 2-butanone due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R6 - TIC's identified in associated Trip blank, results flagged as unusable (R)

CLIENT: Argonne Nat'l Labs

SDG# 6-65703

- ✓ Quant Reports
- ✓ MASS SPECS
- ✓ TIC Compounds
- ✓ Laboratory Blank (Form 1's)
- ✓ MS/MSD (Forms 1's)
- ✓ Total Solids Log (if applicable)
- ✓ Injection Log
- ✓ Chain of Custody
- ✓ Case Narrative

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argonne Nat'l Labs
CASE NO. 9

SDG NO. 6-6703

SITE: AFP 59
ANALYTICAL FRACTION: Volatiles

CLIENT SAMPLE ID	EPA SAMPLE NO.	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE ANALYZED	HOLD TIME	
							COLLECT	RECEIPT
JCDPWRW		6761-006	WATER	02-03-92	02-03-92	02-10-92	7	7
JCDW1BW		6749-005		02-01-92	02-01-92	02-06-92	5	5
JCDW3BW		6761-001		02-02-92	02-02-92	02-06-92	4	3
JCDW4BW		6703-001		01-29-92	01-30-92	02-04-92	6	5
JCDW5BW		6749-001		01-31-92	02-01-92	02-06-92	6	5
JCDW6BW		6749-003		02-01-92	02-01-92	02-06-92	5	5
JCDW8BW		6703-006		01-30-92	01-30-92	02-05-92	6	6
JCDW9BW		6761-004		02-02-92	02-03-92	02-07-92	4	4
JCDW3RW		6761-002		02-02-92	02-03-92	02-06-92	4	3
JCSW1BW		6749-006		02-01-92	02-01-92	02-06-92	5	5
JCSW3BW		6761-003		02-02-92	02-03-92	02-07-92	5	4
JCSW4BW		6703-004		01-29-92	01-30-92	02-04-92	6	5
JCSW5BW		6749-002		01-31-92	02-01-92	02-06-92	6	5
JCSW6BW		6749-004		02-01-92	02-01-92	02-06-92	5	5
JCSW7BW		6703-005		01-30-92	01-30-92	02-05-92	6	6
JCSW8BW		6703-007		01-30-92	01-30-92	02-05-92	6	6
JCSW9BW		6761-005		02-03-92	02-03-92	02-10-92	7	7
JCQC4WW		6703-008		01-30-92	01-30-92	02-03-92	4	4
JCQC5XW		6703-009		01-30-92	01-30-92	02-03-92	4	4
TRIP BLANK 16		6703-010		01-30-92	01-30-92	02-05-92	6	6
TRIP BLANK 17		6749-007		02-01-92	02-01-92	02-07-92	6	6
TRIP BLANK 18		6761-007		02-03-92	02-03-92	02-10-92	7	7
HOLD BLANK 16		6703-001			01-30-92	02-05-92		
HOLD BLANK 17		6749-008			02-01-92	02-07-92		
HOLD BLANK 18		6761-008			02-03-92	02-10-92		

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

Appendix A-1:

Report 18

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

25 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 6-6703

Semivolatiles:	JCDPWBW	JCDW1BW	JCSW1BW	JCDW3BW
	JCDW3RW	JCSW3BW	JCDW4BW	JCSW4BW
	JCDW5BW	JCSW5BW	JCDW6BW	JCSW6BW
	JCSW7BW	JCDW8BW	JCSW8BW	JCDW9BW
	JCSW9BW			

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- surrogate recovery
- matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - GC/MS tuning
- calibration
- * - internal standards performance
- * - field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision # 7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

SURROGATE RECOVERY:

Samples with two or more surrogate recoveries from either the base/neutral or acid fraction which were >10% but did not meet the criteria specified in NYSDEC CLP (Vol. VIII, E-54), and samples with one or more surrogate recoveries <10% as specified in the Functional Guidelines are summarized below:

SAMPLE	PERCENT RECOVERIES					
	BASE-NEUTRAL FRACTION			ACID FRACTION		
	NBZ	FBP	TPH	PHL	2FP	TBP
JCDW4BW	0	7				
JCDW3BW				3	2	2

Action:

- o recoveries <10%; sample results for the associated fraction $\geq$ CRQL are flagged as estimated (J), and detection limit values (CRQL U) are flagged as unusable

Comments:

Both samples were re-extracted, albeit beyond the hold time, with compliant surrogate recoveries. The rejected detection limits were, therefore, replaced with detection limits from the reanalysis flagged as estimated (J) due to hold time exceedences.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet the criteria specified in the NYSDEC CLP (Vol. VIII, E-41) are summarized below.

<u>SAMPLE</u>	<u>PHE</u>	<u>CLPH</u>	<u>DCB</u>	<u>DNP</u>	<u>TCB</u>	<u>RECOVERY (%)</u>		<u>NPH</u>	<u>DNT</u>	<u>PCP</u>	<u>PYR</u>
						<u>CRE</u>	<u>ACE</u>				
JCDW4BW								81/84			
Q1-0094	68		55	55	57	72	63				66

Action:.

- o none, sample results reported as CRQL U

CALIBRATION:

Calibration linearity, sensitivity and stability criteria specified in the NYSDEC CLP (Vol. VIII, E-48-51), or federal criteria (*), are tabulated below.

CONTINUING CALIBRATION CRITERIA:

<u>COMPOUND</u>	<u>%D (max.)</u>	<u>RRF (min.)</u>
SPCC	20	0.05
all other TCL compounds	20	0.05*

Deviations from the above calibration criteria are tabulated below.

CONTINUING CALIBRATION

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>COMPOUND</u>	<u>%D</u>	<u>RRF</u>
GCMSD(#4)	02-21-92/09:14	N-nitroso-di-n-propylamine	22	
		hexachloroethane	22	
		naphthalene	24	
		4-nitrophenol	24	
		4-nitroaniline	24	
		butylbenzylphthalate	21	
	02-24-92/10:28	N-nitroso-di-n-propylamine	23	
		hexachloroethane	23	
		naphthalene	22	
		4-nitrophenol	21	
		Di-n-butylbenzylphthalate	23	
		butylbenzylphthalate	21	
	02-26-92/15:24	2,4-dinitrophenol	23	
		pentachlorophenol	21	
	02-27-92/12:13	pentachlorophenol	23	
		3, 3'-dichlorobenzidine	24	
	02-28-92/13:51	pentachlorophenol	23	

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>COMPOUND</u>	<u>%D</u>	<u>RRF</u>
GCMSD(#4)	03-01-92/16:27	bis(2-chloroisopropyl)ether	21	
		N-nitroso-di-n-propylamine	23	
		4-chloroaniline	22	
		hexachlorocyclopentadiene	22	
		bis(2-ethylhexyl) phthalate	21	

Associated samples:

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>SAMPLE NO.</u>
GCMSD(#4)	02-21-92/09:14	JCDW4BW
	02-24-92/10:28	JCSW7BW JCDW3BW JCSW8BW
	02-26-92/15:24	JCDW8BW JCSW5BW JCDW6BW JCSW6BW
	02-27-92/12:13	JCSW9BW JCSW1BW
	02-28-92/13:51	JCDW5BW JCSW5BW JCDW6BW JCSW6BW JCDW1BW JCSW1BW JCSW4BW

Action:

o none, sample results reported as CRQL U

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 6-6703

Table I. Validation Action Summary

<u>Sample No.</u>	<u>SVOA</u>
JCDPWBW	
JCDW1BW	
JCSW1BW	
JCDW3BW	J1
JCDW3RW	
JCSW3BW	
JCDW4BW	J1
JCSW4BW	
JCDW5BW	
JCSW5BW	
JCDW6BW	
JCSW6BW	
JCSW7BW	
JCDW8BW	
JCSW8BW	
JCDW9BW	
JCSW9BW	

If the field is blank, no qualifiers were necessary.

A1	-	change positive values for () to revised detection limit due to blank contamination
J1	-	estimate positive values (J) and detection limit values (UJ) due to holding time violations
J2	-	estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
J3	-	estimate positive values (J) for () due to non-compliant matrix spike recoveries
J4	-	estimate positive values (J) for () due to calibration not meeting minimum RF criteria
J5	-	estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
J6	-	estimate positive values (J) for () due to non-compliant internal standard stability
J7	-	estimate positive values (J) due to non-compliant field duplicate precision

- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%
- R8 - TIC's identified in associated method blank, results flagged as unusable (R)

**SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC**

CLIENT: Araucne Nod'll Labs

SITE: AFP S9

ANALYTICAL FRACTION: Semivolatiles

SDG NO. 12-6703

[illegible]

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED**HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED**

15

Appendix A-1:

Report 19

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

25 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 6-6703

Pesticides/PCB's:	JCDPWBW	JCDW1BW	JCDW3BW	JCDW3RW
	JCDW4BW	JCDWSBW	JCDW6BW	JCDW8BW
	JCDW9BW	JCSW1BW	JCSW3BW	JCSW4BW
	JCSWSBW	JCSW6BW	JCSW7BW	JCSW8BW
	JCSW9BW			

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
- matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - calibration
- * - pesticide instrument performance
- * - field duplicates
- * - TCL compound identification
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7 and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet the criteria specified in the NYSDEC CLP (Vol. VII, E-73) are summarized below.

<u>SAMPLE</u>	<u>LIN</u>	<u>HEP</u>	<u>RECOVERY (%)</u>			<u>DDT</u>
			<u>ALD</u>	<u>DIEL</u>	<u>END</u>	
JCDW4BW					133/133	
MD					140	

Action:

- o none, sample results reported as CRQL U

Sincerely,
Sincerely,
EICHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 6-6703

Table I. Validation Action Summary

Sample No.
JCDPWBW
JCDW1BW
JCDW3BW
JCDW3RW
JCDW4BW
JCDW5BW
JCDW6BW
JCDW8BW
JCDW9BW
JCSW1BW
JCSW3BW
JCSW4BW
JCSW5BW
JCSW6BW
JCSW7BW
JCSW8BW
JCSW9BW

Pesticide/PCB

If the field is blank, no qualifiers were necessary.

- A1 - change positive values for () to revised detection limit due to blank contamination
- J1 - estimate positive values (J) and detection limit values (U3) due to holding time violations
- J2 - estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
- J3 - estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
- J4 - estimate positive values (J) for () due to non-compliant matrix spike recoveries
- J5 - estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- J6 - estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
- J7 - estimate positive values (J) for () due to non-compliant internal standard stability

- J8 - estimate positive values (J) due to non-compliant field duplicate precision
- R1 - reject detection limit values (UR) due to holding time exceedences
- R2 - reject detection limit values (UR) due to low surrogate recoveries
- R3 - reject detection limit values (UR) for () due to low matrix spike recoveries
- R4 - reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria
- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

SITE: AFP 59

ANALYTICAL FRACTION: Pesticide/PCBs

SDG NO. 6-6703

CLIENT: Argonne Natl Labs
CASE NO. NONE

CLIENT SAMPLE ID	EPA SAMPLE NO.	LAB SAMPLE ID	MATRIX	DATE COLLECTED	DATE RECEIVED	DATE EXTRACTED	HOLD TIME TO EXTRACTION	RECEIPT
JC5W18W	6749-005		WATER	02-03-92	02-03-92	02-04-92	1	1
JC5W3RW	6761-001			02-01-92	02-01-92	02-06-92	5	5
JC5W3RW	6761-002			02-02-92	02-03-92	02-04-92	2	2
JC5W4RW	6703-001			01-29-92	01-30-92	02-04-92	5	5
JC5W5RW	6749-001			01-31-92	02-01-92	02-06-92	6	6
JC5W6RW	6749-003			02-01-92	02-01-92	02-06-92	5	5
JC5W8RW	6703-006			02-01-92	02-01-92	02-06-92	5	5
JC5W9RW	6761-004			02-03-92	02-03-92	02-04-92	1	1
JC5W1RW	6749-006			02-01-92	02-01-92	02-06-92	5	5
JC5W3RW	6703-003			02-02-92	02-03-92	02-04-92	2	2
JC5W4RW	6703-004			02-09-92	02-09-92	02-04-92	6	6
JC5W5RW	6749-002			02-13-92	02-14-92	02-06-92	6	6
JC5W6RW	6749-004			02-01-92	02-01-92	02-06-92	5	5
JC5W7RW	6703-005			02-01-92	02-01-92	02-06-92	5	5
JC5W8RW	6703-007			02-02-92	02-02-92	02-04-92	5	5
JC5W9RW	6761-005			02-03-92	02-03-92	02-04-92	1	1

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE EXTRACTED
HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

REV. M1

Appendix A-1:

Report 20

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

25 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 6-6703

TAL Inorganics:	JCDPWBW	JCDW1BW	JCDW3RW	JCDW4BW
	JCDW5BW	JCDW6BW	JCDW8BW	JCDW9BW
	JCSW1BW	JCSW3BW	JCSW4BW	JCSW5BW
	JCSW6BW	JCSW7BW	JCSWSBW	JCSW9BW
	JCDW3BW			

Dear Dr. Wait:

Validation was performed on the inorganic analytical data from the samples referenced above. The data were evaluated, based on the following parameters:

- * - data completeness
- * - holding times
- * - calibrations
- blanks
- * - ICP interference check sample analysis
- matrix spike analysis
- duplicate sample analysis
- laboratory control sample analysis
- furnace atomic absorption results
- * - ICP serial dilution results
- * - detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II Evaluation of Inorganic Data for the Contract Laboratory Program, February 1990, SOP No. HW-2, Revision X, and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

BLANKS:

1. Positive Blanks

Blanks providing results $\geq$ IDL and their associated action levels are tabulated below:

<u>BLANK ID</u>	<u>PARAMETER</u>	<u>CONCENTRATION</u>	<u>ACTION LEVEL</u>	
			<u>WATER</u>	<u>SOIL</u>
CCB5	calcium	119	595	
	iron	36	180	
	nickel	7	35	
	zinc	5	25	
	calcium	75	375	
	iron	9	45	
	calcium	111	555	
	iron	17	85	
CCB7	zinc	3	15	
	calcium	5	25	
	nickel	7	35	
PB	vanadium	5	25	
	zinc	12	60	

Associated samples with positive values reported below the action level are tabulated below:

<u>CAL BLANK ID</u>	<u>PARAMETER</u>	<u>SAMPLE NO.</u>	
CCB5	nickel	JCDW4BW	JCSW8BW

<u>PREP BLANK ID</u>	<u>PARAMETER</u>	<u>SAMPLE NO.</u>	
PS	nickel	JCSW3BW	JCSW6BW
		JCDPWBW	JCDW3RW
		JCDW4BW	JCDW6BW
		JCDW9BW	JCSW1BW
		JCSW9BW	JCSW8BW
JCSW5BW	vanadium	JCDW1BW	JCDPWBW
		JCSW7BW	JCDW3BW
		JCDW3RW	JCSW8BW
		JCDW4BW	JCDW5BW
		JCSW9BW	JCDW6BW
		JCDW9BW	JCSW1BW
		JCSW3BW	JCSW4BW
JCSW8BW	cobalt	JCDW3BW	JCDW3RW
		JCSW4BW	JCSW6BW
JCDW4BW	zinc	JCSW3BW	JCSW1BW
		JCSW7BW	JCSW5BW
		JCDW5BW	JCSW3BW
		JCDW6BW	JCDWSBW

Action:

- o associated sample results $\geq$ IDL but $<$ action level are flagged as not detected at the sample value (U)

MATRIX SPIKE ANALYSIS:

Samples providing matrix spike recoveries not within 75-125% that also contain native analyte reported at $<4X$ the spiking level as specified in the NYSDEC CLP (Vol. VIII, E-111) are tabulated below:

<u>SAMPLE ID</u>	<u>ELEMENT</u>	<u>% RECOVERY</u>
JCDW4BWMS	thallium	63

Action:

- o for recoveries from 30-74%, results are flagged as estimated (J)

Comments:

The above actions are applied to all samples of the same matrix associated with this SDG.

DUPLICATE SAMPLE ANALYSIS:

1. Field duplicates:

Field duplicate precision results for samples both containing >5CRDL that exceed the aqueous RPD of 30% and solid RPD of 50% or when one or both contain <5CRDL with the difference between them exceeding the 2CRDL for water and 4CRDL for soils, as specified in the USEPA Functional Guidelines, are as follows:

<u>SAMPLE</u>	<u>ELEMENT</u>	<u>RPD%</u>	<u>CRDL</u>	<u>S - D</u>
JCDW3DW	zinc		20	56
	aluminum	68		
	iron	67		
	manganese	37		

Action:

- o results $\geq$ IDL are flagged as estimated (J)

Comments:

The above actions are applied to all samples of the same matrix associated with this SDG.

LABORATORY CONTROL SAMPLE ANALYSIS:

1. Aqueous.

Values that were not reported within 80-120% of the certified concentration as specified by the NYSDEC CLP (Vol. VIII, E-115) are tabulated below:

<u>ELEMENT</u>	<u>%RECOVERY</u>
selenium	79

Action:

- o for recoveries from 50-79%, results are flagged as estimated (J)

Comments:

The above actions are applied to all samples of the same matrix associated with this SDG.

FURNACE ATOMIC ABSORPTION RESULTS:

1. Post-digestion spike

Samples with post-digestion spike recoveries $\geq 40\%$ but not within 85-115%, and also having native analyte sample absorbance $< 50\%$ of the spiked sample value, and samples with post-digestion spike recoveries reported at $< 40\%$ that were diluted 5-10 fold and recoveries repeated at $< 40\%$ or that were not within 85-115%, and also having native sample absorbance $< 50\%$ of the spiked sample value, as specified in the NYSDEC CLP (Vol. VIII, E-118-119) are tabulated below:

<u>SAMPLE</u>	<u>ELEMENT</u>	<u>% RECOVERY</u>
JCDW1BW	lead	83
JCDPWBW	lead	78
JCSW7BW	selenium	73
JCSW5BW	selenium	77
JCSW6BW	selenium	71
JCSW1BW	selenium	81
JCDW4BW	thallium	54
JCSW7BW	thallium	45
JCDW8BW	thallium	53
JCSW8BW	thallium	41
JCDW5BW	thallium	83
JCSW5BW	thallium	49
JCDW6BW	thallium	82
JCSW6BW	thallium	61
JCDW1BW	thallium	66
JCSW1BW	thallium	49
JCDW3BW	thallium	77
JCDW3RW	thallium	81
JCSW3BW	thallium	70
JCDW9DW	thallium	63
JCSW9BW	thallium	81
JCDPWBW	thallium	62
JCSW4BW(5x)	thallium	124

Action:

- o for spike recoveries $> 10\%$, but not within 85-115%, sample results $\geq \text{IDL}$ are flagged as estimated (J)

- o for spike recoveries >10% but <85%, sample detection limit values (IDL U) are flagged as estimated (J)

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 6-6703

Table I. Validation Action Summary

Aluminum	J5	Magnesium	
Antimony		Manganese	J5
Arsenic		Mercury	
Barium		Nickel	A1
Beryllium		Potassium	
Cadmium		Selenium	J6, J7
Calcium		Silver	
Chromium		Sodium	
Cobalt	A1	Thallium	J4, J7
Copper		Vanadium	A1
Iron	J5	Zinc	A1, J5
Lead	J7	Cyanide	

If an element has no entry, no qualifications were necessary.

- A1 - Accept data, raise the sample detection limit(s) due to blank contamination.
- J1 - Estimate (J) positive values and (UJ) detection limit results due to hold time exceedences.
- J2 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant calibrations.
- J3 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant linearity near the CRDL.
- J4 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant matrix spike recoveries.
- J5 - Estimate (J) positive values due to non-compliant duplicate precision.

- J6 - Estimate (J) positive values and (UJ) detection limit results due non-compliant laboratory control sample results.
- J7 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant analytical precision and/or accuracy.
- J8 - Estimate (J) positive values due to non-compliant method of standard additions linearity.
- J9 - Estimate (J) positive values and (UJ) detection limit results due to non-compliant serial dilution reproducibility.

CLIENT: Argonne Nat'l Lab

SDG# 16-16703

	#	M	N	A	B
1	JCPWBLU	X	X	X	X
2A	JCPWI BLU	X	X	X	X
2B	JCPWZ BU	X	X	X	X
3	JCPWZBU	X	X	X	X
4	JCPWZBU	X	X	X	X
5A	JCSWI BLU	X	X	X	X
5B	JCSWI BLU	X	X	X	X
6	JCSWI BLU	X	X	X	X
7	JCSWI BLU	X	X	X	X
8	JCSWI BLU	X	X	X	X
9	JCSWI BLU	X	X	X	X
10	JCSWI BLU	X	X	X	X
11A	JCSWI BLU	X	X	X	X
11B	JCSWI BLU	X	X	X	X
12	JCSWI BLU	X	X	X	X
13	JCSWI BLU	X	X	X	X
14	JCSWI BLU	X	X	X	X

- ☐ Standardization Report for ICP
- ☐ Analysis Report for each calibration, blank, sample
- ☐ Copies of printer tapes for each AAS element
- ☒ Mercury Analysis Sheet
- ☒ Cyanide Analysis Sheet
- ☒ N.A. Total Solids Log (if applicable)
- ☒ Metals Digestion Log
- ☒ Mercury Digestion Log
- ☒ Cyanide Distillation Log
- ☒ Chain of Custody
- ☒ Case Narrative

ECHM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDC

FOR NYSDEC

SITE: AFP 59

ANALYTICAL FRACTION: Mercury

CLIENT: Argonne Nat'l Labs

CASE NO.

[illegible]

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

COMMENTS:

AFP6703I

**ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC**

CLIENT: Argonne Nat'l Labs
CASE NO. _____

SITE: HFP 59

SDG NO. 6-6763[illegible]

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

REV. 201

Appendix A-1:

Report 21

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

24 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 7-6779

Volatiles: JC2L1AS

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
- * - matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - GC/NS tuning
- * - calibration
- * - internal standards performance
- field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summary

FIELD DUPLICATES:

A field duplicate was not identified for this SDG.

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 7-6779

Table I. Validation Action Summary

Sample No.
JC2L1AS

VOA

If the field is blank, no qualifiers were necessary.

A1	-	change positive values for () to revised detection limit due to blank contamination
J1	-	estimate positive values (J) and detection limit values (UJ) due to holding time violations
J2	-	estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
J3	-	estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
J4	-	estimate positive values (J) for () due to non-compliant matrix spike recoveries
J5	-	estimate positive values (J) for () due to calibration not meeting minimum RF criteria
J6	-	estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
J7	-	estimate positive values (J) for () due to non-compliant internal standard stability
J8	-	estimate positive values (J) due to non-compliant field duplicate precision
RI	-	reject detection limit values (UR) due to holding time exceedences
R2	-	reject detection limit values (UR) due to low surrogate recoveries
R3	-	reject detection limit values (UR) for () due to low matrix spike recoveries
R4	-	reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria

- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - TIC's identified in associated method blank, results flagged as unusable (R)

CLIENT: L'Arbonne Nat'l

SDG# 7-1-774

- ☒ Quant Reports
- ☒ MASS SPECS
- ☒ TIC Compounds
- ☒ Laboratory Blank (Form 1's)
- ☒ MS/MSD (Forms 1's)
- ☒ Total Solids Log (if applicable)
- ☒ Injection Log
- ☒ Chain of Custody
- ☒ Case Narrative

ECHEM INC.

Appendix A-1:

Report 22

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

24 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 7-6779

Semivolatiles: JC2L1AS

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
- matrix spike/matrix spike duplicate/matrix spike blank
- blanks
- * - CC/MS tuning
- calibration
- * - internal standards performance
- field duplicates
- * - TCL compound identification
- * - tentatively identified compounds
- * - system performance
- * - compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision # 7, and the NYSDEC ASP, September 1989, as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE/MATRIX SPIKE BLANK:

Matrix spike recoveries which did not meet the criteria specified in the NYSDEC CLP (Vol. VIII, E-41) are summarized below.

<u>SAMPLE</u>	<u>PHE</u>	<u>CLPH</u>	<u>DCB</u>	<u>DNP</u>	<u>TCB</u>	<u>RECOVERY (%)</u>						
						<u>CRE</u>	<u>ACE</u>	<u>NPH</u>	<u>DNT</u>	<u>PCP</u>	<u>PYR</u>	
Q1-0098	66	68	70	65	74	70						69

Action:

- o none, sample results for the compounds reported as either <CRQL J or CRQL U

BLANKS:

A TIC eluting at approximately 7.4 minutes was identified in the sample as well as the method blank. This result was flagged as unusable (R).

CALIBRATION:

Calibration linearity, sensitivity and stability criteria specified in the NYSDEC CLP (Vol. VIII, E-48-51), or federal criteria (*), are tabulated below.

CONTINUING CALIBRATION CRITERIA

<u>COMPOUND</u>	<u>%D (max.)</u>	<u>RRF (min.)</u>
SPCC	20	0.05
all other TCL compounds	20	0.05*

Deviations from the above calibration criteria are tabulated below.

CONTINUING CALIBRATION

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>COMPOUND</u>	<u>%D</u>	<u>RRF</u>
D (#4)	02-18-92/09:49	bis(chloroisopropyl)ether	23	
		N-nitroso-di-n-propylamine	21	
		hexachloroethane	22	
		naphthalene	22	
		fluoranthene	24	

Associated samples:

<u>INSTRUMENT</u>	<u>DATE/TIME</u>	<u>SAMPLE NO.</u>
D (#4)	02-18-92/09:49	JC2L1AS

Action:

- o none, sample results for the compounds either reported as <CRQL J or CRQL U

FIELD DUPLICATES:

A field duplicate was not provided for this SDG.

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 7-6779

Table I. Validation Action Summary

<u>Sample No.</u>	<u>SVOA</u>
JC2L1AS	R8

If the field is blank, no qualifiers were necessary.

A1	-	change positive values for () to revised detection limit due to blank continuation
J1	-	estimate positive values (J) and detection limit values (UJ) due to holding time violations
J2	-	estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
J3	-	estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
J4	-	estimate positive values (J) for pyrene due to non-compliant matrix spike recoveries
J5	-	estimate positive values (J) for () due to calibration not meeting minimum RF criteria
J6	-	estimate positive values (J) and detection limit values (UJ) for fluoranthene due to non-compliant calibration stability
J7	-	estimate positive values (J) for () due to non-compliant internal standard stability
J8	-	estimate positive values (J) due to non-compliant field duplicate precision
R1	-	reject detection limit values (UR) due to holding time exceedences
R2	-	reject detection limit values (UR) due to low surrogate recoveries
R3	-	reject detection limit values (UR) for () due to low matrix spike recoveries
R4	-	reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria

- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%
- R8 - TIC's identified in associated method blank, results flagged as unusable (R)

Appendix A-1:

Report 23

ECHEM INC.
ENGINEERING CHEMISTRY CONSULTANTS

P.O. Box 1510
#32 Route 35
Sebago Common
Windham, Maine 04062
(207) 892-0002
FAX (207) 892-7499

25 March 1992

Dr. A. Dallas Wait
Senior Environmental Chemist
Gradient Corporation
44 Brattle Street
Cambridge, MA 02138

Re: Air Force Plant 59
Laboratory: Galson Laboratories
Case No: NONE
SDG No: 7-6779

Pesticides/PCB's: JC2L1AS

Dear Dr. Wait:

Validation was performed on the organic analytical data from the samples referenced above. The data were evaluated based on the following parameters:

- * - data completeness
- * - holding times
- * - surrogate recovery
- * - matrix spike/matrix spike duplicate/matrix spike blank
- * - blanks
- * - calibration
- * - pesticide instrument performance
- field duplicates
- * - TCL compound identification
- compound quantitation and reported detection limits
- * - sample result verification

* All criteria were met for this parameter.

Table 1 summarizes the validation actions, which were in accordance with USEPA Region II CLP Organics Data Review and Preliminary Review, March 1990, SOP No. HW-6, Revision #7 and the NYSDEC ASP, September 1989 as detailed below.

Also attached are the:

- o data validation log,
- o telephone log,
- o completeness log, and
- o sample preparation and analysis summaries.

FIELD DUPLICATES:

A field duplicate was not provided for this SDG.

COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS:

Arochlor 1260 was detected in the sample at 130 ug/kg which is slightly below the CRQL. It is the reviewer's opinion that this result should have been reported instead of CRQL U; the Form I has been corrected accordingly.

Sincerely,
ECHEM INC.

Bruce K. Wallin, PhD
Vice President

enclosures

Air Force Plant 59
SDG No. 7-6779

Table I. Validation Action Summary

<u>Sample No.</u>	<u>Pesticide/PCB</u>
JC2L1AS	

If the field is blank, no qualifiers were necessary.

A1	-	change positive values for () to revised detection limit due to blank contamination
J1	-	estimate positive values (J) and detection limit values (UJ) due to holding time violations
J2	-	estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
J3	-	estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
J4	-	estimate positive values (J) for () due to non-compliant matrix spike recoveries
J5	-	estimate positive values (J) for () due to calibration not meeting minimum RF criteria
J6	-	estimate positive values (J) and detection limit values (UJ) for () due to non-compliant calibration stability
J7	-	estimate positive values (J) for () due to non-compliant internal standard stability
J8	-	estimate positive values (J) due to non-compliant field duplicate precision
R1	-	reject detection limit values (UR) due to holding time exceedences
R2	-	reject detection limit values (UR) due to low surrogate recoveries
R3	-	reject detection limit values (UR) for () due to low matrix spike recoveries
R4	-	reject detection limit values (UR) for () due to calibration not meeting minimum RF criteria

- R5 - reject detection limit values (UR) for () due to extreme variations in the internal standard stability
- R7 - reject detection limit value (UR) for () due to continuing calibration %D >50%

ECHM INC.

SDG NO. 7-16779

ANALYTICAL FRACTION: Pesticide/PCBs

[illegible]

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

A-240

Appendix A-2:

Data Usability

DATA USABILITY

This appendix consists of a letter report from Gradient Corporation on the usability of Galson Laboratory data for AFP-59 preceded by a list showing the page number on which environmental samples from various site locations are discussed.

<u>Location/Analysis *</u>	<u>Report Page Number</u>
Well Borehole Soil Samples	
MET	1
P/P	3
SVOC	3
VOC	4
Groundwater	
MET	4
P/P	5
SVOC	6
VOC	6
Named-site Bore & Hand Soil	
MET	6
P/P	8
SVOC	8
VOC	8
Creek Sediment	
MET	8
P/P	10
SVOC	10
VOC	10
Creek Water	
MET	10
P/P	11
SVOC	11
VOC	11
Outfalls	
MET	12
P/P	13
SVOC	13
VOC	13
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div> <p>* MET=inorganics</p> <p>P/P=PCB's and pesticides</p> </div> <div> <p>SVC=semi-volatile organic compounds</p> <p>VOC=volatile organic compounds</p> </div> </div>	

Gradient Corporation

April 28, 1992

Mr. Wyman Harrison
Argonne National Laboratory
9700 S. Cass Ave.
Argonne, IL 60439

Dear Wyman:

Gradient Corporation has completed a review of the laboratory data associated with the AFP 59, Johnson City site inspection. The sample analyses were performed by Galson Laboratories, and the data validation was conducted by ECHEM.

The sampling and analysis program was conducted in three phases. The first phase was conducted from November 4 through December 10, 1991, and consisted of well borehole soil samples, site test bore and hand soil samples, creek sediment and water samples, and outfall samples. The second and third phases of the program consisted of groundwater samples which were taken from January 5 through January 9, 1992, and again from January 29 through February 3, 1992.

This report serves as a critique of the analyses performed for this program and assesses data usability. A compilation of the resultant data, with appropriate qualifiers, is provided in attached tables.

Well Borehole Soil Samples

- Metals

Well Borehole Soil Sampling comprised 15 field samples, 3 field replicates, 1 background sample, and 2 field blanks for a total of 21 samples. The field samples were taken from 11/04/91 through 12/10/91 and were grouped into two Sample Delivery Groups (SDG #1 and #3). Each SDG contains associated matrix and laboratory QC which were reviewed as compared to requirements set forth in the site-specific QAPP, NYSDEC ASP (9/89), and applicable Region II Functional Guidelines for Data Validation (SOP No. HW-2, Revision X, 2/16/90). Table Q lists the validated metals data for the Well Borehole Soil Samples. These include the samples associated with SDG #1 (JCDW1AS, JCDW1BS, JCDW1CS, JCDW3AS, JCDW3BS, JCSW4AS, JCSW4BS, JCSW4CS, JCSW5AS, JCSW5BS, JCSW6AS, JCSW6BS, JCSW8AS, JCSW8BS, JCQC1TW, JCQC2BW) and SDG #3 (JCBG1AS, JCSW7AS, JCSW7BS, JCSW9AS, JCSW9BS).

The laboratory did not perform a solid LCS with these soil samples; rather, they substituted a water LCS (blank spike). This is non-compliant with the site-specific QAPP (Section 10, pg. 10-5) and NYSDEC ASP (9/89) and does not allow for an accurate evaluation of laboratory accuracy for the soil matrices. However, two sets of matrix spikes (on JCSW5BS and JCSW9BS) were performed with these soil samples, which suffices. The metals accuracy, therefore, has been based upon the percent recoveries of analytes in these matrix spikes. As no backup information is available due to lack of a solid LCS, it must be stressed that extrapolation of matrix spike data to all samples within this data set may be compromised by sample matrix heterogeneity. Indeed, the

Gradient Corporation

range of percent solids for these samples was 72.4 to 93.6%; indicating heterogeneity in this data set. Matrix suppression of certain analytes was evident in the matrix spike (MS) analytical results for antimony, arsenic, lead, selenium, and thallium. Though the validated results indicate estimated data (J) for specific sample analytes based upon the division of the sample delivery groups, it is prudent to extend this estimation to all of the borehole soil samples. Therefore, all data for antimony, arsenic, lead, selenium, and thallium should be considered estimated and may be biased low. The percent recovery of the antimony MS (JCSW5BS) for data analyzed with SDG #1 was less than 30%; therefore, the validator rejected the nondetected data associated with this MS. However, the MS for the data associated with SDG #2 recovered at 69% for antimony. Due to the fact that the two available MS % recoveries do not agree, and because no antimony was detected in any of the samples, all antimony data are considered usable as estimated results at the detection limit. The lead MS recovery for SDG #3 (JCSW9BS) was listed as 1%. There is reason to believe, however, that the laboratory may have confused the sample, sample duplicate, and spiked sample during analysis. The raw data indicate a correction to the sample ID# from the original designation of the analyst. Additionally, lead met recovery criteria in the other MS (JCSW5BS). The laboratory was contacted and reanalyzed the sample and MS. The reanalysis gave a lead value of 9.3 mg/kg (compared to 8.1 mg/kg reported previously). The MS recovery as 44%. Therefore, the lead data are considered usable but estimated (j) values and may be bias low. No evaluation of accuracy of manganese could be made because of the high manganese found in the field samples. For both MS performed, the level spiked was too low to quantitate accurately above the indigenous manganese in the sample. All manganese data, therefore, must be considered estimated due to the possibility of uncertainty in the quantitation in the soil matrix.

Overall precision of these samples was good. Laboratory duplicate precision met criteria for all analytes except for lead. Three field duplicate pairs were associated with the Well Borehole Soil Samples. All three pairs showed good precision; the relative percent difference (RPD) for all analytes except cyanide was less than 50% (criteria as defined in the QAPP, Section 4). For the field pair JCSW4BS and JCSW4CS, cyanide was not detected in the initial sample but was detected (7.9 mg/Kg) in the replicate. Due to this discrepancy, all cyanide data should be considered usable but estimated due to the uncertainty in the quantitation based upon poor field duplicate precision.

Two rinsate blanks (JCQC1TW and JCQC2BW) were associated with these soil samples. These blanks showed low level contamination of several analytes; however, associated soil data were sufficiently high so that the contamination level was considered negligible. Concurrently, no laboratory blanks showed contamination above the analyte CRDLs. However, the data validator followed Region I Functional Guidelines for the blank action levels. These guidelines are stricter than the Region II guidelines in that they require data to be considered not detected at the level found in the sample for values up to 5 times the level found in the laboratory blank. Therefore, low level laboratory contamination resulted in several sample analytes being considered nondetects (U), with the detection limit raised to the level found in the sample, for barium, beryllium, cadmium, cobalt, sodium, and vanadium. Following Region II guidelines, none of these analytes would have been qualified. Since the reported raised detection limits are still below commonly used ranges for NYSDEC soil cleanup criteria for all analytes, the low level contamination found is insignificant and the data are usable.

There may be a minor matrix suppression of zinc in these samples as evidenced by a slightly high percent difference (12.4% when criteria is 10%) of the serial dilution result performed with SDG #1. However, the serial dilution performed on another sample with SDG #3 met criteria for all analytes. Therefore, no definitive conclusion can be drawn as this discrepancy may be due to individual sample matrix effects.

In summary, overall precision and accuracy are good. All data are usable with the following qualifications: all antimony, arsenic, selenium, and thallium data may be biased low; lead should

Gradient Corporation

be considered estimated due to the possibility of a low bias based upon inconclusive MS results; all manganese data are usable but estimated based on lack of data on accuracy; cyanide data should be considered estimated due to the uncertainty in the result based upon poor field duplicate precision.

- Pesticides/PCBs

The following pesticides were detected in the well borehole soil samples (Table D: Aldrin at 7.6 ppb in JCDW1AS, 4,4'-DDB at 6 ppb in JCSW6AS, and heptachlor epoxide at 84 ppb in JCSW8BS and 62 ppb in JCSW6AS. The identification of the pesticides meets all GC/ECD dual column confirmation criteria as required by NYSDEC ASP, but are at concentrations too low to confirm by GC/MS. All holding times were adhered to, and all analytical QC requirements were met. No problems were noted with the blanks, and although there were some minor exceedances of high surrogate recoveries for DBC and with some of the matrix spike compounds (resulting in J flags), this is of no consequence to data quality. All well borehole soil pesticide data are usable.

- Semivolatile Organics

Many of the well borehole soil samples contained a suite of polynuclear aromatic hydrocarbons (PAHs) typical of petroleum contamination (Table G). JCDW1AS, JCDW1BS, JCSW6BS, and JCSW7AS contained trace levels of some combination of phenanthrene, anthracene, fluoranthene, pyrene and chrysene. Additional PAHs at slightly higher concentrations were found in JCDW3AS. Sample JCSW8BS contained high-ppb/low-ppm concentration of most of the PAHs searched for, and JCSW6AS was heavily contaminated with PAHs at the low ppm levels. A high concentration of bis(2-ethylhexyl)phthalate was also found in JCSW6AS. For samples containing tentatively identified compounds, these compounds were typically hydrocarbons, which may also originate from petroleum contamination.

Field replicate results were quite good. Replicates JCSW4CS/JCSW4BS contained no compounds in significant quantities. A comparison of JCDW1AS and JCDW1BS data (in ppb) follows.

	<u>JCDW1AS</u>	<u>JCDW1BS</u>
phenanthrene	160J	1100U
anthracene	17J	1100U
di-n-butyl phthalate	220J	260J
fluoranthene	140J	65J
pyrene	110J	52J

The detection of phenanthrene and anthracene at trace levels (well below the CRQL) in only one of the two samples is not surprising. The reproducibility of di-n-butyl phthalate between each sample is good. The quantitative difference between fluoranthene and pyrene, which is at trace levels below the CRQL, is reasonable for soil samples.

Gradient Corporation

All other QC criteria were met, including holding times, MS tuning, calibration, and internal standard requirements. All well borehole semivolatile organic soil data are usable.

- **Volatile Organics**

Most of well borehole soil samples did not contain any volatile organics (Table A). A few samples contained trace levels of methylene chloride and/or acetone. The only constituent of interest was trichloroethene, which was present at 14 ppb in JC5S9AS and 8 ppb in JC5W9BS.

With regard to trip and holding blanks, low levels of acetone (11 to 12 ppb) and 1,1,1-trichloroethane (2 to 7 ppb) were detected in a few rinsate blanks and one trip blank. An exhaustive examination of the laboratory and the field operations was conducted to explain the occurrence of these compounds, unfortunately without success. The presence of these compounds has required raising the detection limits slightly for a few samples; however, it does not jeopardize the integrity of the data.

All other QC results were acceptable. Holding times and MS tuning criteria were met for all samples. Calibration and internal standard performance was compliant. All surrogate and matrix spike recoveries were acceptable. All well borehole soil volatile organic data are usable.

Groundwater Samples

- **Metals**

Groundwater sampling comprised 32 field samples, 2 field replicates, 1 background sample, and 1 field blank for a total of 36 samples. The field samples were taken from 1/05/92 through 2/03/92 and therefore were grouped into two Sample Delivery Groups (SDG #5 and #6); the associated Bailer blank (JCQC3XW) was taken on 11107191 and grouped with SDG #1. Each SDG contains associated matrix and laboratory QC which were reviewed as compared to requirements set forth in the site-specific QAPP, NYSDEC ASP (9/89), and applicable Region II Functional Guidelines for Data Validation (SOP No. HW-2, Revision X, 2/16/90). Table R lists the metals validated data for the Groundwater Samples. These comprised SDG #5 (samples: JCDPWAU, JCDW1AU, JCDW3AU, JCDW4AU, JCDW5AU, JCDW6AU, JCDW8AU, JCDW8RU, JCDW9AU, JCSW1AU, JCSW3AU, JCSW4AU, JCSW5AU, JCSW6AU, JCSW7AU, JCSW8AU, JCSW9AU, and background sample JCBG2BU) and SDG #6 (samples: JCDPWBW, JCDW1BW, JCDW3BW, JCDW3RW, JCDW4BW, JCDW5BW, JCDW6BW, JCDW8BW, JCDW9BW, JCSW1BW, JCSW3BW, JCSW4BW, JCSW5BW, JCSW6BW, JCSW7BW, JCSW8BW, JCSWPBW).

All holding times were met and all laboratory and matrix QC criteria were in control for mercury and cyanide except for the mercury LCS recovery associated with SDG #5 which was slightly outside of the control limits. The associated mercury data were all nondetects, except for samples JCSW4AU and JCSW8AU. These mercury results may be false positives based upon the high recovery of the LCS associated with the sample analyses. All cyanide values were nondetects.

For the furnace metals (antimony, arsenic, lead, selenium, and thallium) all matrix and laboratory specific QC met criteria for accuracy and precision, with the following exceptions. The LCS for selenium recovered slightly outside of criteria for the samples associated with SDG #6. Additionally, the post-digestion spike for selenium recovered low for many of the samples associated with SDG #6. These two QC indicators are evidence of a low bias in the selenium groundwater data associated with SDG #6.

Gradient Corporation

However, no evidence of matrix or laboratory effects on quantitation of selenium was found in the QC data associated with the rest of the groundwater samples (SDG #5). As all the selenium values are either nondetects or 10x lower than the NYSDEC Class GA Groundwater Standard value of 10 ug/L, these minor QC issues are not significant and all selenium data are therefore usable. Matrix effects are evident for antimony and thallium based upon low recoveries in the matrix spike sample. The associated data may therefore be biased low; however, all associated antimony and thallium groundwater values are either nondetects or less than half of the Groundwater Standard value (3 ug/L for antimony; 4 ug/L for thallium) and thus the low bias is insignificant at these levels.

For the ICP analytes (all other metals), all matrix and laboratory QC met criteria for accuracy (LCS and MS recoveries) and the laboratory QC for precision met criteria for all analytes. Two field duplicate pairs were associated with these samples. One pair showed excellent precision, all analytes met criteria (RPD <50%). The other pair, JCDW3BW and JCDW3RW, showed poor duplicate precision for aluminum (RPD 68%), copper (RPD 140%), iron (67%), and zinc (RPD 95%). Because all laboratory duplicates met precision criteria, it is likely that the poor precision found in the field duplicate pair is due to sampling effects or heterogeneity of the sample replicates. Therefore, because the extent of this effect cannot be evaluated, the conservative approach requires that all aluminum, copper, iron, and zinc data be considered usable but estimated due to the uncertainty in the results based upon poor field duplicate precision.

The single field blank applicable to the groundwater samples, the bailer field blank (JCQC3XW), had no significant levels of contamination compared to the values found in the field samples. Concurrently, no laboratory blanks showed contamination above analyte CRDLs. However, the data validator followed Region I Functional Guidelines for the blank action levels. These guidelines are stricter than the Region II sidelines in that they require data to be considered not detected at the level found in the sample for values up to 5 times the level found in the laboratory blank. Therefore, low level laboratory contamination resulted in several sample analytes being considered nondetects, with the detection limit raised to the level found in the sample, for beryllium, cobalt, copper, iron, nickel, vanadium, and zinc. Following Region II guidelines, none of these analytes would have been qualified. Since the reported data for beryllium, copper, iron, and zinc are all lower than the NYSDEC Class GA Groundwater Standards or Guidance values, the low level contamination found is insignificant. The remaining analytes (cobalt, nickel, and vanadium) do not have standards or guidance values set under NYSDEC and are considered usable at the higher detection limits indicated on the data summary table.

Several vanadium values were rejected (R) by the data validator due to a negative laboratory blank. Again, following Region II guidelines for data validation, these values would not have been rejected because the level found in the blank was less than the negative CRDL. Therefore, all vanadium data are usable.

In summary, all groundwater data are usable with the following qualifications. The mercury results reported for samples JCSW4AW and JCSW8AW are likely to be false positives. Aluminum, copper, iron, and zinc results are considered estimated due to the uncertainty in the quantitation based upon field replicate precision.

- Pesticides/PCBs

No pesticides were detected in any of the groundwater samples (Table M). All holding times were adhered to, and all analytical QC was very good. All groundwater pesticide data are usable.

Gradient Corporation

- Semivolatile Organics

No semivolatile organic compounds were detected in any of the groundwater samples (Table H). All holding times were met. QC criteria were compliant for MS tuning, calibration and internal standards. Surrogate and matrix spike recoveries were good, and field replicate analyses were consistent. All groundwater semivolatile organic data are usable.

- Volatile Organics

Many of the groundwater samples were characterized by low ppb levels of 1,1,1-trichloroethane and trichloroethene, as well as extremely low levels (high part per trillion) levels of an occasional halogenated solvent, toluene, and/or xylene (Table B). Typically low level volatile organic analysis methods, such as what was used for the waters in this project (Method 524.2), produce results of extremely low concentrations for compounds which ultimately are of little concern. Of particular note was trichloroethane in JCSW4 (95 ppb in AW and 97 ppb in BW); and in JCSW9 both 1,1,1-trichloroethane (15.2 ppb in AW and 15 ppb in BW), and trichloroethane (9.5 ppb in AW and 10 ppb in BW) were detected.

The detection limits for 2-butanone, 2-hexanone, 4-methyl-2-pentanone, and/or vinyl acetate were rejected by ECHEM due to problems with the continuing calibration. However, the 2 ppb initial calibration standard responses were stable at low levels and the QC check standard recoveries at 5 ppb were within established limits. It is therefore appropriate to assume that none of these compounds are present in any of the groundwater samples at the CRDL, and thus the data is usable.

With regards to trip and holding blanks, low levels of methylene chloride were detected in 6 of the blanks and very low levels of benzene, toluene, and 1,1,1-trichloroethane were noted in 1 trip blank. This resulted in minor modifications to some sample detection limits, but does not compromise the integrity of the data. TICs were identified as freons in several of the samples, as well as the trip blanks, thus the TIC freon data is not usable.

All holding times were met. MS tuning was performed satisfactorily and internal standard performance was good. Surrogate and matrix spike results were acceptable. Comparison of data between similar well locations and depths from the first round to the second round is excellent. In addition, replicate data is excellent. With the exception of the freon TICs in a few samples, all groundwater volatile organic data are usable.

Named-site Test Bore and Hand Soil Samples

- Metals

Named-Site Test Bore and Hand Soil Sampling comprised 6 field samples; a 7th sample was collected for VOA only due to sample volume limitations (JC1H1AS). The field rinsate blanks associated with the soil bore-hole samples are also applicable to these soil samples. No field replicates were collected with these samples. The samples were taken from 12/03/91 through 1/31/92 and therefore were grouped into two Sample Delivery Groups (SDG #3 and #7). Each SDG contains associated matrix and laboratory QC which were reviewed as compared to requirements set forth in the site-specific QAPP, NYSDEC ASP (9/89), and applicable Region II Functional Guidelines for Data Validation (SOP No. HW-2, Revision X, 2/16/90). Table T2 lists the metals validated data for the Named-site Test Bore and Hand Soil Samples. These include the samples associated with SDG #3 (JC1H1CS, JC3H1AS, JC4H1AS, JC4H2AS, JC6H1AS) and SDG #7 (JC2L1AS).

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The laboratory did not perform a solid LCS with these soil samples; rather, they substituted a water LCS (blank spike). This is non-compliant with the site-specific QAPP (Section 10, pg. 10-5) and NYSDEC ASP (9/89) and does not allow for an accurate evaluation of laboratory accuracy for the soil matrices. However, two sets of matrix spikes (on JCSW9BS, a Well Borehole sample and JC2LIAS) were performed with these soil samples. The metals accuracy, therefore, has been based upon the percent recoveries of analytes in these matrix spikes. As no backup information is available due to lack of a solid LCS, it must be stressed that extrapolation of matrix spike data to all samples within this data set may be compromised by sample matrix heterogeneity. This is especially important because one of the matrix spikes used to evaluate accuracy may not be indicative of the matrix of these Named-Site samples (JCSW9BS). Matrix suppression of certain analytes was evident in the matrix spike (MS) analytical results for antimony, lead, and selenium. Though the validated results indicate estimated data (J) for specific sample analytes based upon the division of the sample delivery groups, a conservative approach was taken to extend this estimation to all of the Named-Site soil samples. Therefore, all data for antimony, lead, and selenium should be considered estimated and may be biased low. The lead MS recovery for SDG #3 (JCSW9BS) was listed as 1 %. There is reason to believe, however, that the laboratory may have confused the sample, sample duplicate, and spiked sample during analysis. The raw data indicate a correction to the sample ID# from the original designation of the analyst. The MS performed on JC2LIAS cannot be used to evaluate lead accuracy because the sample concentration exceeds the spike added concentration by more than a factor of 4. Given that this discrepancy cannot be resolved, the data are considered usable but estimated values. No evaluation of accuracy of manganese could be made because of the high manganese found in the field samples. For both MS performed, the level spiked was too low to quantitate accurately above the indigenous manganese in the sample. All manganese data, therefore, must be considered estimated due to the possibility of uncertainty in the quantitation in the soil matrix.

Overall precision of these samples was good. Laboratory duplicate precision met criteria for all analytes except for calcium and lead. No field replicates were included with this data set. Therefore, field duplicate precision could not be evaluated. Based upon the uncertainty in the quantitation due to laboratory duplicate precision results, all calcium and lead data are usable but estimated values.

Two rinsate blanks (JCQC1TW and JCQC2BW) were associated with all of the soil sampling events. These blanks showed low level contamination of several analytes; however, associated soil data were sufficiently high so that the contamination level was considered negligible. Concurrently, no laboratory blanks showed contamination above the analyte CRDLs. However, the data validator followed Region I Functional Guidelines for the blank action levels. These guidelines are stricter than the Region U guidelines in that they require data to be considered not detected at the level found in the sample for values up to 5 times the level found in the laboratory blank. Therefore, low level laboratory contamination resulted in several sample analytes being considered nondetects (U), with the detection limit raised to the level found in the sample, for barium, beryllium, cadmium, cobalt, sodium, and vanadium. Following Region II guidelines, none of these analytes would have been qualified. Since the reported raised detection limits are still below commonly used ranges for NYSDEC soil cleanup criteria for all analytes, the low level contamination found is insignificant and the data are usable.

In summary, overall precision and accuracy are good. All data are usable with the following qualifications: all antimony and selenium data may be biased low; lead should be considered

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estimated due to the possibility of a low bias based upon inconclusive MS results; all manganese data are usable but estimated based on lack of data on accuracy; calcium and lead data are considered estimated results due to the uncertainty in the quantitation based upon poor laboratory duplicate precision.

- Pesticides/PCBs

Two of the test bore soil samples contained pesticides/PCBs (Table O2). Sample JC2LIAS contained 130 ppb of Aroclor 1260 and JC1H1AS contained 24 ppb of gamma-chlordane. The identification of the PCB and the pesticide meets all GC/ECD dual column confirmation criteria as required by NYSDEC ASP, but are at concentrations too low to confirm by GC/MS. All holding times were adhered to, and all analytical QC requirements were met. No problems were noted with the blanks, and spike recoveries were reasonable. All test bore soil pesticide data are usable.

- Semivolatile Organics

The same types of PAH contaminants found in the well borehole soil samples were also found in many of the test bore and hand soil samples (Table J2). Low levels of PAH's were detected in JC261AS and JC3H1AS. High ppb/low ppm PAH concentrations were noted in JC1H1CS and JC6H1AS, and ppm levels were found in JC1H1AS. Again, this suite of PAH's is typical of petroleum contamination.

All holding times and MS tuning criteria were met. Results for GC/MS calibration and internal standards were good. Matrix spike and surrogate spike recoveries were acceptable. Method blank results were good, except for one TIC which was found in sample JC2E1AS and the associated blank. All test bore and hand semivolatile organic soil data are usable.

- Volatile Organics

Other than a trace concentration of methylene chloride in JC1H1AS, there were no volatile organics detected in any of the test bore and hand soil samples (Table D2). Methylene chloride at this level may not be indigenous to the sample, but there is no viable reason for excluding it. All holding times were met and MS tuning criteria was adhered to. A calibration problem was noted for 2-butanone in sample JC1H1CS, thus requiring rejection of the detection limit value for that compound for that sample. Matrix spike and surrogate spike recoveries were acceptable. No blank problems were noted. **Except for 2-butanone in JC1H1CS, all test bore and hand soil volatile organic data are usable.**

Creek Sediment Samples

- Metals

Creek sediment sampling consisted of 2 field samples and 1 background sample for a total of 3 samples. The 2 field rinsate blanks associated with the Well Borehole soil samples are also applicable to these sediments. No field replicates were collected with these samples. The samples were taken on 11/17/91 and 11/20/91 and therefore were grouped into a single Sample Delivery Group (SDG #1). Each SDG contains associated matrix and laboratory QC which were reviewed as compared to requirements set forth in the site-specific QAPP, NYSDEC ASP (9/89), and applicable Region II Functional Guidelines for Data Validation (SOP No. HW-2, Revision X, 2/16/90). Table T1 lists the metals validated data for the Creek Sediment Samples. These include the samples associated with SDG #1 (JCSD1AS, JCSD2AS, JCCNSCS).

The laboratory did not perform a solid LCS with these soil samples; rather, they substituted a water LCS (blank spike). This is non-compliant with the site-specific QAPP (Section 10, pg. 10-5) and

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NYSDEC ASP (9/89) and does not allow for an accurate evaluation of laboratory accuracy for the soil matrices. Additionally, no matrix spike (MS) was performed on these sediment samples. Therefore, accuracy was evaluated based upon the MS performed with SDG #1 on a Well Borehole sample (JCSW5BS). The metals accuracy, therefore, has been based upon the percent recoveries of analytes in these matrix spikes. As no backup information is available due to lack of a solid LCS, it must be stressed that extrapolation of matrix spike data to all samples within this data set may be compromised by sample matrix heterogeneity. This is especially important because the matrix spike used to evaluate accuracy may not be indicative of the matrix of these Creek Sediments. The percent recovery of the antimony MS (JCSWSBS) for data analyzed with SDG #1 was less than 30%; therefore, the validator rejected the nondetected data associated with this MS. However, the MS for the data associated with SDG #2 recovered at 69% for antimony. Due to the fact that the two available MS % recoveries do not agree, and because no antimony was detected in any of the samples, all antimony data are considered usable as estimated results at the detection limit. Matrix suppression of certain analytes was evident in the matrix spike (MS) analytical results for antimony, arsenic, and thallium. Also, the post-digestion spikes for selenium indicated a matrix suppression of this analyte for the Creek Sediment samples JCSD1AS and JCSD2AS. Therefore, all data for antimony, arsenic, selenium, and thallium should be considered estimated and may be biased low. No evaluation of accuracy of manganese could be made because of the high manganese found in the field samples. The level spiked for the MS was too low to quantitate accurately above the indigenous manganese in the sample. All manganese data, Therefore, must be considered estimated due to the possibility of uncertainty in the quantitation in the soil matrix.

Overall precision of these samples was good. Laboratory duplicate precision met criteria for all analytes. Per agreement with NYSDEC, no field replicates were included with this data set. Therefore, field duplicate precision could not be evaluated.

Two rinsate blanks (JCQC1TW and JCQC2BW) were associated with all of the soil/sediment sampling events. These blanks showed low level contamination of several analytes; however, associated soil data were sufficiently high so that the contamination level was considered negligible. Concurrently, no laboratory blanks showed contamination above the analyte CRDLs. However, the data validator followed Region I Functional Guidelines for the blank action levels. These guidelines are stricter than the Region II guidelines in that they require data to be considered not detected at the level found in the sample for values up to 5 times the level found in the laboratory blank. Therefore, low level laboratory contamination resulted in several sample analytes begin considered nondetects (U), with the detection limit raised to the level found in the sample, for beryllium and sodium. Following Region II guidelines, none of these analytes would have been qualified. Since the reported raised detection limits are still below commonly used ranges for NYSDEC soil cleanup criteria for these analytes, the low level contamination found is insignificant and the data are usable.

There may be a minor matrix suppression of zinc in these samples as evidenced by a slightly high percent difference (12.4% when criteria is 10%) of the serial dilution result performed with SDG #1. However, this serial dilution was not performed on a Creek Sediment and therefore extrapolation of these results to the sediment matrices is technically questionable. Therefore, no definitive conclusion can be drawn as this discrepancy may be due to individual sample matrix effects.

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In summary, overall laboratory precision is good; however, no field replicate was collected and therefore sampling precision and sample heterogeneity could not be evaluated. Accuracy was evaluated using matrix spike information from a Well Borehole sample. All data are usable with the following qualifications: all antimony, arsenic, selenium, and thallium data may be biased low; all manganese data are usable but estimated based on lack of data on accuracy.

- Pesticides/PCBs

Two of the three creek sediment samples contained aldrin (Table O1). Aldrin was present at 8.8 ppb in JCSD1AS and 18 ppb in JCSD2AS. The identification of aldrin meets all GC/ECD dual column confirmation criteria as required by NYSDEC ASP, but are concentrations too low to confirm by GC/MS. All holding times and analytical QC criteria was met. Surrogate and matrix spike recoveries were good, and no contaminants were noted in the blanks. All creek sediment pesticide data is usable.

- Semivolatile Organics

One of the three creek sediment samples contained PAHs typical of the PAHs found in the well borehole soil samples and the test bore and hand soil samples (Table J1). This may indicate erosion of these materials from the site into the creek.

Holding times were met for all samples but one. Sample JCCNSCS was initially extracted within holding times. GC/MS analysis of the extract indicated poor recoveries for all surrogates. The sample was reextracted well outside of holding times, and thus the data was rejected by ECHEM. However, nothing was detected in either sample, and therefore the data should be considered usable.

All holding times and analytical QC criteria were met, including MS tuning, calibration, and internal standards. Matrix spike and surrogate recoveries were reasonable, as well as blank results. All creek sediment semivolatile organic data are usable.

- Volatile Organics

Except for a trace level of methylene chloride in JCSDS2AS, there were no volatile organic compounds detected in the creek sediments (Table D1). Methylene chloride at this level may not be indigenous to the sample, but there is no viable reason for excluding it. All holding times were met and MS tuning criteria was adhered to. Calibration and internal standard performance was compliant. Matrix spike and surrogate spike recoveries were acceptable. No blank problems were noted. All creek sediment volatile organic data are usable.

Creek Water Samples

- Metals

Creek Water sampling consisted of 2 field samples and 1 background sample collected on 11/17/91 and 11/18/91. These samples were grouped with SDG #2. The field blank for water sampling, Bailer blank JCQC3XW, was taken on 11/07/91 and grouped with SDG #1. Each SDG contains associated matrix and laboratory QC which were reviewed as compared to requirements set forth in the site-specific QAPP, NYSDEC ASP (9/89), and applicable Region II Functional Guidelines for Data Validation (SOP No. HW-2, Revision X, 2/16/90). Table S lists the metals validated data for the Creek Water Samples. These include JCCW1AW and JCCW2AW.

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All holding times were met and all laboratory and matrix QC criteria were in control for mercury and cyanide. For the furnace metals (antimony, arsenic, lead, selenium, and thallium) all matrix and laboratory specific QC met criteria for accuracy (LCS and Matrix Spike) and precision (laboratory duplicate), with the following minor exception. The post-digestion spike for arsenic for sample JCCW1AW recovered slightly higher than the control limit. However, the sample value was a nondetect; therefore, the datum is usable without qualification. For the ICP analytes (all other metals), all matrix and laboratory QC met criteria for accuracy (LCS and MS recoveries) and precision (laboratory duplicate) for all analytes.

Per agreement with NYSDEC, no field replicates were associated with the Creek Water samples and therefore field precision and sample homogeneity could not be evaluated. This would have been valuable in assessing the validity of the high mercury value (4.9 ug/L) found for sample JCCW2AW.

The single field blank applicable to the groundwater samples, the bailer field blank (JCQC3XW) had no significant levels of contamination compared to the values found in the field samples. Concurrently, no laboratory blanks showed contamination above analyte CRDLs. However, tide data validator followed Region I Functional Guidelines for the blank action levels. These guidelines are stricter than the Region II guidelines in that they require data to be considered not detected at the level found in the sample for values up to 5 times the level found in the laboratory blank. Therefore, low level laboratory contamination resulted in several sample analytes being considered nondetects, with the detection limit raised to the level found in the sample, for barium, beryllium, copper, vanadium, and zinc. Following Region II guidelines, none of these analytes would have been qualified. Since the raised reporting limits for barium, copper, and zinc are all lower than the NYSDEC Class GA Groundwater Standards or Guidance values, the low level contamination found is insignificant. No standards or guidance values have been set for vanadium under NYSDEC.

In summary, all creek water sample data met QA/QC criteria, precision, and accuracy criteria as indicated by laboratory QC, duplicates, and matrix spikes. All data are therefore usable with the caution that no field replicate was collected per agreement with NYSDEC and therefore sampling precision and sample heterogeneity could not be evaluated.

- Pesticides

No pesticides were detected in the creek water samples (Table N). All holding times were met, and all analytical QC criteria were adhered to. No contaminants were noted in the blanks, and surrogate and matrix spike recoveries were acceptable. All creek water pesticide data are usable.

- Semivolatile Organics

No semivolatile organics were detected in the creek water samples. Surrogate and matrix spike results were good. All holding times were met and all analytical QC results were satisfactory. No problems were noted with the associated blanks. All creek water semivolatile organic data are usable.

- Volatile Organics

No volatile organics were detected in any of the creek water samples (Table C). All holding times were met and MS tuning criteria was compliant. The detection limits for 2-butanone, 2-hexanone, and 4-methyl-2-pentanone were rejected by ECHEM due to problems with the continuing calibration. However, the 2 ppb initial calibration standard responses were stable at low levels and the QC check standard recoveries at 5 ppb were within established limits. It is therefore

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appropriate to assume that none of these compounds are present in any of the creek water samples at the CRDL, and thus the data is usable.

Some minor problems were noted with slightly high recoveries of the d4-dichloroethane surrogate, which is of no consequence. There were no significant blank contamination problems. All creek water volatile organic data are usable.

Outfall Samples

- **Metals**

Outfall water sampling consisted of 2 field samples collected on 11/23/91 and grouped with SDG #2. The field blank for water sampling, Bailer blank JCQC3XW, was taken on 11/07/91 and grouped with SDG #1. Each SDG contains associated matrix and laboratory QC which were reviewed as compared to requirements set forth in the site-specific QAPP, NYSDEC ASP (9/89), and applicable Region II Functional Guidelines for Data Validation (SOP No. HW-2; Revision X, 2/16/90). Table S lists the metals validated data for the Creek Water Samples. These include JCOF1AW and JCOF2AW.

All holding times were met and, all laboratory and matrix QC criteria were in control for mercury and cyanide. Note that the validator qualified the cyanide value for JCOF2AW as estimated due to holding time violation. A review of the raw data indicated that the holding time was met for this sample and no qualification is necessary. For the furnace metals (antimony, arsenic, lead, selenium, and thallium) all matrix and laboratory specific QC met criteria for accuracy (LCS and Matrix Spike) and precision (laboratory duplicate), with the following minor exception. The post-digestion spike for arsenic for sample JCOF2AW recovered slightly higher than the control limit. However, the sample value was a nondetect; therefore, the datum is usable without qualification. For the ICP analytes (all other metals), all matrix and laboratory QC met criteria for accuracy (LCS and MS recoveries) and precision (laboratory duplicate) for all analytes.

Per agreement with NYSDEC, no field replicates were associated with the Outfall samples and therefore field precision and sample homogeneity could not be evaluated.

The single field blank applicable to the groundwater samples, the bailer field blank (JCQC3XW) had no significant levels of contamination compared to the values found in the field samples. Concurrently, no laboratory blanks showed contamination above analyte CRDLs. However, the data validator followed Region I Functional Guidelines for the blank action levels. These guidelines are stricter than the Region II guidelines in that they require data to be considered not detected at the level found in the sample for values up to 5 times the level found in the laboratory blank. Therefore, low level laboratory contamination resulted in several sample analytes being considered nondetects, with the detection limit raised to the level found in the sample, for barium, copper, nickel, and zinc. Following Region II guidelines, none of these analytes would have been qualified. Since the raised reporting limits for barium, copper, and zinc are all lower than the NYSDEC Class GA Groundwater Standards or Guidance values, the low level contamination found is insignificant. No standards or guidance values have been set for nickel under NYSDEC.

In summary, all Outfall water sample data met QA/QC criteria, precision, and accuracy criteria as indicated by laboratory QC, duplicates, and matrix spikes. All data are therefore usable with the caution that no field replicate was collected per agreement with NYSDEC and therefore sampling precision and sample heterogeneity could not be evaluated,

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- Pesticides

No pesticides were detected in the outfall water samples (Table N). All holding times were met, and all analytical QC criteria were adhered to. No contaminants were noted in the blanks, and surrogate and matrix spike recoveries were acceptable. All outfall water pesticide data are usable.

- Semivolatile Organics

Very trace levels of fluoranthene, pyrene, chrysene, and bis(2-ethylhexyl)phthalate were detected in one of the three outfall samples JCOF2AW (Table I). All holding times were met, as well as MS tuning, calibration, and internal standard criteria. Surrogate and matrix spike recoveries were good and no problems were noted with the blanks. All outfall water semivolatile organic data are usable.

- Volatile Organics

Trace levels of a few volatile organic compounds were detected in both outfall water samples (Table C). Sample JCOF1AW contained 1,1,1-trichloroethane (0.6 ppb), trichloroethene (0.3 ppb), and bromoform (0.4 ppb); while sample JCOF2AW contained acetone (17 ppb) and trichloroethene (4 ppb). The quantitation of the two compounds in JCOF2AW was estimated (J) due to noncompliant surrogate and matrix spike recoveries. All holding times were met and MS tuning criteria was compliant. The detection limits for 2-butanone, 2-hexanone, and 4-methyl-2-pentanone were rejected by ECHEM due to problems with the containing calibration; however, the 2 ppb initial calibration standard responses were stable at low levels and the QC check standard recoveries at 3 ppb were within established limits. It is therefore appropriate to assume that none of these compounds are present in any of the outfall water samples at the CRDL, and thus the data is usable. All outfall water volatile organic data are usable.

In summary, the analytical chemistry program conducted for the AFB 59, Johnson City site investigation is very solid. All data, with some qualifications, were found to be usable. If you have any questions about this report, please do not hesitate to contact me.

Sincerely,

GRADIENT CORPORATION

A. Dallas Wait, Ph.D.
Director, Chemistry Division

Enclosures

Appendix B: Well Data and Lithological Logs

Appendix B-1: Lithological Logs

Appendix B-2: Well Completion Record

Appendix B-1:
Lithological Logs

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.: DW1				PROJECT: AFP#59 IRP SI				DATE: 11/22/91	
PROJECT NO: 91230		LOCATION: Johnson City, NY		DRILLER: MARCOR		DRILLING BIT: 8 1/4" & 6 1/4"			
INSPECTOR: Joseph Hsu				RIG TYPE: Cantenna CT 350		GROUND ELEVATION: 831.83'			
				METHOD: HSA & Driven Steel Casing		SAMPLING METHOD: 24" Split Spoon			
WELL TYPE: 4" PVC		SCREEN LENGTH: 10.0'		PROTOD. WIDTH/TYPE: 6" St-up Lock Steel					
WELL DEPTH: 61.5'		GROUT LENGTH/TYPE: 43.5' / 10:90 Bent/Cemt Mix		PAD ELEVATION: 831.83'					
SCREEN: 4" Cont. Wound PVC		SEAL LENGTH/TYPE: 5' / Bentonite		TOC ELEVATION: 834.57'					
SLOT SIZE: 0.010		FILTER LENGTH/TYPE: 13' / No. 2 Sand		STICK UP/DOWN: 2.74'					
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH			
	SAMPLE NUMBER	HNW (PPM)	STP TEST BLOWS / 6"	REC (in.)					
4"		0			Asphalt (Begin 11-21-91 at 0600 hour)				
2		0	0/8/32	6"	Brown and gray gravel, some fine to coarse sand, trace silt and clay				
4		0	10/4/5/7	24"	Brown fine sand and silt, trace clay				
6	1	0	11/7/8/9	24"	SAB	5			
8		0	3/4/6/7	24"	SAB				
10	2/CHEM	0	5/9/10/10	18"	8-9" SAB (3" split spoon)				
					9'-10' Brown fine to coarse sand, trace silt and clay	10			
12		0	2/5/5/7	6"	10'-11.5" SAB				
					11.5'-12' Brown fine to coarse sand and gravel trace silt				
14		0	1/4/5/7	6"	SAB, trace clay				
16		0	5/4/10/9	12"	SAB	15			
18	3	0	1/2/1/5	18"	Brown fine to coarse sand, trace gravel				
20	CHEM	0	12/15/19/17	12"	SAB, some gravel (3" split spoon)	20			
22	SA-1	0	4/10/11/17	6"	Brown fine to coarse sand and gravel				
24		0	4/8/16/21	12"	SAB				
28						25			
30		0	9/13/15/36	12"	SAB	30			

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG		ARGONNE NATIONAL LABORATORY		PAGE 2	
BORING NO. DW1		PROJECT: AFP#59 IRR SI		DATE: 11/22/91	
SAMPLE COLLECTION DATA					
DEPTH	SAMPLE NUMBER	HNU. (FNU)	STP TEST	REC.	DEPTH
33					
35	0	4/5/23/28	6"	SAB	
38				0"	38' No sample, heaving sands in casing. Brown coarse sand and fine gravel cuttings.
43	4			0"	43' Heaving sands in casing. SAB cuttings.
48				0"	48' Heaving sands, SAB cuttings. (End 1700 hour)
53	5			0"	53' Heaving sands in casing. Brown, medium to coarse sand and fine gravel cuttings. (Begin 0600 hour, 11/22/91)
58					58' Heaving sands in casing. Brown medium to coarse sand and fine gravel cuttings
62.5					62.5' Heaving sands in casing. SAB cuttings.
65					Roller bit refused at 62.5' - Boulder likely.
Boring terminated at 62.5'. Alternating layers of coarse sand and gravel from 38' to 62.5'. (Water at 19.84 bgs) (End 1030 hour)					

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.: DW3				PROJECT: AFP #59 IRP SI				DATE: 11/8/91	
PROJECT NO: 91230		LOCATION: Johnson City, NY		DRILLER: MARCOR		DRILLING BIT: 14 1/4" & 6 1/4"			
INSPECTOR: Joseph Hau				RIG TYPE: Canterra CT 350		GROUND ELEVATION: 829.42'			
				METHOD: HSA & Driven Steel Casing		SAMPLING METHOD: 24" Split Spoon			
WELL TYPE: 4" PVC		WELL DEPTH: 58.0'		SCREEN LENGTH: 20'		PROTOP WIDTH/TYPE: 10" Flush Manhole			
SCREEN: 4" Cont. Wound PVC		SLOT SIZE: 0.010		GROUT LENGTH/TYPE: 59.5' / 10:30 Bent/Cemt Mlx		PAD ELEVATION: 829.41'			
				SEAL LENGTH/TYPE: 5' / Bentonite		TOC ELEVATION: 829.04'			
				FILTER LENGTH/TYPE: 23.5' / No. 2 Sand		STICK UP/DOWN: -0.38'			
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH			
	SAMPLE NUMBER	HNu (PPM)	STP TEST BLOWS / 6"	REC (%)					
		0			Asphalt (begin 11-5-91 at 1230 hour)				
2		NSNO	26/32/45	6"	Gravel cobble fill and brown sand, silt. (Note: HNu Inoperable - screened by color and odor. No Stain, No odor "NSNO")				
4		NSNO	12/0/9/7	6"	SAB				
					SAB				
6	1	NSNO	9/4/3/10	12"	Moist, dark brown, fine sand and gravel, trace silt and clay.	5			
8	2	NSNO	15/34/29/28	12"	Moist, dark brown, fine to coarse sand and gravel.				
10	2	NSNO	14/32/30/38	12"	SAB	10			
12	SA 1a	NSNO	46/50/70/74	12"	SAB (3" spoon)				
14	SA 1b	NSNO	15/28/14/18	24"	SAB				
16	SA 1c	NSNO	7/23/34/43	12"	SAB	15			
18	SA 1d	NSNO	14/29/34/50	12"	SAB				
20		NSNO	50/Ref.	0"	SAB wet spoon (First water at 18")	20			
22	cutting	NSNO	80/100/ref.	0"	SAB, wet (3" split spoon)				
24	cutting	NSNO	30/65/47/33	0"	SAB (3" spoon)				
26	cutting	NSNO	12/13/13/23	6"	SAB (3" spoon)	25			
28	cutting	NSNO	18/12/14/43	6"	SAB (3" spoon) (End 1730 hour)				
	cutting	0	18/12/14/43	6"	SAB (Begin 11-06-91 at 0600 hour)	30			
PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%									

TEST BORING LOG				ARGONNE NATIONAL LABORATORY		PAGE 2	
BORING NO.: DW3				PROJECT: AFP #59 IRP SI		DATE: 11/8/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH	
	SAMPLE NUMBER	HNU (FPM)	STP TEST BLOWS / 6"	REC (in.)			
33	cutting						
33					33' - 34.5' SAB		
35	3	0	3/5/7/13	24"			
35	4				34.5' - 35' Wet, gray, fine sand, little silt, trace clay	35	
38							
40	5	0	4/4/9/17	24"	Wet, gray, fine sand and silt, little clay (Grout 8" casing in at 40') (End 1438 hour)	40	
43							
45	5	0	4/5/9/13	24"	(Begin 11/7/91 at 0600 hour. Drive and wash 6" casing.) SAB, trace clay	45	
48							
50	6	0	27/17/16/16	12"	Wet, gray coarse sand, little gravel	50	
53							
55	7	0	16/14/19/38	12"	53' - 54.75' Gray, fine sand and silt, little clay. 54.75' - 55' Gray, fine to coarse sand, some silt, trace gravel.	55	
58							
60		0	15/28/26/30	12"	Gray, fine sand and silt, little clay	60	
63							
65		0	15/14/20/24	24"	SAB	65	

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY		PAGE 3	
BORING NO.: DW3				PROJECT: AFP #59 IRP SI		DATE: 11/8/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH	
	SAMPLE NUMBER	INU (PPM)	STP TEST BLOWS / 6"	RED (N)			
68							
70		0	16/20/25/27	12"	Gray coarse sand and gravel trace silt (gravel are shale fragments) (Note: Hard to rollerbit)	70	
73							
75	8	0	60/ref	6"	SAB (End 17:00)	75	
78							
80	9	NSNO	64/ref	6"	Gray, angular gravel (Begin 11-08-91 at 0600)	80	
83							
85		NSNO	ref/	0"	SAB	85	
86							
88		NSNO	ref/	0"	SAB		
					Boring terminated at 86' (Water level in well after completion is 19.07' bgs) (End 1200 hour)	90	
						95	
						100	

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG					ARGONNE NATIONAL LABORATORY			PAGE 1	
BORING NO.: DW4			PROJECT: AFP #59 IRP SI				DATE: 11/25/91		
PROJECT NO.: 91230			DRILLER: MARCOR		DRILLING BIT: 14 1/4" & 6 1/4"		GROUND ELEVATION: 829.05'		
LOCATION: Johnson City, NY			RIG TYPE: Cantenna CT 350		SAMPLING METHOD: 24" Split Spoon				
INSPECTOR: Joseph Hsu			METHOD: HSA & Driven Steel Casing						
WELL TYPE: 4" PVC			SCREEN LENGTH: 20'		PROTOR WIDTH/TYPE: 10" Flush Manhole				
WELL LENGTH: 85.0'			GROUT LENGTH/TYPE: 57' / 10:90 Bent.Cemt Mix		PAD ELEVATION: 829.10'				
SCREEN: 4" Cont. Wound PVC			SEAL LENGTH/TYPE: 5' / Bentonite		TOC ELEVATION: 828.75'				
SLOT SIZE: 0.010			FILTER LENGTH/TYPE: 23' / No. 2 Sand		STICK UP/DOWN: -0.27				
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH			
	SAMPLE NUMBER	WAL (PPM)	STP TEST BLOWS / 6"	REC (in.)					
4'			12/9/9	8"	Asphalt (Begin 11-23-91 at 0845 hour)				
2'		0	3/3/4/5	6"	Yellowish-brown, sandy gravel fill				
4'		0	7/14/10/11	6"	Brown fine to coarse sand and gravel, trace silt				
6'		0	7/14/10/11	6"	SAB	5			
8'	1	0	7/8/11/9	8"	SAB				
10'		0	3/11/21/24	6"	SAB	10			
12'		0	14/14/12/12	6"	SAB, moist				
14'		0	5/7/9/11	6"	SAB, wet at ~ 13'				
16'	2	0	10/8/8/10	12"	14' - 15' SAB	15			
18'	3	60	4/3/5/10	18"	15' - 16' Brown fine sand and silt, little clay				
20'			3/3/4/8	24"	SAB, trace clay	20			
23'									
25'	4	0	1/2/2/4	18"	Gray fine sand and silt, trace clay	25			
28'									
30'		0	1/1/2/3	18"	SAB, little clay	30			

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY		PAGE 2	
BORING NO. DW4		PROJECT: AFP #59 IRP SI				DATE: 11/25/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH	
	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / FT	REC (ft)			
33							
35		0	1/3/3/6	18"	SAB (8" casing set at 35') (End 1130 hour)	35	
38							
40	5	0	15/16/31/28	12"	(Begin 11-24-91 at 0600) (Water at 21.3) Brown fine to coarse sand, little gravel, trace silt, 1-2 mm clay layers, up to 1" silt layers. (4" spoon)	40	
43							
45	6	0	10/12/22/32	8"	SAB (4" spoon.)	45	
48				0	48' Five feet of heaving sand and gravel. No recovery, large gravel felt by driller under rollerbit	50	
53				0	53' Six feet of heaving sand and gravel in casing. No recovery. Brown coarse sand and fine gravel cuttings. Large gravel felt by bit.	55	
58				0	58' Twelve feet of heaving sand and gravel in casing. No recovery. Brown coarse sand and fine gravel cuttings, large gravel felt by bit.	60	
63				0	63' Twelve feet of heaving sand and gravel in casing. No recovery. Brown coarse sand and fine gravel cuttings, large gravel felt by bit.		
65						65	

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG		ARGONNE NATIONAL LABORATORY		PAGE 3	
BORING NO.:		DWA		PROJECT: AFP#59, IRP SI	
DATE: 11/25/91		SAMPLE COLLECTION DATA		DEPTH	
DEPTH	SAMPLE NUMBER	HNU (PPH)	STP TEST	REC	DEPTH
68	7			0	68' Nine and one-half feet of heaving sand in casing, gray coarse sand and fine gravel cuttings. No large gravel felt.
73	8			0	73' Nine feet of heaving sand in casing. Gray, slightly finer sands in cuttings. No large gravel felt. (End 1700 hour)
76				0	(Begin 11-25-91 at 0600) (Water at 14.3) 76' Eight feet of heaving sand in casing. Gray coarse sand and fine gravel in cuttings. No large gravel felt.
83	9				83' Seven feet of heaving sands in casing. Gray coarse sand and fine gravel cuttings. No large gravel felt.
88					88' Eight feet of heaving sands in casing. Gray coarse sand and fine gravel cuttings. Large gravel felt at 87.5'
92.5				Ref	92.5' SAB, large gravel and likely shale bedrock (refusal of rollerbit)
Boring terminated at 92.5' (End 1200 hour) (water level at 19.5 bgs)					
PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%					

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.: DWS		PROJECT: AFP #59 IRP SI				DATE: 11/19/91			
PROJECT NO: 91230		DRILLER: MARCOR		DRILLING BIT: 14 1/4" & 8 1/4"		LOCATION: Johnson City, NY		GROUND ELEVATION: 836.24'	
INSPECTOR: Joseph Hau		RIG TYPE: Cantara CT 350		SAMPLING METHOD: 24" Split Spoon		METHOD: HSA & Driven Steel Casing			
WELL TYPE: 4" PVC		SCREEN LENGTH: 10'		PROTEC WIDTH/TYPER: 10" Flush Manhole		WELL LENGTH: 83'		PAD ELEVATION: 836.24'	
SCREEN: 4" Cont. Wound PVC		GROUT LENGTH/TYPER: 65' / 10:90 Bent/Cemt Mix		TOC ELEVATION: 835.97		SLOT SIZE: 0.010		STICK UP/DOWN: -0.27	
SEAL LENGTH/TYPER: 5' / Bentonite		FILTER LENGTH/TYPER: 15' / No. 2 Sand							
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION				DEPTH
	SAMPLE NUMBER	HAU (PPM)	STP TEST BLOWS / 6"	REC (ft.)					
4"		0			Asphalt (Begin 11-17-91 at 1225 hour)				
2		0	7/6/5	8"	Brown fine to coarse sand, some gravel fill				
4					-----				
6	1	0	3/2/2/1	16"	Brown fine to medium sand, some silt, trace clay and gravel				5
8					-----				
10	SA 1	0	10/6/6/10	0	Brown fine to coarse sand and gravel, trace silt, moist. (Used four-3" spoons for 4 qt. recovery)				10
12									
14	2	0	12/20/20/25	18"	SAB				
16									15
18		0	3/5/3/2	12"	SAB				
22		0	9/10/7/9	4"	SAB, wet at tip				20
24					-----				
26	3 4	0	3/2/1/4		Wet, brown grading to gray, fine sand and silt, some clay				25
28									
		0	3/1/2/3	18"	SAB				30

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG					ARGONNE NATIONAL LABORATORY		PAGE 2
BORING NO.:		DW5		PROJECT: AFP #59 IRP SI		DATE: 11/19/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH	
	SAMPLE NUMBER	HMU (FPM)	STP TEST BLOWS / 6"	REC (in.)			
35						35	
37	5	0	2/1/2/4	24"	SAB (Set 6" casing at 35") (end 1535 hour) (Begin 11-18-91 at 0700 hour) (Drive 6" casing)		
38							
40	6	0	0.3828571	12"	38' - 39.5' Wet, gray fine to coarse sand, trace gravel and silt. 39.5' - 40' Wet, gray fine sand and silt, little clay.	40	
43							
45	7	0	4/5/7/9	24"	SAB, some brown streaks	45	
48							
50			13/11/15/15	0	No recovery	50	
53							
55	8	0	10/12/16/18		53' - 53.5' Wet, coarse gray sand, trace silt and clay 53.5' - 55' Wet, gray fine sand and silt, trace clay.	55	
58							
60	9	0	16/19/17/17	18"	Wet, fine to coarse gray sand, little silt, trace clay.	60	
63							
65	10 11	0	11/13/15/20	24"	Wet, brownish gray fine sand, some silt, little clay.	65	

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY		PAGE 3	
BORING NO.:		DWS:		PROJECT: AFP #59 IRP SI		DATE: 11/19/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH	
	SAMPLE NUMBER	HWJ (PPM)	STP TEST BLOWS / 6"	REC (in)			
68					SAB (End 1730 hours)		
70		0	12/16/20/25	24"		70	
73							
75	12	0	6/20/31/33	18"	(Begin 11-19-91 at 0600 hours) SAB Gray, fine to coarse sand, some gravel, trace silt and clay (shale fragments)	75	
78							
80	SA 2	0	35/39/43/39	18"	Gray, fine to coarse sand and angular gravel, trace silt and clay.	80	
83							
83.5			100/R	6"	Hard pan. Compact glacial till, gray, equal amounts of fine to coarse sand, gravel, silt and clay. Refusal of rollerbit (shale?) at 83.5'		
					(Boring terminated at 83.5') (Water level at 25.26 bgs) (End 1123 hour)	85	
						90	
						95	
						100	

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.: DW6		PROJECT: AFP #59 IRP SI				DATE: 11/16/91			
PROJECT NO.: 91230		DRILLER: MARCOR		DRILLING BIT: 14 1/4" & 6 1/4"		LOCATION: Johnson City, NY		GROUND ELEVATION: 828.95'	
INSPECTOR: Joseph Hsu		RIG TYPE: Cantenna CT 350		SAMPLING METHOD: 24" Split Spoon		METHOD: HSA & Driven Steel Casing			
WELL TYPE: 4" PVC		SCREEN LENGTH: 10'		PROTOP WIDTH/TYPE: 10" Flush Manhole		WELL LENGTH: 66.5'		PAD ELEVATION: 828.97'	
SCREEN: 4" Cont. Wound PVC		GROUT LENGTH/TYPE: 48.5' / 10:90 Bent/Cent Mix		TOC ELEVATION: 828.51'		SLOT SIZE: 0.010		STICK UP/DOWN: -0.44'	
SEAL LENGTH/TYPE: 5' / Bentonite		FILTER LENGTH/TYPE: 13 / No. 2 Sand							
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION				DEPTH
SAMPLE NUMBER	HNLI (PPM)	STP TEST BLOWS / 6"	REC (in.)						
4"				Asphalt (Begin 11-13-91 at 0600 hours)					
2	1	0	13/11/10	6"	4"-1.5' gravel fill				
					1.5'-2' Brown, fine to coarse sand and silt, trace clay				
4			6/7/5/8	0	Brown, fine to coarse sand and gravel, trace silt (noted from cuttings)				
6		0	5/8/26/28	6"	SAB				5
8	2	0	5/12/15/19	12"	SAB				
10		0	5/7/7/30	12"	SAB, moist				10
12		0	13/15/19/16	12"	SAB, thin, wet layer at 13'				
14		0	9/5/5/5	12"	SAB				
16		0	15/45/21/22	0	SAB				15
18		0	9/9/8/7	6"	SAB				
20		0	5/9/12/14	12"	SAB				20
23									
25	3	0	7/4/13/12	6"	Wet, brown, fine to coarse sand and gravel (Augers walking west, hard obstruction at 25') (End 1650 hour)				25
27	4	0	25/14/12/8	24"	(Begin 11-14-91 at 0600 hours) (Water at 22') Wet, brown fine sand and silt, little clay.				
30	5	0	cuttings		Wet, gray very fine sand and silt, little clay (cuttings)				30

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY		PAGE 2	
BORING NO.: DW6				PROJECT: AFP #59 IRP SI		DATE: 11/16/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH	
	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / FT	REC. (in.)			
33							
35	5	0	cuttings		SAB (6" casing set at 36") (End 1200 hours)	35	
38							
40	6	0	5/6/11/14	24"	(Begin 11-15-91 at 0600 hours) (Drive 6" casing) SAB, trace clay	40	
43							
46	ST 1	0		20" 36"	SAB, little clay	45	
48							
50		0	6/8/14/21	24"	SAB	50	
53							
55	7	0	9/11/15/22	12"	SAB	55	
58							
60	8	0	35/30/12/12	18"	58' - 59' Gray, fine to coarse sand and gravel, trace silt and clay 59' - 60' Gray, fine sand and silt, trace clay	60	
63							
65		0	11/12/14/25	18"	63' - 64' Gray, fine to coarse sand and gravel, trace silt and clay 64' - 65' Gray, fine sand and silt, trace clay	65	

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY		PAGE 3	
BORING NO.: DW6				PROJECT: AFP #59 IRP SI		DATE: 11/16/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH	
	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / FT	REC (in.)			
68					SAB, small brown streaks		
70		0	2/27/12	24"		70	
73							
75		0	9/14/25/29	24"	SAB	75	
78					Gray, fine sand and silt, little clay		
80	9	0	12/16/28/27	24"		80	
83							
85		0	12/16/22/32	24"	SAB (End 1700 hours)	85	
86.5					(Begin 11-16-91 at 0600 hour) (Water level at 17.5')		
					Refusal of rollerbit		
					Boring terminated at 86.5', (Water level in well post completion is ~ 21') (End 0645 hours)	90	
						95	
						100	

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.: DW8				PROJECT: AFP #59 IRP SI				DATE: 11/3/91	
PROJECT NO.: 91230		LOCATION: Johnson City, NY		DRILLER: MARCOR		DRILLING BIT: 14 1/4" & 6 1/4"			
INSPECTOR: Joseph Hau				RIG TYPE: Cantenna CT 350		GROUND ELEVATION: 830.20'			
				METHOD: HSA & Driven Steel Casing		SAMPLING METHOD: 24" Split Spoon			
WELL TYPE: 4" PVC				SCREEN LENGTH: 20'		PROT. WIDTH/TYP: 10" Flush Mount			
WELL LENGTH: 93'				GROUT LENGTH/TYP: 65'		PAD ELEVATION: 830.20'			
SCREEN: 4" Cont. Wound PVC				SEAL LENGTH/TYP: 5.5' / Bentonite		TOC ELEVATION: 829.70'			
SLOT SIZE: 0.010				FILTER LENGTH/TYP: 22.5' / No. 2 Sand		STICK UP/DOWN: -0.50'			
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH			
	SAMPLE NUMBER	HW (FPM)	STP TEST BLOWS / 6"	REC (ft.)					
					Asphalt (Begin 10-31-91 at 1239 hour)				
2	1	0	8/16/20	6"	Brownish black gravel and sand fill, unsaturated (2" cobbles)				
4	1	0	17/20/25/15	12"	2' - 3' Brown gravel and sand fill, unsaturated				
					3.5' - 4' Brown sand and silt, trace organics				
6	2	0	11/8/3/9	24"	Gray, fine sand, some silt, trace gravel and clay	5			
8	3	0	6/3/4/5	24"	Gray, fine sand, some silt, some clay, trace gravel				
10	4	0	0/1/2/2	24"	8' - 9.5' Gray, fine sand, some silt and clay, trace gravel				
					9.5' - 10' Moist, brown, fine sand and silt, trace clay	10			
12	4	0	0/1/2/4	24"	Moist, mottled, brown/gray, fine sand and silt, little clay				
					12' - 13' SAB				
14	5	0	2/2/3/6	18"	13' - 14' Wet, brown, coarse sand and gravel				
					SAB	15			
16	5	0	3/5/3/2	24"					
					SAB				
18	6	0	1/2/3/4	24"					
					SAB				
20	6	0	7/7/6/5	6"		20			
22	6	0	3/4/6/8	6"	Wet, gray sand and gravel				
24	7	0	8/2/4/6	24"	Wet, gray, fine sand and silt, trace clay				
						25			
26	7	0	2/3/3/5	24"	SAB				
28	7	0	0/2/3/6	24"	SAB				
30	7	0	0/3/4/7	24"	SAB	30			
PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%									

TEST BORING LOG					ARGONNE NATIONAL LABORATORY		PAGE 2	
BORING NO.: DW8					PROJECT: AFP #59 IRP SI		DATE: 11/3/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH		
	SAMPLE NUMBER	HML (PPM)	STP TEST BLOWS / 6"	REC. (N)				
32	7	0	4/2/5/4	24"	SAB			
34	7	0	2/6/8/10	24"	SAB			
36	7	0	7/9/9/10	24"	Wet, gray, fine sand and silt, little clay	35		
38	7	0	1/3/3/5	24"	SAB			
40	7	0	11/9/7/5	24"	SAB (End 1730 hours)	40		
43	DW8 ST 1	0	--	0	(Begin 11-01-91 at 0630 hours) (Set 8" casing at 40') (End 1730 hour) (Begin 11-02-91 at 0630 hour) (Water at 21') (drive and wash 8" casing) SAB, Shelby tube - fail due to gravel fail			
47						45		
49	SA -1	0	0.05	24"	SAB			
52						50		
55	ST 1	0	--	0	Shelby tube - no recovery, cohesionless	55		
57	SA 1a	0		24"	SAB			
62	SA 1a					60		
64	SA 1b	0	12/18/18/18	24"	SAB			
						65		

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG					ARGONNE NATIONAL LABORATORY		PAGE 3	
BORING NO. DW8			PROJECT: AFP #59 IRP SI				DATE: 11/3/91	
DEPTH		SAMPLE COLLECTION DATA			DESCRIPTION		DEPTH	
		SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 5'	REC (in.)			
67								
69	SA 1c	0	16/17/25/22	18"	SAB (End 1700 hour)			
72								70
74	8	0	19/19/19/18	F	(Begin 11-3-91 at 0600) (Water at 14.4') SAB			
77								75
79	9	0	13/14/12/12	F	Wet, gray, fine to coarse sand, some silt, trace clay			
82								80
84	SA-2a 10	0	11/11/15/15	F	SAB			
87	10							85
89	10	0	12/13/18/51	F	SAB			
90					90' Coarse gravel felt by driller under rollerbit, no recovery			90
93					91.5' - 93' Rollerbit into bedrock, Refusal at 93'			
					Boring terminated at 93'. (End 1630 hour) (Begin 11-04-91 at 0642 hour) (Construct DW8 monitor well) (End 1450 hour) (Water in well post completion is ~ 18.37 bgs.)			95
								100

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.: DW9				PROJECT: AFP #59 IRP SI				DATE: 12/9/91	
PROJECT NO.: 91230		LOCATION: Johnson City, NY		DRILLER: MARCOR		DRILLING BIT: 14 1/4" & 6 1/4"			
INSPECTOR: Joseph Hau				RIG TYPE: Cantenna CT 350		GROUND ELEVATION: 828.80'			
				METHOD: HSA & Driven Steel Casing		SAMPLING METHOD: 24" Split Spoon			
WELL TYPE: 4" PVC		SCREEN LENGTH: 20'		PROTAP WIDTH/TY: 6" St-up Lock Steel					
WELL LENGTH: 88.0'		GROUT LENGTH/TY: 59.5' / 10:50 Bent:Cemt Mix		PAD ELEVATION: 828.80'					
SCREEN: 4" Cont Wound PVC		SEAL LENGTH/TY: 5' / Bentonite		TOC ELEVATION: 831.31'					
SLOT SIZE: 0.010		FILTER LENGTH/TY: 23' / No. 2 Sand		STICK UP/DOWN: 2.51'					
SAMPLE COLLECTION DATA					DESCRIPTION				DEPTH
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)					
4'					Turf (Begin 12-6-91 at 1400 hour)				
2	1	0	4/12/11/19	16"	Brown, fine sand and silt, some clay, trace gravel				
4	2	0	9/9/7/7	12"	2'-3" Yellow, coarse sand 3'-4" Dark brown, coarse sand and silt, trace gravel, some clay				
6	3	0	5/5/5/5	6"	Dark brown, fine to coarse sand, some gravel, little silt and clay				5
8		0	3/3/4/4	6"	SAB				
10		0	6/6/11/8	8"	SAB (3" spoon)				10
12	4	0	2/6/15/17	6"	Brown, fine to coarse sand and gravel, trace silt and clay, moist				
14	SA 1	0	12/14/22/26	18"	SAB, moist				
16	SA 1	0	32/36/42/42	18"	SAB, wet (First water at ~ 15')				15
18	5	0	3/9/5/5	16"	Brown, fine to coarse sand, little gravel, trace organic matter				
20		0	4/4/9/13	12"	SAB				20
23									
25		0	3/6/8/13	12"	SAB, trace gravel				25
28									
30		0			SAB, No recovery, heaving sands (End 1700 hour)				30
PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%									

TEST BORING LOG				ARGONNE NATIONAL LABORATORY		PAGE 2	
BORING NO.: DW9		PROJECT: AFP #59 IRP SI				DATE: 12/9/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH	
	SAMPLE NUMBER	HMU (PPM)	STP TEST BLOWS / 6"	REC (in.)			
33					33' - 34' Brown, coarse sand and trace gravel		
35	6	0	3/5/7/11	10"	(Begin 12-7-91 at 0630 hour) (Water at 14.9') 34' - 35' Brown, fine sand and silt, some clay	35	
38					(8" casing set at 38')		
40	7	0	2/4/6/13	4"	Gray, fine sand and silt, little clay	40	
42	8	0	1/4/5/7	8"	40' - 41' SAB 41' - 42' Gray, fine to medium sand, little silt and clay		
43							
45	9	0	7/17/14/16	18"	(Begin 12-8-91 at 0630 hour) 43' - 44' Gray, fine sand and silt, some clay, trace gravel 44' - 45' Gray, fine sand and silt, little clay	45	
48							
50	10	0	13/13/19/19	18"	SAB	50	
53	ST 1	0		27" 36"	SAB		
55	11	0	7/10/14/16	18"	Thin alternating layers of gray fine sand and silt, little clay; to fine to medium gray sand, little silt, trace gravel and clay	55	
58							
60	12 13	0	32/28/22/22	18"	58' - 59.5' Gray, fine to coarse sand and gravel, trace silt and clay 59.5' - 60' Gray, fine sand and silt, little clay	60	
63							
65		0	12/8/27/24	20"	Thin alternating layers of gray fine to coarse sand and gravel, trace silt and clay; to gray, fine sand and silt, little clay	65	

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG					ARGONNE NATIONAL LABORATORY		PAGE 3
BORING NO.: DW9			PROJECT: AFP #59 IRP SI			DATE: 12/9/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH	
	SAMPLE NUMBER	HNH (PPLG)	STP TEST BLOWS / 6"	REC (ft.)			
68							
70	14	0	14/18/27/47	20"	Gray, fine to coarse sand and shale gravel, little silt and clay	70	
72							
73	15		CORE	5"	Refusal at 72' cored 5" shale boulder		
75	16	0	20/30/38/40	18"	Gray, fine to coarse sand and shale gravel, trace silt and clay (End 1636 hour)	75	
78							
80					(Begin 12-9-91 at 0600 hour) No recovery - 3' of heaving sands in casing	80	
83							
85					No recovery - 3' of heaving sands in casing	85	
88							
90	17	0	70/72/94/110	18"	Compact gray till with equal mix of clay, silt, sand and gravel (End 1230 hour)	90	
					(Boring terminated at 90') (Water at 14.9' bgs)		
						95	
						100	

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG		ARGONNE NATIONAL LABORATORY		PAGE 1																																																																	
BORING NO.: IW9		PROJECT: AFP #59 IRR SI																																																																			
DATE: 12/10/91																																																																					
PROJECT NO.: 91230		DRILLER: MARCOR																																																																			
LOCATION: Johnson City, NY		REQ. TYPE: Gamma CT 350																																																																			
INSPECTOR: Joseph Han		METHOD: HSA & Diven Steel Casing																																																																			
WELL TYPE: 2" PVC		SCREEN LENGTH: 5'		PROTOP WIDTH/TYPE: 4" St-up Lock Steel																																																																	
WELL LENGTH: 51'		GROUT LENGTH/TYPE: 36" / 10-30 BankCam Mix		PAD ELEVATION: 828.63																																																																	
SCREEN: 2" Cont. Wound PVC		SEAL LENGTH/TYPE: 5' / Bentonite		TOC ELEVATION: 831.52																																																																	
SLOT SIZE: 0.010		FILTER LENGTH/TYPE: 6' No. 2 Sand		STICK UP/DOWN: 2.50																																																																	
<table border="1"> <thead> <tr> <th colspan="2">SAMPLE COLLECTION DATA</th> <th colspan="2">DEPTH</th> </tr> <tr> <th>REC</th> <th>STP TEST</th> <th>DEPTH</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td>1' (Begin 12-10-91 at 1030)</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Brown, fine sand and silt, some clay, trace gravel</td> </tr> <tr> <td></td> <td></td> <td></td> <td>2' - 3' Yellow, coarse sand</td> </tr> <tr> <td></td> <td></td> <td></td> <td>3' - 4' Dark brown, coarse sand and silt, trace gravel, some clay</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Dark brown, fine to coarse sand, some gravel, little silt and clay</td> </tr> <tr> <td></td> <td></td> <td></td> <td>SAB</td> </tr> <tr> <td></td> <td></td> <td></td> <td>(3' spoon)</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Brown, fine to coarse sand and gravel, trace silt and clay, moist</td> </tr> <tr> <td></td> <td></td> <td></td> <td>SAB, moist</td> </tr> <tr> <td></td> <td></td> <td></td> <td>SAB, wet (First water at ~ 15')</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Brown, fine to coarse sand, little gravel trace organic matter</td> </tr> <tr> <td></td> <td></td> <td></td> <td>SAB</td> </tr> <tr> <td></td> <td></td> <td></td> <td>SAB, trace gravel</td> </tr> <tr> <td></td> <td></td> <td></td> <td>SAB</td> </tr> </tbody> </table>						SAMPLE COLLECTION DATA		DEPTH		REC	STP TEST	DEPTH	DESCRIPTION				1' (Begin 12-10-91 at 1030)				Brown, fine sand and silt, some clay, trace gravel				2' - 3' Yellow, coarse sand				3' - 4' Dark brown, coarse sand and silt, trace gravel, some clay				Dark brown, fine to coarse sand, some gravel, little silt and clay				SAB				(3' spoon)				Brown, fine to coarse sand and gravel, trace silt and clay, moist				SAB, moist				SAB, wet (First water at ~ 15')				Brown, fine to coarse sand, little gravel trace organic matter				SAB				SAB, trace gravel				SAB
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TEST BORING LOG				ARGONNE NATIONAL LABORATORY		PAGE 2
BORING NO.: IW9		PROJECT: AFP #59 IRP SI			DATE: 12/10/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH
	SAMPLE NUMBER	HMU (PPM)	STP TEST BLOWS / ft	REC. (ft)		
33'					33'-34' Brown, coarse sand and trace gravel	33'
34'					34'-35' Brown, fine sand and silt, some clay	35'
40'					Gray, fine sand and silt, little clay 40'-41' SAB	40'
41'					41'-42' Gray, fine to medium sand, little silt and clay	
43'					43'-44' Gray, fine sand and silt, some clay, trace gravel	
44'					44'-45' Gray, fine sand and silt, little clay	45'
50'					SAB	50'
					SAB (End 1500 hour)	
51.0'					Boring terminated at 51.0' (Water at 14.9')	55'
60'						60'
65'						65'

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG					ARGONNE NATIONAL LABORATORY			PAGE 1	
BORING NO.:		IW7		PROJECT: AFP #59 IRP SI				DATE: 12/5/91	
PROJECT NO.:		91230		DRILLER:		MARCOR		DRILLING BIT:	
LOCATION:		Johnson City, NY		RIG TYPE:		Cantenna CT 350		GROUND ELEVATION:	
INSPECTOR:		Joseph Hau		METHOD:		Hollow Stem Auger		SAMPLING METHOD:	
WELL TYPE:		None		SCREEN LENGTH:		----		PROTOP WIDTH/TYPER	
WELL LENGTH:		----		GROUT LENGTH/TYPER		----		PAD ELEVATION:	
SCREEN:		----		SEAL LENGTH/TYPER		----		TOC ELEVATION:	
SLOT SIZE:		----		FILTER LENGTH/TYPER		----		STICK UP/DOWN:	
SAMPLE COLLECTION DATA					DESCRIPTION				
DEPTH	SAMPLE NUMBER	HMU (FPI)	STP TEST BLOWS / 6"	REC (in.)					
2					Grass and clayey topsoil w/ organics (Begin 12-5-91 at 0800 hour)				
4		0	3/3/4/6	6"	Brown, fine sand and silt, little clay, trace gravel with organics				
6					6' - 7' SAB				
8		0	9/8/6/12	6"	7'-8' Brown, fine to coarse sand and gravel, trace silt				
10									
12	1	0	3/4/6/10	6"	SAB				
14									
16	2	0	4/5/11/12	12"	14' - 15' SAB (3" spoon) 15'-16' Brown, coarse sand, trace to little gravel, moist (First water at 15.8' bgs)				
18	3	0	7/8/15/18	8"	16'-17' Brown, coarse gravel and coarse sand, wet 17'-18' Brown, coarse gravel and coarse sand, wet (3" spoon)				
20	SA 1	0	16/17/27/29	10"	SAB (3" spoon)				
22									
24	SA 1	0	23/14/10/10	18"	SAB (3" spoon)				
26					26'-26.5' SAB				
28	4		11/11/11/14	20"	26.5'-28' Brown, fine sand and silt, little clay (3" spoon)				
30									
PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%									

TEST BORING LOG					ARGONNE NATIONAL LABORATORY		PAGE 2	
BORING NO.: IW7					PROJECT: AFP #59 IRP SI		DATE: 12/5/91	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH		
	SAMPLE NUMBER	HNH (PPM)	STP TEST BLOWS / 6"	REC (IN)				
31	ST-1 (Cont)		--	0"	28'-31' Attempt Shelby tube (No recovery)			
32				36"				
34	5	0	33/38/43/45	8"		Brown, fine to coarse sand, little silt		
35								
36								
38		0	1/6/13/13	24"	SAB, trace gravel			
40								
42	6	0	7/11/18/22	24"		SAB, trace gravel		
44								
45					Boring terminated at 44'			
50					IW7 not installed. Attempted to install SW7 - running sands interfered with bentonite plug. Boring backfilled with grout 0'-28', bentonite/formation sand mix 28'-28', sand 28'-32', formation collapse 32'-44'			
55								
60								
65								

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.:		SW4		PROJECT: AFP #59 IRP SI				DATE: 12/2/91	
PROJECT NO:		91230		DRILLER:		MARCOR		DRILLING BIT: 8 1/4"	
LOCATION:		Johnson City, NY		RIG TYPE:		Centerra CT 350		GROUND ELEVATION: 829.05	
INSPECTOR:		Joseph Hsu		METHOD:		Hollow Stem Auger		SAMPLING METHOD: 24" Split Spoon	
WELL TYPE:		2" PVC		SCREEN LENGTH:		15		PROTOP WIDTH/TYPE: 8" Flush Manhole	
WELL LENGTH:		29'		GROUT LENGTH/TYPE:		9.5' / 10:90 Bent/Cemt Mix		PAD ELEVATION: 829.28	
SCREEN:		2" Cont. Wound PVC		SEAL LENGTH/TYPE:		2' / Bentonite		TOC ELEVATION: 828.85	
SLOT SIZE:		0.010		FILTER LENGTH/TYPE:		17.5' / No. 2 Sand		STICK UP/DOWN: -0.43'	
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH			
	SAMPLE NUMBER	HMU (PPM)	STP TEST BLOWS / 6"	REC. (IN)					
4"					Asphalt (Begin 0730 hour)				
2					Yellowish, brown sand and gravel fill				
4		0	5/5/5/9	6"	Brown, fine to coarse sand and gravel, trace silt				
6		0	5/9/10/12	8"	SAB	5			
8	CHEM	0	26/24/20/21	18"	SAB				
10		0	8/12/22/24	6"	SAB	10			
12		0	16/10/6/7	6"	SAB, moist				
14		0	5/7/7/14	6"	SAB, wet at 13'				
16	CHEM	0	10/19/14/15	12"	14"-15' SAB (3" spoon)	15			
18	CHEM	0	17/23/27/31	F	15"-16' Brown, fine sand and silt, little clay				
21.5					SAB, trace clay (3" spoon)	20			
					SAB, wet				
					Gray, fine sand and silt, trace clay (End 1200 hour)	25			
30					Boring terminated at 29' (Water at 18.38' bgs.)	30			

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.: SWS				PROJECT: AFP #59 IRP SI				DATE: 11/20/91	
PROJECT NO: 91230		LOCATION: Johnson City, NY		DRILLER: MARCOR		DRILLING BIT: 8 1/4"		GROUND ELEVATION: 836.24'	
INSPECTOR: Joseph Hau				RIG TYPE: Canterra CT 350		SAMPLING METHOD: 24" Split Spoon			
WELL TYPE: 2" PVC		WELL DEPTH: 30.5		SCREEN LENGTH: 10'		PROTOP WIDTH/TYPE: 8" Flush Manhole		PAD ELEVATION: 836.32'	
SCREEN: 2" Cont. Wound PVC		SCREEN SIZE: 0.010		GROUT LENGTH/TYPE: 14.5' / 10:90 Bent/Cent Mix		SEAL LENGTH/TYPE: 3' / Bentonite		TOC ELEVATION: 835.84'	
FILTER LENGTH/TYPE: 13' / No. 2 Sand				STICK UP/DOWN: -0.40'					
SAMPLE COLLECTION DATA					DESCRIPTION				
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)					
4					Asphalt (Begin 0600 hour)				
3					Brown fine to coarse sand, some gravel				
5		0	1/1/1/2	18"	Brown, fine to medium sand, some silt, trace clay and gravel				
8					-----				
10		0	3/3/7/13	18"	Brown, fine to coarse sand and gravel, trace silt				
12	CHEM	0	36/35/41/55	12"	SAB (two, 3" spoons)				
13									
15		0	13/26/28/26	18"	SAB				
18									
20		0	2/9/29/37	4"	SAB				
22	CHEM	0	24/19/16/12	12"	SAB (3" spoon)				
23			36/100/R	0					
25	CHEM	0	17/12/12/12		Wet, brown grading to gray, fine sand and silt, some clay (3" spoon)				
27	CHEM	0.5-0.8	10/11/11/20		Gray SAB, some brown, streaks wet, (Note: 3" spoon, ovm hotspots, 0.5-0.8 ppp at 25.5 and 26 ft below grade)				
30	SWS ST 1		---	25" 36"	SAB Shelby Tube Sample				
Boring Terminated at 30.5' (Water at 25.4') (End 0930 hour)									
PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%									

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.: SW6				PROJECT: AFP #59 IRP SI				DATE: 11/17/91	
PROJECT NO: 91230		LOCATION: Johnson City, NY		DRILLER: MARCOR		DRILLING BIT: 8 1/4"			
INSPECTOR: Joseph Hau				RIG TYPE: Cantenna CT 350		GROUND ELEVATION: 828.95'			
				METHOD: Hollow Stem Auger		SAMPLING METHOD: 24" Split Spoon			
WELL TYPE: 2" PVC				SCREEN LENGTH: 10'		PHOTO P WIDTH/TYPE: 8" Flush Manhole			
WELL LENGTH: 29'				GROUT LENGTH/TYPE: 13' / 10:30 Bent/Cemt Mix		PAD ELEVATION: 828.90'			
SCREEN: 2" Cont. Wound PVC				SEAL LENGTH/TYPE: 3' / Bentonite		TOC ELEVATION: 828.49'			
SLOT SIZE: 0.010				FILTER LENGTH/TYPE: 13' / No. 2 Sand		STICK UP/DOWN: -0.48			
SAMPLE COLLECTION DATA					DESCRIPTION				
DEPTH	SAMPLE NUMBER	INCH (FPM)	STP TEST BLOWS / 6"	REC (ft.)					
4					Asphalt (Begin 11-16-91 at 1406 hours)				
					4'-1.5' Gravel fill				
3					1.5'-2' Brown, fine to coarse sand and gravel trace silt				
5		0	2/3/6/10	18"	Brown coarse sand and gravel, trace silt				
8									
10		0	3/4/8/20	12"	Brown fine to coarse sand and gravel, trace silt (Two, 3" spoons)				
13									
15		0	9/8/8/10	6"	SAB				
16									
18		0	5/8/7/16	6"	SAB (Two, 3" spoons)				
20		0	32/31/19/22	18"	SAB (3" spoon)				
25					SAB (End 1600 hours)				
29					(Begin 11-17-91 at 0600 hour) Brown fine sand and silt, little clay				
30					Boring terminated at 29' (End 0635 hour) (Water level in well after completion is at 21.7')				
PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%									

TEST BORING LOG					ARGONNE NATIONAL LABORATORY			PAGE 1	
BORING NO.: SW7		PROJECT: AFP #59 IRP SI					DATE: 12/6/91		
PROJECT NO: 91230		DRILLER: MARCOR		DRILLING BIT: 8 1/4"		GROUND ELEVATION: 828.58'			
LOCATION: Johnson City, NY		RIG TYPE: Cantenna CT 350		SAMPLING METHOD: 2" Split Spoon					
INSPECTOR: Joseph Hsu		METHOD: Hollow Stem Auger							
WELL TYPE: 2" PVC		SCREEN LENGTH: 15'		PROTOP WIDTH/TYPE: 4" St-up Lock Steel					
WELL LENGTH: 26.5'		GROUT LENGTH/TYPE: 6.5' / 10:90 Bent-Cornt Mix		PAD ELEVATION: 829.12'					
SCREEN: 2" Cont. Wound PVC		SEAL LENGTH/TYPE: 3' / Bentonite		TOC ELEVATION: 831.80'					
SLOT SIZE: 0.010		FILTER LENGTH/TYPE: 17' / No. 2 Sand		STICK UP/DOWN: 3.01'					
DEPTH	SAMPLE COLLECTION DATA				DESCRIPTION	DEPTH			
	SAMPLE NUMBER	HRU (PPL)	STP TEST BLOWS / 6"	REC (ft)					
2					Grass and clayey topsoil w/ organics				
7					Brown, fine sand and silt, little clay, trace gravel w/ organics	5			
9	CHEM	0	10/11/10/11	5"	Brown, fine to coarse sand and gravel, trace silt (3" spoon)	10			
11	CHEM	0	9/10/19/19	4"	SAB (3" spoon)				
14									
16	CHEM	0	5/6/13/9	8"	14'-15' SAB 15'-16" Brown, coarse sand, trace gravel, moist (3" spoon)	15			
18	CHEM	0	8/11/16/19	8"	16'-17' SAB 17'-18" Brown, coarse gravel and coarse sand, wet (3" spoon)				
26.5					SAB (End 0840 hours)	20 25			
30					Boring terminated at 26.5' (Water at ~ 15.8')	30			

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG					ARGONNE NATIONAL LABORATORY					PAGE 1	
BORING NO.: SW7					PROJECT: AFP #59 IRP SI					DATE: 12/6/91	
PROJECT NO:		91230			DRILLER:		MARCOR		DRILLING BIT:		8 1/4"
LOCATION:		Johnson City, NY			RIG TYPE:		Cantenna CT 350		GROUND ELEVATION:		828.58'
INSPECTOR:		Joseph Heu			METHOD:		Hollow Stem Auger		SAMPLING METHOD:		24" Split Spoon
WELL TYPE:		2" PVC			SCREEN LENGTH:		15'		PROTECTOR WIDTH/TYPE:		4" St-up Lock Steel
WELL LENGTH:		26.5'			GROUT LENGTH/TYPE:		6.5' / 10:90 Bent/Cemt Mix		PAD ELEVATION:		829.12'
SCREEN:		2" Cont. Wound PVC			SEAL LENGTH/TYPE:		3' / Bentonite		TOC ELEVATION:		831.89'
SLOT SIZE:		0.010			FILTER LENGTH/TYPE:		17' / No. 2 Sand		STICK UP/DOWN:		3.01'
DEPTH	SAMPLE NUMBER	THU (PPM)	STP TEST BLOWS / 6"	REC (ft.)	DESCRIPTION	DEPTH					
2					Grass and clayey topsoil w/ organics						
7					Brown, fine sand and silt, little clay, trace gravel w/ organics	5					
9	CHEM	0	10/11/10/11	5"	Brown, fine to coarse sand and gravel, trace silt (3" spoon)						
11	CHEM	0	9/10/19/19	4"	SAB (3" spoon)	10					
14											
16	CHEM	0	5/6/13/9	8"	14'-15' SAB 15'-16' Brown, coarse sand, trace gravel, moist (3" spoon)	15					
18	CHEM	0	8/11/16/19	8"	16'-17' SAB 17'-18' Brown, coarse gravel and coarse sand, wet (3" spoon)						
26.5					SAB (End 0840 hours)	20 25					
30					Boring terminated at 26.5' (Water at ~ 15.8')	30					

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG					ARGONNE NATIONAL LABORATORY			PAGE 1	
BORING NO.: SW9			PROJECT: AFP #59 IRP SI				DATE: 12/10/91		
PROJECT NO: 01230		LOCATION: Johnson City, NY		DRILLER: MARCOR		DRILLING BIT: 8 1/4"		GROUND ELEVATION: 828.80'	
INSPECTOR: Joseph Hau				REQ. TYPE: Cantenna CT 350		SAMPLING METHOD: 24" Split Spoon			
WELL TYPE: 2" PVC		SCREEN LENGTH: 15'		PROTOP. WIDTH/TY: 4" St-up Lock Steel		PAD ELEVATION: 828.80'			
WELL LENGTH: 25'		GROUT LENGTH/TY: 6' / 10:90 Bent.Cemt Mix		TOC ELEVATION: 831.38'		STICK UP/DOWN: 2.58'			
SCREEN: 2" Cont. Wound PVC		SEAL LENGTH/TY: 2' / Bentonite							
SLOT SIZE: 0.010		FILTER LENGTH/TY: 17' / No. 2 Sand							
SAMPLE COLLECTION DATA					DESCRIPTION			DEPTH	
DEPTH	SAMPLE NUMBER	INQ. (PPM)	STP TEST BLOWS / 6"	REC. (ft.)					
4'					TUR				
					Brown, fine sand and silt, some clay, trace gravel (All 3" spoons)				
					2' - 3' Yellow, coarse sand				
					3' - 4' Dark brown, coarse sand and silt, trace gravel, some clay				
6								5	
8	CHEM	0	12/15/17/20	10"	Dark brown, fine to coarse sand, some gravel, little silt and clay				
10	CHEM	0	31/31/30/27	10"	SAB			10	
12									
14	CHEM	0	44/49/47/64	12"	Brown, fine to coarse sand and some gravel, trace silt and clay, moist			15	
16	CHEM	0	50/50/46/52	12"	SAB				
								20	
					SAB				
					(End 1000 hours)			25	
25					Boring terminated at 25' (Water at 15.0')				
								30	
30									

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

TEST BORING LOG		ARGONNE NATIONAL LABORATORY		PAGE 1		
BORING NO.: 3H1		PROJECT: AFP #59 IRR-SI				
DATE: 12/4/91						
PROJECT NO: 91230 LOCATION: Johnson City, NY INSPECTOR: Joseph Hsu		DRILLER: MARCOR RIG TYPE: Gamma CT 350 METHOD: Hollow Stem Auger				
WELL TYPE: None WELL LENGTH: --- SCREEN: --- SLOT SIZE: ---		SCREEN LENGTH: --- GROUT LENGTH: --- SEAL LENGTH: --- RUBER LENGTH: ---				
PROTOP WIDTH: --- PAD ELEVATION: --- TOC ELEVATION: --- STICK UP/DOWN: ---		DRILLING BIT: 3 1/4" GROUND ELEVATION: 828.58' SAMPLING METHOD: 24" Spk Spoon				
SAMPLE COLLECTION DATA		DEPTH				
SAMPLE NUMBER	HML (Ft)	STP TEST	BLOWS / FT	REC	DEPTH	
6' Turf (Begin 11.45 hour)						
0	15/13/18/17	8'	Brown, sand and gravel fill, trace silt (All 3' spoons)			
4	0	3/3/4/4	20'	Brown, fine sand and silt, little clay		
6	0	1/2/3/5	20'	SAB		
8	0	1/4/5/6	20'	SAB, some clay		
10	27	2/4/8/9	20'	8'-9.7' SAB, little clay		
12	78.5	10/13/14/17	6'	9.7'-10' Gray, oily, fine to coarse sand and gravel		
14	63.8	11/12/7/17	6'	Oily SAB		
Oily, gray coarse sand						
Boring terminated at 14' (Bunker detect alaphitic alkenes and naphthalene) (End 1245 hours)						
PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%						

TEST BORING LOG				ARGONNE NATIONAL LABORATORY				PAGE 1	
BORING NO.: 6H1				PROJECT: AFP #59 IRP SI				DATE: 12/4/91	
PROJECT NO: 91230		LOCATION: Johnson City, NY		DRILLER: MARCOR		DRILLING BIT: 8 1/4"			
INSPECTOR: Joseph Hau				REG TYPE: Centerra CT 350		GROUND ELEVATION: 532.03'			
				METHOD: Hollow Stem Auger		SAMPLING METHOD: 24" Split Spoon			
WELL TYPE: None				SCREEN LENGTH: ---		PHOTO: WIDTH/TYPE: ---			
WELL LENGTH: ---				GROUT LENGTH/TYPE: ---		PAD ELEVATION: ---			
SCREEN: ---				SEAL LENGTH/TYPE: ---		TOC ELEVATION: ---			
SLOT SIZE: ---				FILTER LENGTH/TYPE: ---		STICK UP/DOWN: ---			
SAMPLE COLLECTION DATA					DESCRIPTION				DEPTH
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (ft.)					
0					Asphalt (Begin 1415 hour)				
2		0	25/9/11	6"	Brown, coarse sand and gravel fill with asphalt pieces (3" spoon)				
4		0	5/4/4/12	6"	Brown, fine sand and silt, little clay, trace gravel and asphalt pieces (3" spoon)				
6		0	1/3/6/4	6"	SAB (2" spoon)				5
8		0	1/3/1/3	6"	SAB (2" spoon)				
10		0	3/5/5/4	8"	8"-9.7" SAB (2" spoon)				
					9.7" - 10" Brown, fine to coarse sand and gravel (3" spoon)				10
12		0	5/5/5/5	8"	SAB (3" spoon)				
14		0	6/4/5/25	8"	SAB (3" spoon)				
					Boring terminated at 14' (End 1555 Hour)				15
									20
									25
									30

PROPORTIONS USED: TRACE = 0-10%, LITTLE = 10-20%, SOME 20-35%, AND = 35-50%

Appendix B-2:
Well Completion Record

DW1 WELL COMPLETION RECORD ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	6 1/4 in. & 6 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Centerra CT 350	GROUND ELEVATION:	831.83 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	10 ft.	PROTOP WIDTH/TYPE:	6 in. SU Lock Steel
WELL DEPTH:	61.5 ft.	GROUT LENGTH/TYPE:	43.5 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	831.93 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5 ft. / bentonite	TOC ELEVATION:	834.57 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	13 ft. / No. 2 Sand	STICK UP/DOWN:	2.74 ft.
		UPPER CASING:	None	WATER LEVEL:	19.89 ft.

DW3 WELL COMPLETION RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	14 1/4 in. & 6 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	GROUND ELEVATION:	829.42 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	20 ft.	PROTOP WIDTH/TYPE:	10 in. Flush Manhole
WELL DEPTH:	88.0 ft.	GROUT LENGTH/TYPE:	59.5 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	829.41 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5 ft. / bentonite	TOC ELEVATION:	829.04 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	23.5 ft. / No. 2 Sand	STICK UP/DOWN:	-0.38 ft.
		UPPER CASING:	40 ft. 8 in. PVC	WATER LEVEL:	19.1 ft.

DW4 WELL COMPLETION RECORD ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	14 1/4 in. & 6 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	GROUND ELEVATION:	829.05 ft.
INSPECTOR:	Joseph Hay	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	20 ft.	PROTOP WIDTH/TYPE:	10 in. Flush Manhole
WELL DEPTH:	85 ft.	GROUT LENGTH/TYPE:	57 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	829.10 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5 ft. / bentonite	TOC ELEVATION:	828.78 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	23 ft. / No. 2 Sand	STICK UP/DOWN:	-0.27 ft.
		UPPER CASING:	35 ft. 8 in. PVC	WATER LEVEL:	19.5 ft.

DW5 WELL COMPLETION RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	14 1/4 in. & 6 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	GROUND ELEVATION:	836.24 ft.
INSPECTOR:	Joseph Hay	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	10 ft.	PROTOP WIDTH/TYPE:	10 in. Flush Manhole
WELL DEPTH:	83 ft.	GROUT LENGTH/TYPE:	65 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	836.24 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5 ft. / bentonite	TOC ELEVATION:	835.97 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	13 ft. / No. 2 Sand	STICK UP/DOWN:	-0.27 ft.
		UPPER CASING:	35 ft. 8 in. PVC	WATER LEVEL:	25.3 ft.

DW6 WELL COMPLETION RECORD ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	14 1/4 in. & 6 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Centerra CT 350	GROUND ELEVATION:	828.95 ft.
INSPECTOR:	Joseph Hay	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	10 ft.	PROTOP WIDTH/TYPE:	10 in. Flush Manhole
WELL DEPTH:	66.5 ft.	GROUT LENGTH/TYPE:	48.5 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	828.97 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5 ft. / bentonite	TOC ELEVATION:	828.51 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	13 ft. / No. 2 Sand	STICK UP/DOWN:	-0.44 ft.
		UPPER CASING:	36 ft. 8 in. PVC	WATER LEVEL:	21 ft.

DW8 WELL COMPLETION RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	14 1/4 in. & 6 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	GROUND ELEVATION:	830.20 ft.
INSPECTOR:	Joseph Hsu	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	20 ft.	PROTOP. WIDTH/TYPE:	10 in. Flush Manhole
WELL DEPTH:	93 ft.	GROUT LENGTH/TYPE:	65 ft. / 10:90 Bent.Cemt. Mix	PAD ELEVATION:	830.20 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5.5 ft. / bentonite	TOC ELEVATION:	829.70 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	22.5 ft. / No. 2 Sand	STICK UP/DOWN:	-0.50 ft.
		UPPER CASING:	40 ft. 8 in. PVC	WATER LEVEL:	18.4 ft.

DW9 WELL COMPLETION RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	14 1/4 in. & 6 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	GROUND ELEVATION:	828.80 ft.
INSPECTOR:	Joseph Hay	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	20 ft.	PROTOP. WIDTH/TYPE:	6 in. SU Lock Steel
WELL DEPTH:	88 ft.	GROUT LENGTH/TYPE:	59.5 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	828.80 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5 ft. / Bentonite	TOC ELEVATION:	831.31 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	23 ft. / No. 2 Sand	STICK UP/DOWN:	2.51 ft.
		UPPER CASING:	38 ft. 8 in. PVC	WATER LEVEL:	14.9 ft.

SW4 WELL COMPLETION RECORD ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	8 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	GROUND ELEVATION:	829.05 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	2 in PVC	SCREEN LENGTH:	15 ft	PROTOP WIDTH/TYPE:	8 in. Flush Manhole
WELL DEPTH:	29 ft.	GROUT LENGTH/TYPE:	9.5 ft. / 10:90 Bent.Ceml. Mix	PAD ELEVATION:	829.28 ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	2 ft. / bentonite	TOC ELEVATION:	828.85 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	17.5 ft./No. 2 Sand	STICK UP/DOWN:	-0.43 ft.

SW5 WELL COMPLETION RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	8 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Centerra CT 350	GROUND ELEVATION:	836.24 ft.
INSPECTOR:	Joseph Hay	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	2 in. PVC	SCREEN LENGTH:	10 ft	PROTOP WIDTH/TYPE:	8 in. Flush Manhole
WELL DEPTH:	30.5 ft.	GROUT LENGTH/TYPE:	14.5 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	836.32 ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	3 ft. / bentonite	TOC ELEVATION:	835.84 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	13 ft. / No. 2 Sand	STICK UP/DOWN:	-0.40 ft.

SW6 WELL COMPLETION RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	8 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	GROUND ELEVATION:	828.95 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	2 in PVC	SCREEN LENGTH:	10 ft	PROTOP WIDTH/TYPE:	8 in. Flush Manhole
WELL DEPTH:	29 ft.	GROUT LENGTH/TYPE:	13 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	828.99 ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	3 ft. / bentonite	TOC ELEVATION:	828.49 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	13 ft./No. 2 Sand	STICK UP/DOWN:	-0.48 ft.

The diagram illustrates a vertical well assembly. At the top, a horizontal line indicates the 'GROUND SURFACE ELEVATION 828.88 FT.'. Above this, a label points to the 'TOP OF CASING ELEVATION 831.89 FT.'. The well structure consists of several layers: a '4 IN. LOCKING PROTECTIVE STEEL CASING' at the very top, followed by a 'CONCRETE PAD'. Below the pad is an '8 1/4 IN. BOREHOLE' filled with '10:90 BENTONITE-CEMENT GROUT'. A '2 IN. PVC WELL CASING' is installed within the borehole. Two 'BENTONITE SEAL' rings are shown, with elevations of '6.5 FT.' and '9.5 FT.' marked on the left. Below the seals, a 'NO. 2 SAND FILTER PACK' is indicated, with a 'WATER LEVEL' line shown at '11.5 FT.'. The bottom of the well features a '0.010 CONTINUOUSLY WOUND PVC SCREEN' at a depth of '26.5 FT.'.

SW8 WELL COMPLETION RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	8 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	GROUND ELEVATION:	830.20 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	2 in PVC	SCREEN LENGTH:	10 ft	PROTOP WIDTH/TYPE:	8 in. Flush Manhole
WELL DEPTH:	23 ft.	GROUT LENGTH/TYPE:	7.5 ft. / 10:90 Bent. Cemt. Mix	PAD ELEVATION:	830.28 ft.
SCREEN:	2 in. Std. Slot PVC	SEAL LENGTH/TYPE:	3 ft. / bentonite	TOC ELEVATION:	829.85 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	12.5 ft. / No. 2 Sand	STICK UP/DOWN:	-0.35 ft.

SW9 WELL COMPLETION RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	8 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Cantera CT 350	GROUND ELEVATION:	828.80 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	2 in PVC	SCREEN LENGTH:	15 ft	PROTOP WIDTH/TYPER:	4 in. SU Lock Steel
WELL DEPTH:	25 ft.	GROUT LENGTH/TYPER:	6 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	828.80 ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPER:	2 ft. / bentonite	TOC ELEVATION:	831.38 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPER:	17 ft./No. 2 Sand	STICK UP/DOWN:	2.58 ft.

TOP OF CASING ELEVATION 831.38 FT.

GROUND SURFACE ELEVATION 828.80 FT.

IW9 WELL COMPLETION RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DRILLING BIT:	8 1/4 in.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	GROUND ELEVATION:	828.62 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	SAMPLING METHOD:	24" Split Spoon
WELL TYPE:	2 in PVC	SCREEN LENGTH:	5 ft	PROT. WIDTH/TYPE:	4 in. SU Lock Steel
WELL DEPTH:	51 ft.	GROUT LENGTH/TYPE:	38 ft. / 10:90 Bent:Cemt. Mix	PAD ELEVATION:	828.63 ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5 ft. / bentonite	TOC ELEVATION:	831.52 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	8 ft. / No. 2 Sand	STICK UP/DOWN:	2.90 ft.

Appendix C:
Raw Field Data

Appendix C-1:
Well Development Records

DW1 WELL DEVELOPMENT RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DEPTH TO WATER:	20.68 ft.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	HEIGHT OF WATER:	41.34 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	27 gal.
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	10 ft.	PROTOP WIDTH/TYPE:	6 in. SU Lock Steel
WELL DEPTH:	61.5 ft.	GROUT LENGTH/TYPE:	43.5 ft. / 10:30 Bent. Cemt. Mix	GROUND ELEVATION:	831.83 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5 ft. / bentonite	PAD ELEVATION:	831.93 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	13 ft. / No. 2 Sand	TOC ELEVATION:	834.57 ft.
				STICK UP/DOWN:	2.74 ft.

DATE	12/12/91								
TIME	0745	0800	0805	0810	0815	0820	0825	0830	0835
RATE (GPM)	6								
DEPTH TO WATER (FT)	20.66	27.00	27.73	27.81	27.82	28.11	28.18	28.22	28.34
VOLUME (GAL)	---- ⁽¹⁾	40	50	70	100	130	150	175	225
TEMPERATURE (°C)	----	11.0	11.5	11.5	11.6	11.4	11.4	11.4	11.2
pH	----	6.87	8.33	7.61	7.48	7.26	7.26	7.24	[7.23] ⁽²⁾
CONDUCTIVITY (mS)	----	----	----	----	----	----	----	----	14.16
TURBIDITY (NTUs)	----	----	----	----	----	----	----	85.1	56.4

DATE			END	REC					
TIME	0840	0845	0850	0855					
RATE (GPM)									
DEPTH TO WATER (FT)	28.38	28.42	28.43	20.68					
VOLUME (GAL)	250	275	300	----					
TEMPERATURE (°C)	11.5	[11.5]	----	----					
pH	----	----	----	----					
CONDUCTIVITY (mS)	14.01	[14.03]	----	----					
TURBIDITY (NTUs)	----	[36.2]	----	----					

(1) ---- means no reading

(2) [Number] means parameter has stabilized or is acceptable

DW3 WELL DEVELOPMENT RECORD

ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DEPTH TO WATER:	14.81 ft.
LOCATION:	Johnson Cty, NY	RIG TYPE:	Carrera CT 350	HEIGHT OF WATER:	51.69 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	34 gal.
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	20 ft.	PROTOP WIDTH/TYPE:	10 in. SU Lock Steel
WELL DEPTH:	88.0 ft.	GROUT LENGTH/TYPE:	59.5 ft. / 10:90 Bent.Cemt. Mix	GROUND ELEVATION:	829.42 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5 ft. / bentonite	PAD ELEVATION:	829.41 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	23.5 ft. / No. 2 Sand	TOC ELEVATION:	829.04 ft.
				STICK UP/DOWN:	-0.38 ft.

DATE	START 12/11/91								
TIME	1112	1117	1127						
RATE (GPM)	7.89								
DEPTH TO WATER (FT)	15.29	15.92	16.04	16.04	16.06	15.41	---	15.95	16.00
VOLUME (gal)	---	---	---	---	---	175	---	---	---
TEMPERATURE (°C)	12.7	---	---	---	---	13.3	---	---	---
pH	6.08	---	---	---	---	6.38	---	---	---
CONDUCTIVITY (mS)	---	---	---	---	---	10.14	---	---	---
TURBIDITY (NTUs)	---	---	---	---	66.5	---	---	---	---

DATE			END	REC					
TIME	1157	1202	1207	1212					
RATE (GPM)									
DEPTH TO WATER (FT)	16.02	16.00	16.05	15.35					
VOLUME (GAL)	300	350	400	---					
TEMPERATURE (°C)	13.3	13.3	[13.3]	---					
pH	7.01	7.05	[7.02]	---					
CONDUCTIVITY (mS)	10.23	10.32	[10.24]	---					
TURBIDITY (NTUs)	[3.65]								

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

DW4 WELL DEVELOPMENT RECORD					ARGONNE NATIONAL LABORATORY				
PROJECT NO:	91230		DRILLER:	MARCOR		DEPTH TO WATER:	15.34 ft.		
LOCATION:	Johnson City, NY		RIG TYPE:	Canterra CT 350		HEIGHT OF WATER:	76.67 ft.		
INSPECTOR:	Joseph Hau		METHOD:	HSA & Driven Steel Casing		VOLUME IN WELL:	50 gal.		
WELL TYPE:	4 in. PVC		SCREEN LENGTH:	20 ft.		PROTOP WIDTH/TYPE:	10 in. SU Lock Steel		
WELL DEPTH:	85 ft.		GROUT LENGTH/TYPE:	57 ft. / 10:90 Bent: Cemt. Mix		GROUND ELEVATION:	829.05 ft.		
SCREEN:	4 in. Con. Wnd PVC		SEAL LENGTH/TYPE:	5 ft. / bentonite		PAD ELEVATION:	829.10 ft.		
SLOT SIZE:	0.010 in.		FILTER LENGTH/TYPE:	23 ft. / No. 2 Sand		TOC ELEVATION:	828.78 ft.		
						STICK UP/DOWN:	2.74 ft.		
DATE	12/12/91								
TIME	0950	0955	1000	1005	1010	1015	1020	1025	1030
RATE (GPM)	5	5	5	5	6	6	6	6	6
DEPTH TO WATER (FT)	15.34	23.96	27.14	27.62	28.79	29.39	30.43	30.74	30.60
VOLUME (gal)	0	15	40	75	90	120	150	175	200
TEMPERATURE (°C)	12.3	12.4	12.9	12.8	12.5	12.5	12.8	13.1	12.7
pH	---	7.22	7.38	7.36	7.35	7.33	[7.35]	---	---
CONDUCTIVITY (mS)	---	---	---	---	---	---	---	9.27	9.71
TURBIDITY (NTUs)	---	---	---	---	---	---	---	---	---
DATE								END	REC
TIME	1040	1045	1050	1055	1100	1105	1110	1115	1120
RATE (GPM)									
DEPTH TO WATER (FT)	31.04	31.58	31.72	31.71	31.93	32.03	31.99	32.04	16.07
VOLUME (GAL)	265	280	315	325	360	400	420	440	450
TEMPERATURE (°C)	[13.0]	13.0	13.0	13.0	13.0	13.1	13.0	13.0	13.0
pH	---	---	---	---	---	---	---	---	---
CONDUCTIVITY (mS)	9.61	9.58	9.68	9.60	9.33	9.05	8.67	8.61	[8.63]
TURBIDITY (NTUs)	---	---	---	141	86	109	68	[44]	---
(1) --- means no reading (2) [Number] means parameter has stabilized or is acceptable									

DW5 WELL DEVELOPMENT RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DEPTH TO WATER:	22.33 ft.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	HEIGHT OF WATER:	60.97 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	40 gal.
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	10 ft.	PROTOP WIDTH/TYPER:	10 in. SU Lock Steel
WELL DEPTH:	63 ft.	GROUT LENGTH/TYPER:	65 ft. / 10:90 Bent Cement Mix	GROUND ELEVATION:	836.24 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPER:	5 ft. / bentonite	PAD ELEVATION:	836.24 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPER:	13 ft. / No. 2 Sand	TOC ELEVATION:	835.79 ft.
				STICK UP/DOWN:	-0.27 ft.

DATE	12/11/91								
TIME	1610	1619	1625	1630	1635	1640	1645	1650	1655
RATE (GPM)	7.14								
DEPTH TO WATER (FT)	22.33	24.05	24.12	24.17	24.23	24.30	24.38	24.46	24.51
VOLUME (gal)	0	50	100	150	175	210	250	275	325
TEMPERATURE (°C)	12.8	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3
pH	8.40	7.50	7.47	7.36	7.37	[7.35]	---	---	---
CONDUCTIVITY (mS)	---	---	---	---	---	---	8.47	8.32	8.46
TURBIDITY (NTUs)	---	---	---	---	---	---	---	---	---

DATE							END	REC	
TIME	1700	1705	1710	1714	1720	1725	1730	1735	
RATE (GPM)									
DEPTH TO WATER (FT)	24.56	24.55	24.60	24.60	24.65	24.68	24.69	22.90	
VOLUME (GAL)	375	425	475	500	525	575	600	---	
TEMPERATURE (°C)	12.3	12.3	12.3	[12.3]	---	---	---	---	
pH	---	---	---	---	---	---	---	---	
CONDUCTIVITY (mS)	8.53	[8.58]	---	---	---	---	---	---	
TURBIDITY (NTUs)	141	---	---	92.5	71.2	---	[48.3]	---	

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

DW6 WELL DEVELOPMENT RECORD					ARGONNE NATIONAL LABORATORY					
PROJECT NO:	91230		DRILLER:	MARCOR		DEPTH TO WATER:	14.81 ft.			
LOCATION:	Johnson City, NY		RIG TYPE:	Carrera CT 350		HEIGHT OF WATER:	51.69 ft.			
INSPECTOR:	Joseph Hau		METHOD:	HSA & Driven Steel Casing		VOLUME IN WELL:	34 gal.			
WELL TYPE:	4 in. PVC		SCREEN LENGTH:	10 ft.		PROTOP WIDTH/TYPER:	10 in. SU Lock Steel			
WELL DEPTH:	66.5 ft.		GROUT LENGTH/TYPER:	48.5 ft. / 10:90 Bent.Cemt. Mix		GROUND ELEVATION:	828.95 ft.			
SCREEN:	4 in. Con. Wnd PVC		SEAL LENGTH/TYPER:	5 ft. / bentonite		PAD ELEVATION:	828.97 ft.			
SLOT SIZE:	0.010 in.		FILTER LENGTH/TYPER:	13 ft. / No. 2 Sand		TOC ELEVATION:	828.51 ft.			
STICK UP/DOWN:							-0.44 ft.			
DATE	12/11/91			END	12/12/91				END	12/13/91
TIME	1355	1400	1406	1424	1510	1525	1545	1556	1611	0705
RATE (GPM)	7.43				1.5					1.4
DEPTH TO WATER (FT)	14.81	TO PUMP	55.0	38.0	14.92	39.37	53.0	TO PUMP	41.3	14.8
VOLUME (gal)	---	34	---	---	0	25	35	50	---	---
TEMPERATURE (°C)	10.2	---	---	---	12.3	12.6	12.6	12.6	---	---
pH	---	---	---	---	11.65	11.54	11.49	11.56	---	---
CONDUCTIVITY (mS)	---	---	---	---	---	---	---	---	---	---
TURBIDITY (NTUs)	---	---	---	---	---	---	---	---	---	---
DATE									END	RECV
TIME	0710	0715	0720	0725	0730	0735	0740	0745	0750	0755
RATE (GPM)	1.4									
DEPTH TO WATER (FT)	26.6	35.14	42.67	48.71	54.50	TO PUMP	TO PUMP	TO PUMP	TO PUMP	45.52
VOLUME (GAL)	---	15	20	25	30	35	40	45	50	---
TEMPERATURE (°C)	---	14.9	15.5	15.6	15.6	15.6	15.2	15.2	[15.2]	---
pH	---	11.0	11.22	11.29	11.14	[11.18]	---	---	---	---
CONDUCTIVITY (mS)	---	---	---	---	---	6.03	5.83	5.65	[5.58]	---
TURBIDITY (NTUs)	---	---	---	---	---	---	---	---	[>200]	---
(1) --- means no reading (2) [Number] means parameter has stabilized or is acceptable										

DW8 WELL DEVELOPMENT RECORD

ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DEPTH TO WATER:	15.6 ft.
LOCATION:	Johnson Cky, NY	RIG TYPE:	Canterra CT 350	HEIGHT OF WATER:	76.9 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	50 gal.
WELL TYPE:	4 in. PVC	SCREEN LENGTH:	20 ft.	PROTOW WIDTH/TYPE:	10 in. SU Lock Steel
WELL DEPTH:	93 ft.	GROUT LENGTH/TYPE:	65 ft. / 10:30 BentCemt. Mix	GROUND ELEVATION:	830.20 ft.
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	5.5 ft. / bentonite	PAD ELEVATION:	830.20 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	22.5 ft. / No. 2 Sand	TOC ELEVATION:	829.70 ft.
				STICK UP/DOWN:	-0.50 ft.

DATE	12/13/91								
TIME	0844	0850	0855	0900	0905	0910	0915	0920	0925
RATE (GPM)	6								
DEPTH TO WATER (FT)	15.6	25.46	25.60	25.80	25.87	24.81	25.89	26.64	26.77
VOLUME (gal)	0	40	60	75	120	150	175	205	225
TEMPERATURE (°C)	11.2	[11.3]	11.3	11.3	11.3	11.3	11.3	11.3	11.3
pH	8.33	7.50	7.38	7.23	7.18	7.72	7.51	7.22	7.14
CONDUCTIVITY (mS)	----	----	----	----	----	----	----	----	----
TURBIDITY (NTUs)	----	----	----	----	----	----	----	>200	109.4

DATE				END	RECV				
TIME	0930	0935	0940	0945	0945				
RATE (GPM)	6								
DEPTH TO WATER (FT)	26.77	26.84	27.03	27.14	15.67				
VOLUME (GAL)	250	280	320	350	----				
TEMPERATURE (°C)	11.3	11.3	11.3	11.3	----				
pH	[7.13]	----	----	----	----				
CONDUCTIVITY (mS)	15.94	15.74	15.83	15.82	----				
TURBIDITY (NTUs)	----	55.6	----	42.1	----				

(1) ---- means no reading

(2) [Number] means parameter has stabilized or is acceptable

DW9 WELL DEVELOPMENT RECORD	ARGONNE NATIONAL LABORATORY
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PROJECT NO: 91230	DRILLER: MARCOR	DEPTH TO WATER: 17.28 ft.	
LOCATION: Johnson City, NY	RIG TYPE: Canterra CT 350	HEIGHT OF WATER: 70.22 ft.	
INSPECTOR: Joseph Hau	METHOD: HSA & Driven Steel Casing	VOLUME IN WELL: 46 gal.	
WELL TYPE: 4 in. PVC	SCREEN LENGTH: 20 ft.	PROTOP WIDTH/TYPER: 6 in. SU Lock Steel	
WELL DEPTH: 88 ft.	GROUT LENGTH/TYPER: 59.5 ft. / 10:90 Bent:Gemt. Mix	GROUND ELEVATION: 828.00 ft.	
SCREEN: 4 in. Con. Wnd PVC	SEAL LENGTH/TYPER: 5 ft. / bentonite	PAD ELEVATION: 828.00 ft.	
SLOT SIZE: 0.010 in.	FILTER LENGTH/TYPER: 23 ft. / No. 2 Sand	TOC ELEVATION: 831.31 ft.	
		STICK UP/DOWN: 2.51 ft.	

DATE	12/12/91								
TIME	1325	1330	1335	1340	1345	1350	1355	1400	1405
RATE (GPM)	7.5								
DEPTH TO WATER (FT)	17.28	18.48	18.42	18.43	18.43	18.43	18.43	18.39	18.43
VOLUME (gal)	25	50	75	115	150	185	220	285	320
TEMPERATURE (°C)	13.0	13.1	13.1	13.1	13.1	13.2	13.2	13.2	---
pH	7.85	6.95	6.94	6.93	[6.95]	---	---	---	---
CONDUCTIVITY (mS)	---	---	---	---	11.87	12.09	12.05	[12.09]	---
TURBIDITY (NTUs)	---	---	---	>200	69.4	[40.7]	---	---	---

DATE	END	RECV							
TIME	1410	1415							
RATE (GPM)	7.5								
DEPTH TO WATER (FT)	18.51	17.36							
VOLUME (GAL)	350	---							
TEMPERATURE (°C)	---	---							
pH	---	---							
CONDUCTIVITY (mS)	---	---							
TURBIDITY (NTUs)	---	---							

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

SW4 WELL DEVELOPMENT RECORD	ARGONNE NATIONAL LABORATORY
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PROJECT NO: 91230	DRILLER: MARCOR	DEPTH TO WATER: 15.31 ft.	
LOCATION: Johnson City, NY	RIG TYPE: Cantera CT 350	HEIGHT OF WATER: 13.91 ft.	
INSPECTOR: Joseph Hau	METHOD: HSA & Driven Steel Casing	VOLUME IN WELL: 2.26 gal.	
WELL TYPE: 2 in. PVC	SCREEN LENGTH: 15 ft.	PROTOP WIDTH/TYPE: 8 in. SU Lock Steel	
WELL DEPTH: 29 ft.	GROUT LENGTH/TYPE: 9.5 ft. / 10:90 Bent.Cemt. Mix	GROUND ELEVATION: 829.05 ft.	
SCREEN: 4 in. Con. Wnd PVC	SEAL LENGTH/TYPE: 2 ft. / bentonite	PAD ELEVATION: 829.28 ft.	
SLOT SIZE: 0.010 in.	FILTER LENGTH/TYPE: 17.5 ft. / No. 2 Sand	TGC ELEVATION: 828.85 ft.	
		STICK UP/DOWN: -0.43 ft.	

DATE	12/12/91								
TIME	1134	1140	1145	1150	1155	1200	1205	1210	1215
RATE (GPM)	0.25								
DEPTH TO WATER (FT)	15.31	TO PUMP	TO PUMP	23.35	23.95	23.37	TO PUMP	TO PUMP	TO PUMP
VOLUME (gal)	0	3	4	6	8	9	12	15	17
TEMPERATURE (°C)	---	19.6	18.5	17.8	17.7	17.3	17.3	17.3	17.3
pH	---	---	---	6.89	7.04	[7.25]	---	---	---
CONDUCTIVITY (mS)	---	---	---	---	9.58	---	---	---	---
TURBIDITY (NTUs)									

DATE		END	RECV						
TIME	1220	1225	1230						
RATE (GPM)	0.25								
DEPTH TO WATER (FT)	TO PUMP	TO PUMP	19.78						
VOLUME (GAL)	19	20	---						
TEMPERATURE (°C)	17.3	[17.3]	---						
pH	---	7.28	---						
CONDUCTIVITY (mS)	---	[9.63]	---						
TURBIDITY (NTUs)		>200 ⁽³⁾	---						

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

(3) Well was slow yielding - unable to remove fines to < 200 NTUs

Well was developed to less than 50 NTUs during purging prior to sampling

SW5 WELL DEVELOPMENT RECORD				ARGONNE NATIONAL LABORATORY			
PROJECT NO:	91230	DRILLER:	MARGOR	DEPTH TO WATER:	25.22 ft.		
LOCATION:	Johnson Cky, NY	RIG TYPE:	Canterra CT 350	HEIGHT OF WATER:	4.78 ft.		
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	0.78 gal.		
WELL TYPE:	2 in. PVC	SCREEN LENGTH:	10 ft.	PROTOP WIDTH/TYPER:	8 in. SU Lock Steel		
WELL DEPTH:	30.5 ft.	GROUT LENGTH/TYPER:	14.5 ft. / 10:90 Bent.Cemt. Mix	GROUND ELEVATION:	836.24 ft.		
SCREEN:	4 in. Cor. Wnd PVC	SEAL LENGTH/TYPER:	3 ft. / bentonite	PAD ELEVATION:	836.32 ft.		
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPER:	13 ft. / No. 2 Sand	TOC ELEVATION:	835.84 ft.		
				STICK UP/DOWN:	-0.40 ft.		

DATE	BAILED 11/24/91		END	PUMPED (3) 12/11/91				
TIME	1100	1130	1200	1545				
RATE (GPM)								
DEPTH TO WATER (FT)	25.22	25.28	26.35	22.15				
VOLUME (gal)	0	3	5	1.36				
TEMPERATURE (°C)	11.4	11.0	[11.0] ⁽²⁾	---				
pH	7.85	7.41	[7.48]	---				
CONDUCTIVITY (mS)	12.23	11.50	[11.14]	---				
TURBIDITY (NTUs)	---	---	>200 ⁽³⁾	---				

DATE								
TIME								
RATE (GPM)								
DEPTH TO WATER (FT)								
VOLUME (GAL)								
TEMPERATURE (°C)								
pH								
CONDUCTIVITY (mS)								
TURBIDITY (NTUs)								

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

(3) Well was slow yielding - developed by bailing - attempted pumping but pumped dry immediately - unable to remove fines to < 200 NTUs - Well was developed to less than 50 NTUs during purging prior to sampling

SW6 WELL DEVELOPMENT RECORD

ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DEPTH TO WATER:	20.6 ft.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	HEIGHT OF WATER:	8.4 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	1.37 gal.
WELL TYPE:	2 in. PVC	SCREEN LENGTH:	10 ft.	PROTOP WIDTH/TYPE:	8 in. SU Lock Steel
WELL DEPTH:	29 ft.	GROUT LENGTH/TYPE:	13 ft. / 10:90 Bent. Cemt. Mix	GROUND ELEVATION:	828.95 ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	3 ft. / bentonite	PAD ELEVATION:	828.99 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	13 ft. / No. 2 Sand	TOC ELEVATION:	828.49 ft.
				STICK UP/DOWN:	-0.46 ft.

DATE	BAILED 11/23/91		END						
TIME	1000	1020	1045						
RATE (GPM)									
DEPTH TO WATER (FT)	20.6	20.68	20.65						
VOLUME (gal)	0	5.0	9.5						
TEMPERATURE (°C)	14.6	14.3	[14.0] ⁽²⁾						
pH	6.94	7.44	[7.67]						
CONDUCTIVITY (mS)	9.48	9.12	[8.66]						
TURBIDITY (NTUs)	---	---	>200 ⁽³⁾						

DATE									
TIME									
RATE (GPM)									
DEPTH TO WATER (FT)									
VOLUME (GAL)									
TEMPERATURE (°C)									
pH									
CONDUCTIVITY (mS)									
TURBIDITY (NTUs)									

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

(3) Well slow yielding - could not install pump due to joint obstruction - unable to remove fines below 200 NTUs - Well initially developed by bailing - Well was developed to less than 50 NTUs during purging prior to sampling.

SW7 WELL DEVELOPMENT RECORD

ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARGOR	DEPTH TO WATER:	15.68 ft.
LOCATION:	Johnson City, NY	RIG TYPE:	Cantera CT 350	HEIGHT OF WATER:	10.82 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	1.8 gal.
WELL TYPE:	2 in. PVC	SCREEN LENGTH:	15 ft.	PROTOP WIDTH/TYPE:	4 in. SU Lock Steel
WELL DEPTH:	26.5 ft.	GROUT LENGTH/TYPE:	6.5 ft. / 10:90 Bent.Cemt. Mix	GROUND ELEVATION:	828.88 ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	3 ft. / bentonite	PAD ELEVATION:	829.12 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	17 ft. / No. 2 Sand	TOC ELEVATION:	831.89 ft.
				STICK UP/DOWN:	3.01 ft.

DATE	BAILING 12/13/91			END					
TIME	1545	1553	1605	1625					
RATE (GPM)									
DEPTH TO WATER (FT)	15.68	15.68	15.70	15.70					
VOLUME (gal)	---	(1) 1	5	10					
TEMPERATURE (°C)	---	13.9	13.9	[13.8] ⁽²⁾					
pH	---	6.37	6.51	[6.94]					
CONDUCTIVITY (mS)	---	12.11	11.80	[11.76]					
TURBIDITY (NTUs)	---	---	---	>200 ⁽³⁾					

DATE									
TIME									
RATE (GPM)									
DEPTH TO WATER (FT)									
VOLUME (GAL)									
TEMPERATURE (°C)									
pH									
CONDUCTIVITY (mS)									
TURBIDITY (NTUs)									

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

(3) Unable to install pump at time of well development - well was developed by bailing - unable to remove fines to <200 NTUs - well was developed to less than 50 NTUs during purging prior to sampling

SW8 WELL DEVELOPMENT RECORD

ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DEPTH TO WATER:	12.52 ft.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	HEIGHT OF WATER:	10.48 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	1.71 gal.
WELL TYPE:	2 in. PVC	SCREEN LENGTH:	10 ft.	PROTOP WIDTH/TYPE:	8 in. SU Lock Steel
WELL DEPTH:	23 ft.	GROUT LENGTH/TYPE:	7.5 ft. / 10:90 Bent.Cemt. Mix	GROUND ELEVATION:	830.20 ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	3 ft. / bentonite	PAD ELEVATION:	830.28 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	12.5 ft. / No. 2 Sand	TOC ELEVATION:	829.85 ft.
				STICK UP/DOWN:	-0.35 ft.

DATE	BAILED 11/23/91		END						
TIME	1215	1245	1315						
RATE (GPM)									
DEPTH TO WATER (FT)	12.52	12.6	12.6						
VOLUME (gal)	0	5	10						
TEMPERATURE (°C)	16.5	16.2	[16.2] ⁽²⁾						
pH	6.38	6.80	[6.95]						
CONDUCTIVITY (mS)	10.20	10.48	[10.71]						
TURBIDITY (NTUs)	---- ⁽¹⁾	----	>200 ⁽³⁾						

DATE									
TIME									
RATE (GPM)									
DEPTH TO WATER (FT)									
VOLUME (GAL)									
TEMPERATURE (°C)									
pH									
CONDUCTIVITY (mS)									
TURBIDITY (NTUs)									

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

(3) Unable to install pump at time of well development - well was developed by bailing - unable to remove fines to <200 NTUs - well was developed to less than 50 NTUs during purging prior to sampling

SW9 WELL DEVELOPMENT RECORD

ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARCOR	DEPTH TO WATER:	15.2 ft.
LOCATION:	Johnson City, NY	RIG TYPE:	Cantera CT 350	HEIGHT OF WATER:	11.3 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	1.8 gal.
WELL TYPE:	2 in. PVC	SCREEN LENGTH:	15 ft.	PROF. WIDTH/TYPE:	4 in. SU Lock Steel
WELL DEPTH:	25 ft.	GROUT LENGTH/TYPE:	6 ft. / 10:90 Bent. Cemt. Mix	GROUND ELEVATION:	828.80 ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPE:	2 ft. / bentonite	PAD ELEVATION:	828.80 ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	17 ft. / No. 2 Sand	TOC ELEVATION:	831.38 ft.
				STICK UP/DOWN:	2.58 ft.

DATE	BAILING 12/13/91			END					
TIME	1320	1334	1351	1400					
RATE (GPM)									
DEPTH TO WATER (FT)	15.2	15.2	15.25	15.25					
VOLUME (gal)	(1) ---	2	6	10					
TEMPERATURE (°C)	---	15.7	15.4	(2) [15.4]					
pH	---	6.32	7.33	[7.32]					
CONDUCTIVITY (mS)	---	10.39	11.50	[11.29]					
TURBIDITY (NTUs)	---	---	---	(3) >200					

DATE									
TIME									
RATE (GPM)									
DEPTH TO WATER (FT)									
VOLUME (GAL)									
TEMPERATURE (°C)									
pH									
CONDUCTIVITY (mS)									
TURBIDITY (NTUs)									

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

(3) Unable to install pump at time of well development - well was developed by bailing - unable to remove fines to <200 NTUs - well was developed to less than 50 NTUs during purging prior to sampling

IW9 WELL DEVELOPMENT RECORD | ARGONNE NATIONAL LABORATORY

PROJECT NO:	91230	DRILLER:	MARGOR	DEPTH TO WATER:	16.72 ft.
LOCATION:	Johnson City, NY	RIG TYPE:	Canterra CT 350	HEIGHT OF WATER:	34.28 ft.
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	5.58 gal.
WELL TYPE:	2 in. PVC	SCREEN LENGTH:	5 ft.	PROTOP WIDTH/TYPER	4 in. SU Lock Steel
WELL DEPTH:	51 ft.	GROUT LENGTH/TYPER	38 ft. / 10:90 Bent.Cemt. Mix	GROUND ELEVATION:	828.62ft.
SCREEN:	2 in. Con. Wnd PVC	SEAL LENGTH/TYPER	5 ft. / bentonite	PAD ELEVATION:	828.83ft.
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPER	8 ft. / No. 2 Sand	TOC ELEVATION:	831.52ft.
				STICK UP/DOWN:	2.90 ft.

DATE	12/13/91					END			
TIME	1405	1419	1440	1510	1520	1530			
RATE (GPM)									
DEPTH TO WATER (FT)	16.72	30.6	30.78	31.04	31.3	31.7			
VOLUME (gal)	0	5	10	12	14	17			
TEMPERATURE (°C)	--- ⁽¹⁾	14.6	14.3	13.1	13.0	[13.0] ⁽²⁾			
pH	---	6.67	6.41	6.44	6.42	[6.43]			
CONDUCTIVITY (mS)	---	11.76	5.28	5.50	5.41	[5.33]			
TURBIDITY (NTUs)	---	---	---	---	---	>200 ⁽³⁾			

DATE									
TIME									
RATE (GPM)									
DEPTH TO WATER (FT)									
VOLUME (GAL)									
TEMPERATURE (°C)									
pH									
CONDUCTIVITY (mS)									
TURBIDITY (NTUs)									

(1) --- means no reading

(2) [Number] means parameter has stabilized or is acceptable

(3) Unable to install pump at time of well development - well was developed by bailing - unable to remove fines to <200 NTUs

Appendix C-2:

Aquifer Slug Test Recovery Curves

Type: 2109-10

DW1SLUG

Recorder ID:7518

FT.H2O

Type: 2109-10

DW3SLUG

Recorder ID:7518

Type: 2109-10

DW4SLUG

Recorder ID:7518

Type: 2109-10

DW5SLUG

Recorder ID:7518

24.00

FT.H2O

22.00

20.00

18.00

16.00

01/11/92

01/11/92

01/11/92

05:34:09

TIME

05:36:39

05:39:09

Type: 2109-10

DW6SLUG PART 1

Recorder ID:7518

Type: 2109-10

DW6SLUG PART 2

Recorder ID:7518

Type: 2109-10

DW8SLUG

Recorder ID:7518

Type: 2109-10

DW9SLUG

Recorder ID:7518

Type: 2109-10

IW9SLUG

Recorder ID: 7515

13.00

FT.H2O

12.00

11.00

10.00

01/12/92

11:44:38

TIME

01/12/92

12:03:05

01/12/92

12:21:31

Type: 2109-10

SW3SLUG

Recorder ID: 7515

Type: 2109-10

SW4SLUG

Recorder ID:7515

12.00

FT.H2O

11.00

10.00

9.00

01/12/92

14:09:54

TIME

01/12/92

14:18:37

01/12/92

14:27:18

Type: 2100-10

SW5SLUG

Recorder ID:7515

Type: 2109-10

SW6SLUG

Recorder ID: 7515

Type: 2109-10

SW7SLUG

Recorder ID:7515

Type: 2109-10

SW8SLUG

Recorder ID:7515

Type: 2109-10

SW9SLUG

Recorder ID:7515

Appendix C-3:
Water Level Data

Type: 2101-65

ATMOSPHERIC PRESSURE

Recorder ID:7004

Type: 2101-65

ATMOSPHERIC PRESSURE

Recorder ID: 7004

Type: 2109-5

DW1 WATER LEVELS

Recorder ID:3460

Type: 2109-10

DW4 WATER LEVELS

Recorder ID:7519

FT.H2O

Type: 2109-10
17.70

DW5 WATER LEVELS

Recorder ID:3454

Type: 2109-10

DW8 WATER LEVELS

Recorder ID:7518

FT.H2O

Type: 2109-10
16.0

DW9 WATER LEVELS

Recorder ID:7248

FT.H2O

15.0

14.0

13.0

01/16/92

09:57:57

TIME

01/22/92

10:04:37

01/28/92

10:07:57

Type: 2109-5

SW1 WATER LEVELS

Recorder ID:3204

Type: 2109-10
7.30

SW4 WATER LEVELS

Recorder ID:7474

Type: 2109-10

SW5 WATER LEVELS

Recorder ID:5496

Type: 2109-10

SW8 WATER LEVELS

Recorder ID:7515

Type: 2109-10

SW9 WATER LEVELS

Recorder ID:7514

FT.H2O

Appendix C-4:
Geotechnical Analysis

JAN 16 '92 14:21

P. 1

MARCOR
OF NEW YORK, Inc.120 Elmgrove Park
Rochester, NY 14624
(716) 247-6955

FACSIMILE TRANSMITTAL COVER SHEET

PLEASE DELIVER THE FORTHCOMING PAGES TO:

NAME: Joe Han
FIRM/DEPARTMENT: Argonne @ G.E.
FAX MACHINE NUMBER: 607-770-5728
FROM: Mary
DATE: 1-16-91

Transmission includes 12 page(s)-not including this cover sheet.

If you do not receive all the pages indicated above, please call (716) 247-6955.

+++++

Comments and/or Special Instructions:

soil analytical results

For your information, we may receive transmissions on our FAX machine at (716) 247-6852.

BALTIMORE

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JACKSONVILLE, FL
904-363-2900

WASHINGTON, D.C.

301-953-9034

SAN FRANCISCO

415-475-0864

LOS ANGELES

818-401-0722

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215-524-3374

ROCHESTER

716-247-6955

SALISBURY, MD

410-777-1111

NATIONWIDE

1-800-647-0128

WEST COAST

JAN 16 '92 14:21

P.2

VAN DER HORST

GEOTECHNICAL ENGINEERING

CONSTRUCTION MONITORING

MATERIALS TESTING

December 31, 1991

Ms. Mary Angevine
Marcor of New York
120 Elmgrove Park
Rochester, New York 14624

Re: Laboratory Testing
Soil Samples
Site AFP#59
VDH-91-069

Dear Mary:

VAN DER HORST has completed testing on the 10 different samples for the referenced project. The samples included seven(7) sets of samples in glass jars and three(3) undisturbed shelly tube samples.

All of the jar samples were tested for gradation. All of the jar samples were determined to be non-plastic and therefore hydrometer analysis and atterberg limits were not performed on these samples. These samples are being held in case remolded permeability tests are required.

The three(3) shelly tube samples were each tested for permeability and gradation. A hydrometer analysis was included for 2 of the shelly tube samples because of the high percentage of silts. Atterberg limits testing was not performed on any of the shelly tube samples because they were non-plastic. It is noted that tube sample DW5-ST-1 was a Gray silt with occasional pinkish-brown clay partings. The clay partings were about 1/8 of an inch thick and there was an insufficient amount to perform atterberg limits.

The following TABLES summarize the results of the laboratory testing and the individual gradation tests results are attached to this letter report. Should you have any questions please contact our office.

Very Truly Yours,

Robert F. van der Horst, P.E.

JAN 16 '92 14:21

P.3

VAN DER HORST

Marcor of New York
Soils Testing
page 2

SUMMARY OF TESTING FROM SHELBY TUBE SAMPLES

SAMPLE I.D.	PERMEABILITY (K-cm/sec)	% GRAVEL	% SAND	% SILT	% CLAY
DW6-ST-1 (LAB 313)	2.3×10^{-4}	0.0	44.4	55.6	see note 1
QA-H 2-10-97 S/DW5-ST-1 (LAB 316)	1.6×10^{-5}	0.0	0.0	74.5	24.8
DW9-SP-1 (LAB 330)	8.1×10^{-4}	0.4	64.4	19.3	15.9

Notes: 1) This sample did not include a hydrometer analysis; the percentage of silt includes both the silt and clay size particles.

SUMMARY OF TESTS FROM JAR SAMPLES

SAMPLE I.D.	% GRAVEL	% SAND	% FINES
DW8-SA-1 (LAB 310)	0.1	24.9	75.0
DW8-SA-2 (LAB 311)	0.0	72.4	27.6
DW3-SA-1 (LAB 312)	65.9	33.9	0.2
DW5-SA-1 (LAB 314)	63.5	36.1	0.4
DW5-SA-2 (LAB 315)	38.2	53.4	8.4
DW9-SA-1 (LAB 328)	55.9	34.6	9.5
IW7-SA-1 (LAB 329)	63.7	30.4	5.9

JAN 16 '92 14:22

P. 4

GRAIN SIZE DISTRIBUTION TEST REPORT									
Test	%+75 _{ms}	% GRAVEL	% SAND		% SILT		% CLAY		
• 4	0.0	0.0	44.4		55.6				
LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		0.24	0.09						
MATERIAL DESCRIPTION						USCS	AASHTO		
• GRAY SANDY SILT						ML			
Project No.: V0H-91-069 Project: MARCOR OF NEW YORK • Location: QW6-ST-1 SHELBY TUBE SAMPLE Date: 12-30-91						Remarks: MARCOR SITE AFP#59 Figure No. 313			
VANDER HORST 100 Elm Grove Park Rochester, NY 14624									

Figure No. 310

JAN 16 '92 14:23

P.6

JAN 16 '92 14:23

P.7

GRAIN SIZE DISTRIBUTION TEST REPORT

Test	%+75 μ	% GRAVEL	% SAND	% SILT	% CLAY
1	0.0	0.1	24.9	75.0	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		0.11							

MATERIAL DESCRIPTION		USCS	AASHTO
● GRAY CLAYEY SILT, some Sand		ML	
Project No.: VOM-91-069 Project: MARCOR OF NEW YORK ● Location: QWB-SA-1 Date: 12-23-91		Remarks: Figure No. 310	
VANDER HORST 140 Elm Grove Park Rochester, NY 14624			

MATERIAL DESCRIPTION	USCS	AASHTO
● GRAY BROWN GRAVEL, some Sand, trace silt	GW	
Project No.: VDH-91-069 Project: MARCOR OF NEW YORK ● Location: DW3-SA-1, 10'-18'	Remarks:	
Date: 12-23-81		
VAN DER HORST 160 Elm Grove Park Hicksville, NY 11824	Figure No. 312	

JAN 16 '92 14:25

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GRAIN SIZE DISTRIBUTION TEST REPORT

Figure No. 315

JAN 16 '92 14:26

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GRAIN SIZE DISTRIBUTION TEST REPORT

Test	%+75 μ	% GRAVEL	% SAND	% SILT	% CLAY
• 6	0.0	55.9	34.6	9.5	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
•		24.55	10.59	6.75	0.922	0.2914	0.0831	0.96	127.5

MATERIAL DESCRIPTION	USCS	AASHTO
• BROWN SANDY GRAVEL, TRACE SILT	GP-GM	

Project No.: VOH-91-069
 Project: MARCOR OF NEW YORK
 • Location: DW9-SA-1

Date: 12-30-91

VANDERHORST100 Elm Grove Park
Haghesia, NY 14824

Remarks:
 MARCOR SITE AFP#59
 JOHNSON CITY, NEW YORK

Figure No. 328

JAN 16 '92 14:27

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Appendix C-5:

IRPIMS Materials

C-5-A	IRPIMS BCHWCI	well completion information
C-5-B	IRPIMS BCHGWD	groundwater information
C-5-C	IRPIMS BCHLTD	lithologic description
C-5-D	IRPIMS BCHGWD	hydrologic parameters
C-5-E	IRPIMS BCHGWD	borehole widths

Appendix C-5-A:
IRPIMS BCHWCI
Well Completion Information

D-5-KL

ANL A USAF															
FORMATION (BCHWCI)															
AFIID	WCM- CODE	GZC- CODE	SAQ- CODE	SE- DEPTH	FPL	MP- ELEV	TOT- DEPTH	CAS- DIAM	CMA- CODE	SE- DEPTH	SCR- LENGTH	SOLIA	SCR- DIAM	PCTOPEN	REMARKS
AFP#5	GS	W	BTNY	48.5	13.0	834.57	61.5	4.0	PVC	51.5	10.0	0.01	4.0	~ 8.0%	NO WELL FOOTER
AFP#59 DW3 08-Nov-91 USAF MNW	GS	C	BTNY	64.5	23.5	829.04	88.0	4.0	PVC	67.5	20.0	0.01	4.0	~ 8.0%	1/2' FOOTER
AFP#59 DW4 25-Nov-91 USAF MNW	GS	C	BTNY	62.0	23.0	828.78	85.0	4.0	PVC	65.0	20.0	0.01	4.0	~ 8.0%	NO WELL FOOTER
AFP#59 DW5 19-Nov-91 USAF MNW	GS	C	BTNY	70.0	13.0	835.97	83.0	4.0	PVC	73.0	10.0	0.01	4.0	~ 8.0%	NO WELL FOOTER
AFP#59 DW6 16-Nov-91 USAF MNW	GS	A	BTNY	53.5	13.0	828.51	66.5	4.0	PVC	56.5	10.0	0.01	4.0	~ 8.0%	NO WELL FOOTER
AFP#59 DW8 03-Nov-91 USAF MNW	GS	C	BTNY	70.5	22.5	829.70	93.0	4.0	PVC	72.5	20.0	0.01	4.0	~ 3.0%	1/2' FOOTER
AFP#59 DW9 09-Dec-91 USAF MNW	GS	C	BTNY	64.5	23.5	831.31	88.0	4.0	PVC	67.5	20.0	0.01	4.0	~ 8.0%	1/2' FOOTER
AFP#59 SW4 02-Dec-91 USAF MNW	GS	W	BTNY	11.5	17.5	828.85	29.0	2.0	PVC	13.5	15.0	0.01	2.0	~ 8.0%	1/2' FOOTER
AFP#59 SW5 20-Nov-91 USAF MNW	GS	W	BTNY	17.5	13.0	835.84	30.5	2.0	PVC	20.5	10.0	0.01	2.0	~ 8.0%	NO WELL FOOTER
AFP#59 SW6 17-Nov-91 USAF MNW	GS	W	BTNY	16.0	13.0	828.49	29.0	2.0	PVC	19.0	10.0	0.01	2.0	~ 8.0%	NO WELL FOOTER
AFP#59 SW7 06-Dec-91 USAF MNW	GS	W	BTNY	9.5	17.0	831.89	26.5	2.0	PVC	11.5	15.0	0.01	2.0	~ 8.0%	NO WELL FOOTER
AFP#59 SW8 04-Nov-91 USAF MNW	GS	W	BTNY	10.5	12.5	829.85	23.0	2.0	PVC	12.5	10.0	0.01	2.0	~ 3.0%	1/2' FOOTER
AFP#59 SW9 10-Dec-91 USAF MNW	GS	W	BTNY	8.0	17.0	831.38	25.0	2.0	PVC	10.0	15.0	0.01	2.0	~ 8.0%	NO WELL FOOTER
AFP#59 IW9 10-Dec-91 USAF OBS	GS	L	BTNY	43.0	8.0	831.52	51.0	2.0	PVC	46.0	5.0	0.01	2.0	~ 8.0%	NO WELL FOOTER

NOTE: MPELEV = NOTCHED TOP OF CASING. SEDEPTH, FPL, TOTDEPTH, AND SBDEPTH ARE MEASURED FROM GROUND SURFACE.

ANL AFP#59 IRP SI

USAF IRPIMS DW1 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	DW1	22-Nov-91	Hydro-Terra	1030	19.84	---	---	---	---	64.24	@ Installation
AFP#59	DW1	26-Nov-91	Hydro-Terra	1045	22.80	---	---	---	---	64.24	Check
AFP#59	DW1	12-Dec-91	Hydro-Terra	745	20.66	---	---	---	---	64.24	Start Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	800	---	6.0	60.0	27.00	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	805	---	6.0	60.0	27.73	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	810	---	6.0	60.0	27.81	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	815	---	6.0	60.0	27.82	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	820	---	6.0	60.0	28.11	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	825	---	6.0	60.0	28.18	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	830	---	6.0	60.0	28.22	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	835	---	6.0	60.0	28.34	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	840	---	6.0	60.0	28.38	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	845	---	6.0	60.0	28.42	---	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	850	---	6.0	60.0	28.43	---	64.24	End Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	855	---	---	---	20.68	5.0	64.24	Recovery
AFP#59	DW1	02-Jan-92	Hydro-Terra	1513	20.26	---	---	---	---	64.24	@ 1st Sampling
AFP#59	DW1	02-Jan-92	Hydro-Terra	1548	---	5.0	57.5	23.68	---	64.24	End Purge
AFP#59	DW1	02-Jan-92	Hydro-Terra	1553	---	---	---	20.26	5.0	64.24	Recovery
AFP#59	DW1	11-Jan-92	Hydro-Terra	1218	20.29	---	---	---	---	64.24	@ Slug Test
AFP#59	DW1	31-Jan-92	Hydro-Terra	1345	20.42	---	---	---	---	64.24	@ 2nd Sampling
AFP#59	DW1	31-Jan-92	Hydro-Terra	1410	---	6.0	57.5	---	---	64.24	End Purge
AFP#59	DW1	31-Jan-92	Hydro-Terra	1415	---	---	---	20.40	5.0	64.24	Recovery

Appendix C-5-B:
IRPIMS BCHGWD
Groundwater Information

ANL AFP#59 IRP SI

USAF IRPIMS DW3 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	DW3	08-Nov-91	Hydro-Terra	1600	19.07	---	---	---	---	87.62	@ Installation
AFP#59	DW3	26-Nov-91	Hydro-Terra	1050	18.70	---	---	---	---	87.62	Check
AFP#59	DW3	11-Dec-91	Hydro-Terra	1112	15.29	---	---	---	---	87.62	Start Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1117	---	7.9	85	15.92	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1127	---	7.9	85	16.04	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1132	---	7.9	85	16.04	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1137	---	7.9	85	16.06	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1142	---	7.9	85	15.41	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1145	---	7.9	85	---	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1147	---	7.9	85	15.92	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1152	---	7.9	85	16.00	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1157	---	7.9	85	16.02	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1202	---	7.9	85	16.00	---	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1207	---	7.9	85	16.05	---	87.62	End Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1212	---	---	---	15.35	5.0	87.62	Recovery
AFP#59	DW3	07-Jan-92	Hydro-Terra	830	15.19	---	---	---	---	87.62	@ 1st Sampling
AFP#59	DW3	07-Jan-92	Hydro-Terra	906	---	6.0	80	16.58	---	87.62	End Purge
AFP#59	DW3	07-Jan-92	Hydro-Terra	911	---	---	---	15.19	5.0	87.62	Recovery
AFP#59	DW3	07-Jan-92	Hydro-Terra	835	15.28	---	---	---	---	87.62	@ Slug Test
AFP#59	DW3	02-Feb-92	Hydro-Terra	910	15.48	---	---	---	---	87.62	@ 2nd Sampling
AFP#59	DW3	02-Feb-92	Hydro-Terra	945	---	6.0	80	---	---	87.62	End Purge
AFP#59	DW3	02-Feb-92	Hydro-Terra	950	---	---	---	15.48	5.0	87.62	Recovery

ANL AFP#59 IRP SI

USAF IRPIMS DW4 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	DW4	25-Nov-91	Hydro-Terra	1800	19.50	----	----	----	----	84.73	@ Installation
AFP#59	DW4	26-Nov-91	Hydro-Terra	1100	18.70	----	----	----	----	84.73	Check
AFP#59	DW4	12-Dec-91	Hydro-Terra	950	15.34	----	----	----	----	84.73	Start Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	955	----	5.0	85.0	23.96	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1000	----	5.0	85.0	27.14	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1005	----	5.0	85.0	27.62	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1010	----	6.0	85.0	28.79	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1015	----	6.0	85.0	29.39	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1020	----	6.0	85.0	30.43	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1025	----	6.0	85.0	30.74	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1030	----	6.0	85.0	30.60	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1035	----	6.0	85.0	30.84	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1040	----	6.0	85.0	31.04	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1045	----	6.0	85.0	31.58	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1050	----	6.0	85.0	31.72	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1055	----	6.0	85.0	31.71	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1100	----	6.0	85.0	31.93	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1105	----	6.0	85.0	32.03	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1110	----	6.0	85.0	31.99	----	84.73	Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1115	----	6.0	85.0	32.04	----	84.73	End Well Development
AFP#59	DW4	12-Dec-91	Hydro-Terra	1120	----	----	----	16.07	5.0	84.73	Recovery
AFP#59	DW4	08-Jan-92	Hydro-Terra	1015	14.61	----	----	----	----	84.73	@ 1st Sampling
AFP#59	DW4	08-Jan-92	Hydro-Terra	1100	----	5.0	85.0	17.95	----	84.73	End Purge
AFP#59	DW4	08-Jan-92	Hydro-Terra	1105	----	----	----	14.64	5.0	84.73	Recovery
AFP#59	DW4	12-Jan-92	Hydro-Terra	1315	14.64	----	----	----	----	84.73	@ Slug Test
AFP#59	DW4	29-Jan-92	Hydro-Terra	1255	14.74	----	----	----	----	84.73	@ 2nd Sampling
AFP#59	DW4	29-Jan-92	Hydro-Terra	1330	----	6.0	85.0	----	----	84.73	End Purge
AFP#59	DW4	29-Jan-92	Hydro-Terra	1335	----	----	----	14.74	5.0	84.73	Recovery

ANL AFP#59 IRP SI

USAF IRPIMS DW5 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	DW5	19--Nov--91	Hydro-Terra	1530	25.26	----	----	----	----	82.73	@ Installation
AFP#59	DW5	26--Nov--91	Hydro-Terra	1110	24.66	----	----	----	----	82.73	Check
AFP#59	DW5	11--Dec--91	Hydro-Terra	1610	22.33	----	----	----	----	82.73	Start Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1619	----	7.1	81.0	24.05	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1625	----	7.1	81.0	24.12	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1630	----	7.1	81.0	24.17	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1635	----	7.1	81.0	24.23	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1640	----	7.1	81.0	24.30	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1645	----	7.1	81.0	24.38	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1650	----	7.1	81.0	24.46	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1655	----	7.1	81.0	24.51	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1700	----	7.1	81.0	24.56	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1705	----	7.1	81.0	24.55	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1710	----	7.1	81.0	24.60	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1714	----	7.1	81.0	24.60	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1720	----	7.1	81.0	24.65	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1725	----	7.1	81.0	24.68	----	82.73	Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1730	----	7.1	81.0	24.69	----	82.73	End Well Development
AFP#59	DW5	11--Dec--91	Hydro-Terra	1735	----	----	----	22.90	5.0	82.73	Recovery
AFP#59	DW5	07--Jan--92	Hydro-Terra	1455	22.60	----	----	----	----	82.73	@ 1st Sampling
AFP#59	DW5	07--Jan--92	Hydro-Terra	1525	----	5.0	76.0	23.63	----	82.73	End Purge
AFP#59	DW5	07--Jan--92	Hydro-Terra	1530	----	----	----	22.60	5.0	82.73	Recovery
AFP#59	DW5	11--Jan--92	Hydro-Terra	1600	22.56	----	----	----	----	82.73	@ Slug Test
AFP#59	DW5	31--Jan--92	Hydro-Terra	840	22.66	----	----	----	----	82.73	@ 2nd Sampling
AFP#59	DW5	31--Jan--92	Hydro-Terra	915	----	5.0	76.0	----	----	82.73	End Purge
AFP#59	DW5	31--Jan--92	Hydro-Terra	920	----	----	----	22.66	5.0	82.73	Recovery

ANL AFP#59 IRP SI

USAF IRPIMS DW6 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	DW6	16-Nov-91	Hydro-Terra	1400	21.00	----	----	----	----	66.06	@ Installation
AFP#59	DW6	11-Dec-91	Hydro-Terra	1355	14.81	----	----	----	----	66.06	Start Well Development
AFP#59	DW6	11-Dec-91	Hydro-Terra	1400	----	7.4	64.0	64.00	----	66.06	Well Development
AFP#59	DW6	11-Dec-91	Hydro-Terra	1406	----	7.4	64.0	55.00	----	66.06	End Well Development
AFP#59	DW6	11-Dec-91	Hydro-Terra	1424	----	----	----	38.00	18.0	66.06	Recovery
AFP#59	DW6	12-Dec-91	Hydro-Terra	1510	14.92	----	----	----	----	66.06	Start Well Development
AFP#59	DW6	12-Dec-91	Hydro-Terra	1525	----	1.5	64.0	39.37	----	66.06	Well Development
AFP#59	DW6	12-Dec-91	Hydro-Terra	1545	----	1.5	64.0	53.00	----	66.06	Well Development
AFP#59	DW6	12-Dec-91	Hydro-Terra	1556	----	1.5	64.0	64.00	----	66.06	End Well Development
AFP#59	DW6	12-Dec-91	Hydro-Terra	1611	----	----	----	41.30	15.0	66.06	Recovery
AFP#59	DW6	13-Dec-91	Hydro-Terra	705	14.80	----	----	----	----	66.06	Start Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	710	----	1.5	64.0	26.60	----	66.06	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	715	----	1.5	64.0	35.14	----	66.06	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	720	----	1.5	64.0	42.67	----	66.06	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	725	----	1.5	64.0	48.71	----	66.06	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	730	----	1.5	64.0	54.50	----	66.06	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	735	----	1.5	64.0	64.00	----	66.06	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	740	----	1.5	64.0	64.00	----	66.06	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	745	----	1.5	64.0	64.00	----	66.06	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	750	----	1.5	64.0	64.00	----	66.06	End Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	755	----	----	----	45.52	5.0	66.06	Recovery
AFP#59	DW6	06-Jan-92	Hydro-Terra	1035	14.66	----	----	----	----	66.06	@ 1st Sampling
AFP#59	DW6	06-Jan-92	Hydro-Terra	1120	----	0.75	59.0	59.00	----	66.06	End Purge
AFP#59	DW6	06-Jan-92	Hydro-Terra	1125	----	----	----	38.71	5.0	66.06	Recovery
AFP#59	DW6	12-Jan-92	Hydro-Terra	1530	14.84	----	----	----	----	66.06	@ Slug Test
AFP#59	DW6	01-Jan-92	Hydro-Terra	845	15.08	----	----	----	----	66.06	@ 2nd Sampling
AFP#59	DW6	01-Jan-92	Hydro-Terra	915	----	1.0	59.0	59.00	----	66.06	End Purge
AFP#59	DW6	01-Jan-92	Hydro-Terra	920	----	----	----	29.96	5.0	66.06	Recovery

ANL AFP #59 IRP SI

USAF IRPIMS DW8 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	DW8	03-Nov-91	Hydro-Terra	1450	18.37	----	----	----	----	92.50	@ Installation
AFP#59	DW8	26-Dec-91	Hydro-Terra	1125	17.92	----	----	----	----	92.50	Check
AFP#59	DW8	13-Dec-91	Hydro-Terra	844	15.60	----	----	----	----	92.50	Start Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	850	----	6.0	90.0	25.46	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	855	----	6.0	90.0	25.60	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	900	----	6.0	90.0	25.80	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	905	----	6.0	90.0	25.87	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	910	----	6.0	90.0	24.81	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	915	----	6.0	90.0	25.89	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	920	----	6.0	90.0	26.64	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	925	----	6.0	90.0	26.64	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	930	----	6.0	90.0	26.77	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	935	----	6.0	90.0	26.84	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	940	----	6.0	90.0	27.03	----	92.50	Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	945	----	6.0	90.0	27.14	----	92.50	End Well Development
AFP#59	DW8	13-Dec-91	Hydro-Terra	950	----	----	----	15.67	5.0	92.50	Recovery
AFP#59	DW8	09-Jan-92	Hydro-Terra	1025	15.30	----	----	----	----	92.50	@ 1st Sampling
AFP#59	DW8	09-Jan-92	Hydro-Terra	1100	----	6.00	85.0	18.51	----	92.50	End Purge
AFP#59	DW8	09-Jan-92	Hydro-Terra	1105	----	----	85.0	15.30	5.0	92.50	Recovery
AFP#59	DW8	13-Jan-92	Hydro-Terra	1520	15.37	----	----	----	----	92.50	@ Slug Test
AFP#59	DW8	30-Jan-92	Hydro-Terra	1230	15.86	----	----	----	----	92.50	@ 2nd Sampling
AFP#59	DW8	30-Jan-92	Hydro-Terra	1310	----	6.0	85.0	----	----	92.50	End Purge
AFP#59	DW8	30-Jan-92	Hydro-Terra	1315	----	----	----	15.86	5.0	92.50	Recovery

ANL AFP#59 IRP SI

USAF IRPIMS DW9 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	DW9	09-Dec-91	Hydro-Terra	1845	14.90	----	----	----	----	90.51	@ Installation
AFP#59	DW9	12-Dec-91	Hydro-Terra	1325	17.28	----	----	----	----	90.51	Start Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1330	----	7.5	85.0	18.48	----	90.51	Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1335	----	7.5	85.0	18.42	----	90.51	Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1340	----	7.5	85.0	18.43	----	90.51	Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1345	----	7.5	85.0	18.43	----	90.51	Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1350	----	7.5	85.0	18.43	----	90.51	Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1355	----	7.5	85.0	18.43	----	90.51	Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1400	----	7.5	85.0	18.39	----	90.51	Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1405	----	7.5	85.0	18.43	----	90.51	Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1410	----	7.5	85.0	18.51	----	90.51	End Well Development
AFP#59	DW9	12-Dec-91	Hydro-Terra	1415	----	----	----	17.36	5.0	90.51	Recovery
AFP#59	DW9	07-Jan-92	Hydro-Terra	1400	17.41	----	----	----	----	90.51	@ 1st Sampling
AFP#59	DW9	07-Jan-92	Hydro-Terra	1435	----	6.0	82.0	18.39	----	90.51	End Purge
AFP#59	DW9	07-Jan-92	Hydro-Terra	1440	----	----	82.0	17.41	5.0	90.51	Recovery
AFP#59	DW9	12-Jan-92	Hydro-Terra	1000	17.56	----	----	----	----	90.51	@ Slug Test
AFP#59	DW9	03-Feb-92	Hydro-Terra	830	17.86	----	----	----	----	90.51	@ 2nd Sampling
AFP#59	DW9	03-Feb-92	Hydro-Terra	905	----	6.0	82.0	----	----	90.51	End Purge
AFP#59	DW9	03-Feb-92	Hydro-Terra	910	----	----	----	17.86	5.0	90.51	Recovery

ANL AFP#59 IRP SI

USAF IRPIMS SW1 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW1	26-Nov-91	Hydro-Terra	1140	22.81	---	---	---	---	29.65	Check
AFP#59	SW1	07-Jan-92	Hydro-Terra	1643		---	---	---	---	29.65	@ 1st Sampling
AFP#59	SW1	07-Jan-92	Hydro-Terra	1718	---	2.0	22.5	---	---	29.65	End Purge
AFP#59	SW1	07-Jan-92	Hydro-Terra	1723	---	---	---		5.0	29.65	Recovery
AFP#59	SW1	13-Jan-92	Hydro-Terra	1208	20.23	---	---	---	---	29.65	@ Slug Test
AFP#59	SW1	31-Jan-92	Hydro-Terra	1505	20.36	---	---	---	---	29.65	@ 2nd Sampling
AFP#59	SW1	31-Jan-92	Hydro-Terra	1530	---	0.3	26.0	---	---	29.65	End Purge
AFP#59	SW1	31-Jan-92	Hydro-Terra	1535	---	---	---	20.36	5.0	29.65	Recovery

ANL AFP#59 IRP SI

USAF IRPIMS SW3 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW3	26-Nov-91	Hydro-Terra	1150	20.87	---	---	---	---	30.51	Check
AFP#59	SW3	07-Dec-91	Hydro-Terra	1035	17.40	---	---	---	---	30.51	@ 1st Sampling
AFP#59	SW3	07-Dec-91	Hydro-Terra	1048	---	3.5	28.5	18.71	---	30.51	End Purge
AFP#59	SW3	07-Dec-91	Hydro-Terra	1053	---	---	---	17.40	5.0	30.51	Recovery
AFP#59	SW3	13-Jan-92	Hydro-Terra	910	17.51	---	---	---	---	30.51	@ Slug Test
AFP#59	SW3	02-Feb-92	Hydro-Terra	1035	17.68	---	---	---	---	30.51	@ 2nd Sampling
AFP#59	SW3	02-Feb-92	Hydro-Terra	1050	---	3.0	28.5	---	---	30.51	End Purge
AFP#59	SW3	02-Feb-92	Hydro-Terra	1055	---	---	---	17.68	5.0	30.51	Recovery

ANL AFP#59 IRP SI

USAF IRPIMS SW4 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW4	02-Dec-91	Hydro-Terra	1200	18.38	---	---	---	---	28.57	@ Installation
AFP#59	SW4	12-Dec-91	Hydro-Terra	1134	15.31	---	---	---	---	28.57	Start Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1140	---	0.25	26.0	26.00	---	28.57	Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1145	---	0.25	26.0	26.00	---	28.57	Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1150	---	0.25	26.0	23.35	---	28.57	Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1155	---	0.25	26.0	23.95	---	28.57	Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1200	---	0.25	26.0	23.37	---	28.57	Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1205	---	0.25	26.0	26.00	---	28.57	Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1210	---	0.25	26.0	26.00	---	28.57	Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1215	---	0.25	26.0	26.00	---	28.57	Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1220	---	0.25	26.0	26.00	---	28.57	Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1225	---	0.25	26.0	26.00	---	28.57	End Well Development
AFP#59	SW4	12-Dec-91	Hydro-Terra	1230	---	---	---	19.78	5.0	28.57	Recovery
AFP#59	SW4	08-Jan-92	Hydro-Terra	1205	14.67	---	---	---	---	28.57	@ 1st Sampling
AFP#59	SW4	08-Jan-92	Hydro-Terra	1235	---	0.30	26.0	24.40	---	28.57	End Purge
AFP#59	SW4	08-Jan-92	Hydro-Terra	1240	---	---	---	18.48	5.0	28.57	Recovery
AFP#59	SW4	13-Jan-92	Hydro-Terra	1400	14.69	---	---	---	---	28.57	@ Slug Test
AFP#59	SW4	29-Jan-92	Hydro-Terra	1430	14.76	---	---	---	---	28.57	@ 2nd Sampling
AFP#59	SW4	29-Jan-92	Hydro-Terra	1500	---	0.3	26.0	17.98	---	28.57	End Purge
AFP#59	SW4	29-Jan-92	Hydro-Terra	1505	---	---	---	15.63	5.0	28.57	Recovery

ANL AFP #59 IRP SI

USAF IRPIMS SW5 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW5	20-Nov-91	Hydro-Terra	1100	25.40	----	----	----	----	30.10	@ Installation
AFP#59	SW5	26-Nov-91	Hydro-Terra	1155	24.90	----	----	----	----	30.10	Check
AFP#59	SW5	24-Nov-91	Hydro-Terra	1100	25.22	----	----	----	----	30.10	Start Well Development -- Bailing
AFP#59	SW5	24-Nov-91	Hydro-Terra	1130	----	0.16	28.5	25.28	----	30.10	Well Development -- Bailing
AFP#59	SW5	24-Nov-91	Hydro-Terra	1200	----	0.16	28.5	26.35	----	30.10	End Well Development -- Bailing
AFP#59	SW5	11-Dec-91	Hydro-Terra	1545	22.15	----	----	----	----	30.10	Start Well Development -- Pump
AFP#59	SW5	11-Dec-91	Hydro-Terra	1546	----	0.25	28.5	28.50	----	30.10	End Well Development -- Pump
AFP#59	SW5	07-Jan-92	Hydro-Terra	1640	22.50	----	----	----	----	30.10	@ 1st Sampling
AFP#59	SW5	07-Jan-92	Hydro-Terra	1648	----	0.3	28.5	29.50	----	30.10	End Purge
AFP#59	SW5	07-Jan-92	Hydro-Terra	1653	----	----	----	23.45	5.0	30.10	Recovery
AFP#59	SW5	12-Jan-92	Hydro-Terra	800	22.42	----	----	----	----	30.10	@ Slug Test
AFP#59	SW5	31-Jan-92	Hydro-Terra	1015	22.50	----	----	----	----	30.10	@ 2nd Sampling
AFP#59	SW5	31-Jan-92	Hydro-Terra	1025	----	0.3	28.5	28.50	----	30.10	End Purge
AFP#59	SW5	31-Jan-92	Hydro-Terra	1030	----	----	----	23.00	5.0	30.10	Recovery

ANL AFP#59 IRP SI											
USAF IRPIS SW6 GROUNDWATER LEVEL DATA (BCHGWD)											
AFID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPRATE	DEPWT	RECTIME	SOUNDING	REMARKS
AFP#59	SW6	17-Nov-91	Hydro-Terra	900	17.88	---	---	---	---	---	28.54 @ Installation
AFP#59	SW6	26-Nov-91	Hydro-Terra	1200	17.38	---	---	---	---	---	28.54 Check
AFP#59	SW6	23-Nov-91	Hydro-Terra	1000	20.60	---	---	---	---	---	28.54 Start Well Development - Bailing
AFP#59	SW6	23-Nov-91	Hydro-Terra	1020	---	0.20	27.0	20.68	---	---	28.54 Well Development - Bailing
AFP#59	SW6	23-Nov-91	Hydro-Terra	1045	---	0.20	27.0	20.65	---	---	28.54 End Well Development - Bailing
AFP#59	SW6	06-Jan-92	Hydro-Terra	1230	15.07	---	---	---	---	---	28.54 @ 1st Sampling
AFP#59	SW6	06-Jan-92	Hydro-Terra	1245	---	---	3.8	27.0	16.64	---	28.54 End Purge
AFP#59	SW6	06-Jan-92	Hydro-Terra	1250	---	---	---	15.07	5.0	---	28.54 Recovery
AFP#59	SW6	12-Jan-92	Hydro-Terra	1825	15.08	---	---	---	---	---	28.54 @ Slug Test
AFP#59	SW6	01-Feb-92	Hydro-Terra	1010	15.22	---	---	---	---	---	28.54 @ 2nd Sampling
AFP#59	SW6	01-Feb-92	Hydro-Terra	1025	---	---	3.8	27.0	---	---	28.54 End Purge
AFP#59	SW6	01-Feb-92	Hydro-Terra	1229	---	---	---	---	15.29	124.0	28.54 Recovery

ANL AFP #59 IRP SI

USAF IRPIMS SW7 GROUNDWATER LEVEL DATA (BCHGWD)

AFID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW7	06-Dec-91	Hydro-Terra	1000	15.80	---	---	---	---	29.51	@ Installation
AFP#59	SW7	13-Dec-91	Hydro-Terra	1545	15.68	---	---	---	---	29.51	Start Well Development -- Bailing
AFP#59	SW7	13-Dec-91	Hydro-Terra	1553	---	0.25	27.0	15.68	---	29.51	Well Development -- Bailing
AFP#59	SW7	13-Dec-91	Hydro-Terra	1605	---	0.25	27.0	15.70	---	29.51	Well Development -- Bailing
AFP#59	SW7	13-Dec-91	Hydro-Terra	1625	---	0.25	27.0	15.70	---	29.51	End Well Development -- Bailing
AFP#59	SW7	08-Jan-92	Hydro-Terra	1350	18.23	---	---	---	---	29.51	@ 1st Sampling
AFP#59	SW7	08-Jan-92	Hydro-Terra	1405	---	2.5	27.0	20.74	---	29.51	End Purge
AFP#59	SW7	08-Jan-92	Hydro-Terra	1410	---	---	---	18.23	5.0	29.51	Recovery
AFP#59	SW7	13-Jan-92	Hydro-Terra	1210	18.36	---	---	---	---	29.51	@ Slug Test
AFP#59	SW7	30-Jan-92	Hydro-Terra	955	18.32	---	---	---	---	29.51	@ 2nd Sampling
AFP#59	SW7	30-Jan-92	Hydro-Terra	1010	---	2.5	27.0	---	---	29.51	End Purge
AFP#59	SW7	30-Jan-92	Hydro-Terra	1015	---	---	---	18.32	5.0	29.51	Recovery

ANL AFP #59 IRP SI

USAF IRPIMS SW8 GROUNDWATER LEVEL DATA (BCHGWD)

AFID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW8	04-Nov-91	Hydro-Terra	830	13.06	---	---	---	---	22.65	@ Installation
AFP#59	SW8	26-Nov-91	Hydro-Terra	1205	12.65	---	---	---	---	22.65	Check
AFP#59	SW8	23-Nov-91	Hydro-Terra	1215	12.52	0.16	---	---	---	22.65	Start Well Development -- Bailing
AFP#59	SW8	23-Nov-91	Hydro-Terra	1245	---	0.16	21.0	12.60	---	22.65	Well Development -- Bailing
AFP#59	SW8	23-Nov-91	Hydro-Terra	1315	---	0.16	21.0	12.60	---	22.65	End Well Development -- Bailing
AFP#59	SW8	09-Jan-92	Hydro-Terra	1235	12.91	---	---	---	---	22.65	@ 1st Sampling
AFP#59	SW8	09-Jan-92	Hydro-Terra	1250	---	0.8	21.0	14.83	---	22.65	End Purge
AFP#59	SW8	09-Jan-92	Hydro-Terra	1255	---	---	---	12.91	5.0	22.65	Recovery
AFP#59	SW8	13-Jan-92	Hydro-Terra	1520	13.03	---	---	---	---	22.65	@ Slug Test
AFP#59	SW8	30-Jan-92	Hydro-Terra	1400	13.05	---	---	---	---	22.65	@ 2nd Sampling
AFP#59	SW8	30-Jan-92	Hydro-Terra	1415	---	0.8	21.0	---	---	22.65	End Purge
AFP#59	SW8	30-Jan-92	Hydro-Terra	1420	---	---	---	13.08	5.0	22.65	Recovery

ANL AFP#59 IRP SI

USAF IRPIMS SW9 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW9	10-Dec-91	Hydro-Terra	1000	17.00	----	----	----	----	27.58	@ Installation
AFP#59	SW9	13-Dec-91	Hydro-Terra	1320	17.20	----	----	----	----	27.58	Start Well Development -- Bailing
AFP#59	SW9	13-Dec-91	Hydro-Terra	1334	----	0.25	25.0	17.20	----	27.58	Well Development -- Bailing
AFP#59	SW9	13-Dec-91	Hydro-Terra	1351	----	0.25	25.0	17.25	----	27.58	Well Development -- Bailing
AFP#59	SW9	13-Dec-91	Hydro-Terra	1400	----	0.25	25.0	17.25	----	27.58	End Well Development -- Bailing
AFP#59	SW9	07-Jan-92	Hydro-Terra	1535	17.66	----	----	----	----	27.58	@ 1st Sampling
AFP#59	SW9	07-Jan-92	Hydro-Terra	1550	----	3.5	25.0	17.99	----	27.58	End Purge
AFP#59	SW9	07-Jan-92	Hydro-Terra	1555	----	----	----	17.66	5.0	27.58	Recovery
AFP#59	SW9	12-Jan-92	Hydro-Terra	1050	17.80	----	----	----	----	27.58	@ Slug Test
AFP#59	SW9	03-Feb-92	Hydro-Terra	955	18.10	----	----	----	----	27.58	@ 2nd Sampling
AFP#59	SW9	03-Feb-92	Hydro-Terra	1010	----	3.5	25.0	----	----	27.58	End Purge
AFP#59	SW9	03-Feb-92	Hydro-Terra	1015	----	----	----	18.10	5.0	27.58	Recovery

ANL AFP#59 IRP SI

USAF IRPIMS IW9 GROUNDWATER LEVEL DATA (BCHGWD)

AFIID	LOCID	LOGDATE	LOGCODE	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	IW9	13-Dec-91	Hydro-Terra	1405	16.72	----	----	----	----	53.90	Start Well Development -- Bailing
AFP#59	IW9	13-Dec-91	Hydro-Terra	1419	----	0.20	51.0	23.60	----	53.90	Well Development -- Bailing
AFP#59	IW9	13-Dec-91	Hydro-Terra	1440	----	0.20	51.0	25.47	----	53.90	Well Development -- Bailing
AFP#59	IW9	13-Dec-91	Hydro-Terra	1510	----	0.20	51.0	31.04	----	53.90	Well Development -- Bailing
AFP#59	IW9	13-Dec-91	Hydro-Terra	1520	----	0.20	51.0	36.30	----	53.90	Well Development -- Bailing
AFP#59	IW9	13-Dec-91	Hydro-Terra	1530	----	0.20	51.0	43.96	----	53.90	End Well Development -- Bailing
AFP#59	IW9	12-Jan-92	Hydro-Terra	1140	17.86	----	----	----	----	53.90	@ Slug Test

Appendix C-5-C:
IRPIMS BCHLTD
Lithologic Description

ANL AFP#59 IRP SI

USAF IRPIMS LITHOLOGIC DESCRIPTION DATA (BCHLTD)

AFID	LOCID	LOGCODE	LOGDATE	BEG- DEPTH	END- DEPTH	LITH- CODE	ASTM- CODE	STRAT- ORDER	VISDESC
AFP#59	DW1	Hydro-Terra	22-Nov-91	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	DW1	Hydro-Terra	22-Nov-91	0.3	2.0	GVLB	GPGM	1	Fill and Gravel Alluvium, brown and grey
AFP#59	DW1	Hydro-Terra	22-Nov-91	2.0	9.0	GVLB	GPGM	2	Fine-Grained Alluvium, brown
AFP#59	DW1	Hydro-Terra	22-Nov-91	9.0	11.5	SDGR	SMSP	2	Fine-Grained Alluvium, brown
AFP#59	DW1	Hydro-Terra	22-Nov-91	11.5	37.5	SDGR	SMPS	3	Glacial Outwash, brown
AFP#59	DW1	Hydro-Terra	22-Nov-91	37.5	62.5	SDGR	GPGM	6	Coarse-Grained Ice-Contact Deposits, brown, heaving
AFP#59	DW3	Hydro-Terra	08-Nov-91	0.0	0.3	ASPT	---	1	Fill and Gravel Alluvium, brown
AFP#59	DW3	Hydro-Terra	08-Nov-91	0.3	5.0	GVLB	GP	1	Fill and Gravel Alluvium, brown
AFP#59	DW3	Hydro-Terra	08-Nov-91	5.0	34.5	GVLB	GW	3	Glacial Outwash, dark brown
AFP#59	DW3	Hydro-Terra	08-Nov-91	34.5	37.5	SDSL	SMML	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW3	Hydro-Terra	08-Nov-91	37.5	47.5	SDSL	SMML	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW3	Hydro-Terra	08-Nov-91	47.5	51.5	SDGR	SP	5	Glacial Lake Beds, gray
AFP#59	DW3	Hydro-Terra	08-Nov-91	51.5	54.5	SDSL	SM	5	Glacial Lake Beds, gray
AFP#59	DW3	Hydro-Terra	08-Nov-91	54.5	57.5	SDGR	SM	5	Glacial Lake Beds, gray
AFP#59	DW3	Hydro-Terra	08-Nov-91	57.5	68.5	SDSL	SPSM	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW3	Hydro-Terra	08-Nov-91	68.5	88.0	GVLG	GMGP	6	Coarse-Grained Ice-Contact Deposits, gray
AFP#59	DW4	Hydro-Terra	25-Nov-91	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	DW4	Hydro-Terra	25-Nov-91	0.3	2.0	GVLB	GP	1	Fill and Gravel Alluvium, yellowish-brown
AFP#59	DW4	Hydro-Terra	25-Nov-91	2.0	15.0	GVLB	GPSP	3	Glacial Outwash, brown
AFP#59	DW4	Hydro-Terra	25-Nov-91	15.0	37.5	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, brown to gray
AFP#59	DW4	Hydro-Terra	25-Nov-91	37.5	68.0	SDGR	SMSP	6	Coarse-Grained Ice-Contact Deposits, brown, heaving
AFP#59	DW4	Hydro-Terra	25-Nov-91	68.0	87.5	SDGR	SP	6	Coarse-Grained Ice-Contact Deposits, gray, heaving
AFP#59	DW4	Hydro-Terra	25-Nov-91	87.5	92.5	SDGR	GMSP	6	Coarse-Grained Ice-Contact Deposits, gray, heaving
AFP#59	DW5	Hydro-Terra	19-Nov-91	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	DW5	Hydro-Terra	19-Nov-91	0.3	3.0	GVLB	SP	1	Fill and Gravel Alluvium, brown
AFP#59	DW5	Hydro-Terra	19-Nov-91	3.0	7.0	SDSL	SPSM	3	Glacial Outwash, brown
AFP#59	DW5	Hydro-Terra	19-Nov-91	7.0	23.0	GVLB	GP	3	Glacial Outwash, brown
AFP#59	DW5	Hydro-Terra	19-Nov-91	23.0	38.0	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, brown to gray
AFP#59	DW5	Hydro-Terra	19-Nov-91	38.0	39.5	SDGR	SPSM	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW5	Hydro-Terra	19-Nov-91	39.5	48.0	SDSL	SMML	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW5	Hydro-Terra	19-Nov-91	48.0	53.5	SDSL	SM	5	Glacial Lake Beds, gray
AFP#59	DW5	Hydro-Terra	19-Nov-91	53.5	55.0	SDSL	SM	5	Glacial Lake Beds, gray
AFP#59	DW5	Hydro-Terra	19-Nov-91	55.0	59.5	SDSL	SM	5	Glacial Lake Beds, gray
AFP#59	DW5	Hydro-Terra	19-Nov-91	59.5	74.5	SDSL	MLSM	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW5	Hydro-Terra	19-Nov-91	74.5	82.0	SDGR	SMSP	6	Coarse-Grained Ice-Contact Deposits
AFP#59	DW5	Hydro-Terra	19-Nov-91	82.0	83.0	HRDP	GMSP	7	Glacial Till, gray, very hard

ANL AFP#59 IRP SI

USAF IRPIMS LITHOLOGIC DESCRIPTION DATA (BCHLTD)

AFID	LOCID	LOGCODE	LOGDATE	BEG- DEPTH	END- DEPTH	LITH- CODE	ASTM- CODE	STRAT- ORDER	VISDESC
AFP#59	DW6	Hydro-Terra	16-Nov-91	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	DW6	Hydro-Terra	16-Nov-91	0.3	1.5	GVLB	GP	1	Fill and Gravel Alluvium, brown
AFP#59	DW6	Hydro-Terra	16-Nov-91	1.5	2.0	SDSL	SM	1	Fill and Gravel Alluvium, brown
AFP#59	DW6	Hydro-Terra	16-Nov-91	2.0	25.0	GVLB	GMSP	3	Glacial Outwash, brown
AFP#59	DW6	Hydro-Terra	16-Nov-91	25.0	57.5	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW6	Hydro-Terra	16-Nov-91	57.5	59.0	GVLG	SP	5	Glacial Lake Beds, gray
AFP#59	DW6	Hydro-Terra	16-Nov-91	59.0	61.5	SDSL	SMML	5	Glacial Lake Beds, gray
AFP#59	DW6	Hydro-Terra	16-Nov-91	61.5	64.0	SDSL	SMSP	5	Glacial Lake Beds, gray
AFP#59	DW6	Hydro-Terra	16-Nov-91	64.0	86.5	SDSL	SMML	6	Coarse-Grained Ice-Contact Deposits, gray
AFP#59	DW8	Hydro-Terra	03-Nov-91	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	DW8	Hydro-Terra	03-Nov-91	0.3	3.5	GVLB	GP	1	Fill and Gravel Alluvium, brownish-black
AFP#59	DW8	Hydro-Terra	03-Nov-91	3.5	4.0	SDSL	OL	1	Fill and Gravel Alluvium, brown
AFP#59	DW8	Hydro-Terra	03-Nov-91	4.0	9.5	SDGR	SPSM	2	Fine-Grained Alluvium, brown
AFP#59	DW8	Hydro-Terra	03-Nov-91	9.5	13.0	SDSL	SM	3	Glacial Outwash, brown
AFP#59	DW8	Hydro-Terra	03-Nov-91	13.0	20.0	SDGR	GMSP	3	Glacial Outwash, brown
AFP#59	DW8	Hydro-Terra	03-Nov-91	20.0	77.0	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW8	Hydro-Terra	03-Nov-91	77.0	89.0	SDSL	SM	6	Coarse-Grained Ice-Contact Deposits, gray
AFP#59	DW8	Hydro-Terra	03-Nov-91	89.0	93.0	HRDP	GPSP	7	Glacial Till, gray, very hard
AFP#59	DW9	Hydro-Terra	09-Dec-92	0.0	0.3	PTHM	OL	1	Fill and Gravel Alluvium, brown silt
AFP#59	DW9	Hydro-Terra	09-Dec-92	0.3	2.0	SDSL	SPSM	1	Fill and Gravel Alluvium, brown
AFP#59	DW9	Hydro-Terra	09-Dec-92	2.0	3.0	SD	SW	1	Fill and Gravel Alluvium, yellow
AFP#59	DW9	Hydro-Terra	09-Dec-92	3.0	4.0	SDGR	SP	3	Glacial Outwash, dark brown
AFP#59	DW9	Hydro-Terra	09-Dec-92	4.0	10.0	SDGR	GPSP	3	Glacial Outwash, dark brown
AFP#59	DW9	Hydro-Terra	09-Dec-92	10.0	16.0	GVLB	GMGP	3	Glacial Outwash, brown
AFP#59	DW9	Hydro-Terra	09-Dec-92	16.0	34.0	SDGR	GPSP	3	Glacial Outwash, brown
AFP#59	DW9	Hydro-Terra	09-Dec-92	34.0	37.5	SDGR	SP	4	Fine-Grained Ice-Contact Deposits, brown
AFP#59	DW9	Hydro-Terra	09-Dec-92	37.5	41.5	SDSL	MLSM	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW9	Hydro-Terra	09-Dec-92	41.5	43.0	SDSL	SM	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW9	Hydro-Terra	09-Dec-92	43.0	44.0	SDGR	SP	5	Glacial Lake Beds, gray
AFP#59	DW9	Hydro-Terra	09-Dec-92	44.0	53.0	SDSL	MLSM	5	Glacial Lake Beds, gray
AFP#59	DW9	Hydro-Terra	09-Dec-92	53.0	57.5	SDGR	GMSP	5	Glacial Lake Beds, gray
AFP#59	DW9	Hydro-Terra	09-Dec-92	57.5	59.5	SDGR	GMSP	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW9	Hydro-Terra	09-Dec-92	59.5	60.0	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW9	Hydro-Terra	09-Dec-92	60.0	67.8	SDGR	GMSP	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW9	Hydro-Terra	09-Dec-92	67.8	90.0	SDGR	GMSP	6	Coarse-Grained Ice-Contact Deposits, gray
AFP#59	SW4	Hydro-Terra	02-Dec-92	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	SW4	Hydro-Terra	02-Dec-92	0.3	2.0	GVLB	GP	1	Fill and Gravel Alluvium, yellowish-brown
AFP#59	SW4	Hydro-Terra	02-Dec-92	2.0	15.0	GVLB	GPSP	3	Glacial Outwash, brown
AFP#59	SW4	Hydro-Terra	02-Dec-92	15.0	29.0	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, brown to gray

ANL AFP#59 IRP SI

USAF IRPIMS LITHOLOGIC DESCRIPTION DATA (BCHLTD)

AFID	LOCID	LOGCODE	LOGDATE	BEG- DEPTH	END- DEPTH	LITH- CODE	ASTM- CODE	STRAT- ORDER	VISDESC
AFP#59	SW5	Hydro-Terra	20-Nov-91	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	SW5	Hydro-Terra	20-Nov-91	0.3	3.0	GVLB	SP	1	Fill and Gravel Alluvium, brown
AFP#59	SW5	Hydro-Terra	20-Nov-91	3.0	7.0	SDSL	SPSM	3	Glacial Outwash, brown
AFP#59	SW5	Hydro-Terra	20-Nov-91	7.0	23.0	GVLB	GP	3	Glacial Outwash, brown
AFP#59	SW5	Hydro-Terra	20-Nov-91	23.0	30.0	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, brown to gray
AFP#59	SW6	Hydro-Terra	17-Nov-91	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	SW6	Hydro-Terra	17-Nov-91	0.3	1.5	GVLB	GP	1	Fill and Gravel Alluvium, brown
AFP#59	SW6	Hydro-Terra	17-Nov-91	1.5	2.0	SDSL	SM	1	Fill and Gravel Alluvium, brown
AFP#59	SW6	Hydro-Terra	17-Nov-91	2.0	25.0	GVLB	GMSP	3	Glacial Outwash, brown
AFP#59	SW6	Hydro-Terra	17-Nov-91	25.0	29.0	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, gray, CVM 0.5 to 0.8 ppm at 25.5'
AFP#59	SW7	Hydro-Terra	06-Dec-92	0.0	2.0	PTHM	OL	1	Fill and Gravel Alluvium, grass and topsoil
AFP#59	SW7	Hydro-Terra	06-Dec-92	2.0	7.0	SDGR	GMSM	3	Glacial Outwash, brown
AFP#59	SW7	Hydro-Terra	06-Dec-92	7.0	15.0	SDGR	GMSP	3	Glacial Outwash, brown
AFP#59	SW7	Hydro-Terra	06-Dec-92	15.0	17.0	SDGR	SP	3	Glacial Outwash, brown
AFP#59	SW7	Hydro-Terra	06-Dec-92	17.0	26.5	GVLB	GMGP	3	Glacial Outwash, brown
AFP#59	IW7	Hydro-Terra	05-Dec-92	0.0	2.0	PTHM	OL	1	Fill and Gravel Alluvium, grass and topsoil
AFP#59	IW7	Hydro-Terra	05-Dec-92	2.0	7.0	SDGR	GMSM	3	Glacial Outwash, brown
AFP#59	IW7	Hydro-Terra	05-Dec-92	7.0	15.0	SDGR	GMSP	3	Glacial Outwash, brown
AFP#59	IW7	Hydro-Terra	05-Dec-92	15.0	17.0	SDGR	SP	3	Glacial Outwash, brown
AFP#59	IW7	Hydro-Terra	05-Dec-92	17.0	26.5	GVLB	GMGP	3	Glacial Outwash, brown
AFP#59	IW7	Hydro-Terra	05-Dec-92	26.5	29.5	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, brown
AFP#59	IW7	Hydro-Terra	05-Dec-92	29.5	36.0	SDSL	SMSP	4	Fine-Grained Ice-Contact Deposits, brown
AFP#59	IW7	Hydro-Terra	05-Dec-92	36.0	44.0	SDGR	GMSP	4	Fine-Grained Ice-Contact Deposits, brown
AFP#59	SW8	Hydro-Terra	04-Nov-91	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	SW8	Hydro-Terra	04-Nov-91	0.3	3.0	GVLB	GP	1	Fill and Gravel Alluvium, brownish-black
AFP#59	SW8	Hydro-Terra	04-Nov-91	3.0	5.0	SDSL	OL	1	Fill and Gravel Alluvium, brown
AFP#59	SW8	Hydro-Terra	04-Nov-91	5.0	9.5	SDGR	SPSM	2	Fine-Grained Alluvium, brown
AFP#59	SW8	Hydro-Terra	04-Nov-91	9.5	12.0	SDSL	SM	3	Glacial Outwash, brown, strong petroleum odor 7'-14'
AFP#59	SW8	Hydro-Terra	04-Nov-91	12.0	23.0	SDGR	GMSP	3	Glacial Outwash, brown
AFP#59	SW9	Hydro-Terra	10-Dec-92	0.0	0.3	PTHM	OL	1	Fill and Gravel Alluvium, brown silt
AFP#59	SW9	Hydro-Terra	10-Dec-92	0.3	2.0	SDSL	SPSM	1	Fill and Gravel Alluvium, brown
AFP#59	SW9	Hydro-Terra	10-Dec-92	2.0	3.0	SD	SW	1	Fill and Gravel Alluvium, yellow
AFP#59	SW9	Hydro-Terra	10-Dec-92	3.0	4.0	SDGR	SP	3	Glacial Outwash, dark brown
AFP#59	SW9	Hydro-Terra	10-Dec-92	4.0	10.0	SDGR	GPSP	3	Glacial Outwash, dark brown
AFP#59	SW9	Hydro-Terra	10-Dec-92	10.0	16.0	GVLB	GMGP	3	Glacial Outwash, brown
AFP#59	SW9	Hydro-Terra	10-Dec-92	16.0	25.0	SDGR	GPSP	3	Glacial Outwash, brown

ANL AFP#59 IRP SI

USAF IRPIMS LITHOLOGIC DESCRIPTION DATA (BCHLTD)

AFID	LOCID	LOGCODE	LOGDATE	BEG- DEPTH	END- DEPTH	LITH- CODE	ASTM- CODE	STRAT- ORDER	VISDESC
AFP#59	IW9	Hydro-Terra	10-Dec-92	0.0	0.3	PTHM	OL	1	Fill and Gravel Alluvium, brown silt
AFP#59	IW9	Hydro-Terra	10-Dec-92	0.3	2.0	SDSL	SPSM	1	Fill and Gravel Alluvium, brown
AFP#59	IW9	Hydro-Terra	10-Dec-92	2.0	3.0	SD	SW	1	Fill and Gravel Alluvium, yellow
AFP#59	IW9	Hydro-Terra	10-Dec-92	3.0	4.0	SDGR	SP	3	Glacial Outwash, dark brown
AFP#59	IW9	Hydro-Terra	10-Dec-92	4.0	10.0	SDGR	GPSP	3	Glacial Outwash, dark brown
AFP#59	IW9	Hydro-Terra	10-Dec-92	10.0	16.0	GVLB	GMGP	3	Glacial Outwash, brown
AFP#59	IW9	Hydro-Terra	10-Dec-92	16.0	34.0	SDGR	GPSP	3	Glacial Outwash, brown
AFP#59	IW9	Hydro-Terra	10-Dec-92	34.0	37.5	SDGR	SP	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	IW9	Hydro-Terra	10-Dec-92	37.5	41.5	SDSL	MLSM	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	IW9	Hydro-Terra	10-Dec-92	41.5	43.0	SDSL	SM	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	IW9	Hydro-Terra	10-Dec-92	43.0	44.0	SDGR	SP	5	Glacial Lake Beds, gray
AFP#59	IW9	Hydro-Terra	10-Dec-92	44.0	51.0	SDSL	MLSM	5	Glacial Lake Beds, gray
AFP#59	A4H1	Hydro-Terra	03-Dec-92	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	A4H1	Hydro-Terra	03-Dec-92	0.3	1.5	GVLB	GP	1	Fill and Gravel Alluvium, brown
AFP#59	A4H1	Hydro-Terra	03-Dec-92	1.5	18.0	SDGR	GMSP	3	Glacial Outwash, brown, low ppm hydrocarbon detection
AFP#59	A4H2	Hydro-Terra	03-Dec-92	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	A4H2	Hydro-Terra	03-Dec-92	0.3	2.5	GVLB	GP	1	Fill and Gravel Alluvium, brown
AFP#59	A4H2	Hydro-Terra	03-Dec-92	2.5	19.0	SDGR	GMSM	3	Glacial Outwash, brown
AFP#59	A1H1	Hydro-Terra	04-Dec-92	0.0	0.5	FILL	---	1	Fill and Gravel Alluvium, brown
AFP#59	A1H1	Hydro-Terra	04-Dec-92	0.5	8.0	FILL	GPSP	1	Fill and Gravel Alluvium, brown
AFP#59	A1H1	Hydro-Terra	04-Dec-92	8.0	14.0	SDGR	SPGP	3	Glacial Outwash, oily stain, low ppm hydrocarbon detected
AFP#59	A3H1	Hydro-Terra	04-Dec-92	0.0	0.5	FILL	---	1	Fill and Gravel Alluvium, brown
AFP#59	A3H1	Hydro-Terra	04-Dec-92	0.5	2.0	FILL	GM	1	Fill and Gravel Alluvium, brown
AFP#59	A3H1	Hydro-Terra	04-Dec-92	2.0	10.0	FILL	MLSM	1	Fill and Gravel Alluvium, gray, oily stain
AFP#59	A3H1	Hydro-Terra	04-Dec-92	10.0	14.0	SDGR	GPSP	3	Glacial Outwash, gray, oily stain, low ppm hydrocarbon detect
AFP#59	A6H1	Hydro-Terra	04-Dec-92	0.0	0.3	ASPT	---	1	Asphalt
AFP#59	A6H1	Hydro-Terra	04-Dec-92	0.3	2.0	FILL	GP	1	Fill and Gravel Alluvium, brown
AFP#59	A6H1	Hydro-Terra	04-Dec-92	2.0	10.0	FILL	SP	1	Fill and Gravel Alluvium, brown
AFP#59	A6H1	Hydro-Terra	04-Dec-92	10.0	14.0	SDGR	GPSP	3	Glacial Outwash, brown

Appendix C-5-D:

IRPIMS BCHGWD

Hydrologic Parameters

ANL AFP #59 IRP SI					SLUG TEST				
USAF IRPIMS HYDROLOGIC PARAMETER DATA (BCHGWD)					SLUG TEST				
AFID	LOCID	LOGDATE	PARCODE	PARVAL	UTMCODE	AFID	LOCID	LOGDATE	PARCODE
AFP #59	DW1	11-Jan-92	NE			AFP #59	DW1	11-Jan-92	NE
AFP #59	DW1	11-Jan-92	K	14.2	ft/d	AFP #59	DW1	11-Jan-92	K
AFP #59	DW1	11-Jan-92	S			AFP #59	DW1	11-Jan-92	S
AFP #59	DW1	11-Jan-92	T	1025	ft ² /d	AFP #59	DW1	11-Jan-92	T
AFP #59	DW3	07-Jan-92	NE			AFP #59	DW3	07-Jan-92	NE
AFP #59	DW3	07-Jan-92	K	2	ft/d	AFP #59	DW3	07-Jan-92	K
AFP #59	DW3	07-Jan-92	S			AFP #59	DW3	07-Jan-92	S
AFP #59	DW3	07-Jan-92	T	150	ft ² /d	AFP #59	DW3	07-Jan-92	T
AFP #59	DW4	12-Jan-92	NE			AFP #59	DW4	12-Jan-92	NE
AFP #59	DW4	12-Jan-92	K	4.5	ft/d	AFP #59	DW4	12-Jan-92	K
AFP #59	DW4	12-Jan-92	S			AFP #59	DW4	12-Jan-92	S
AFP #59	DW4	12-Jan-92	T	325	ft ² /d	AFP #59	DW4	12-Jan-92	T
AFP #59	DW5	11-Jan-92	NE			AFP #59	DW5	11-Jan-92	NE
AFP #59	DW5	11-Jan-92	K	12	ft/d	AFP #59	DW5	11-Jan-92	K
AFP #59	DW5	11-Jan-92	S			AFP #59	DW5	11-Jan-92	S
AFP #59	DW5	11-Jan-92	T	725	ft ² /d	AFP #59	DW5	11-Jan-92	T
AFP #59	DW6	12-Jan-92	NE			AFP #59	DW6	12-Jan-92	NE
AFP #59	DW6	12-Jan-92	K	0.1	ft/d	AFP #59	DW6	12-Jan-92	K
AFP #59	DW6	12-Jan-92	S			AFP #59	DW6	12-Jan-92	S
AFP #59	DW6	12-Jan-92	T	7	ft ² /d	AFP #59	DW6	12-Jan-92	T
AFP #59	DW8	13-Jan-92	NE			AFP #59	DW8	13-Jan-92	NE
AFP #59	DW8	13-Jan-92	K	8	ft/d	AFP #59	DW8	13-Jan-92	K
AFP #59	DW8	13-Jan-92	S			AFP #59	DW8	13-Jan-92	S
AFP #59	DW8	13-Jan-92	T	620	ft ² /d	AFP #59	DW8	13-Jan-92	T
AFP #59	DW9	12-Jan-92	NE			AFP #59	DW9	12-Jan-92	NE
AFP #59	DW9	12-Jan-92	K	2.6	ft/d	AFP #59	DW9	12-Jan-92	K
AFP #59	DW9	12-Jan-92	S			AFP #59	DW9	12-Jan-92	S
AFP #59	DW9	12-Jan-92	T	190	ft/d	AFP #59	DW9	12-Jan-92	T
AFP #59	SW1	13-Jan-92	NE			AFP #59	SW1	13-Jan-92	NE
AFP #59	SW1	13-Jan-92	K	1.0	ft/d	AFP #59	SW1	13-Jan-92	K
AFP #59	SW1	13-Jan-92	S			AFP #59	SW1	13-Jan-92	S
AFP #59	SW1	13-Jan-92	T	70	ft ² /d	AFP #59	SW1	13-Jan-92	T

ANL AFP #59 IRP SI					SLUG TEST				
USAF IRPIMS HYDROLOGIC PARAMETER DATA (BCHGWD)					SLUG TEST				
AFID	LOCID	LOGDATE	PARCODE	PARVAL	UTMCODE	AFID	LOCID	LOGDATE	PARCODE
AFP #59	SW3	13-Jan-92	NE			AFP #59	SW3	13-Jan-92	NE
AFP #59	SW3	13-Jan-92	K	NI		AFP #59	SW3	13-Jan-92	K
AFP #59	SW3	13-Jan-92	S			AFP #59	SW3	13-Jan-92	S
AFP #59	SW3	13-Jan-92	T	NI		AFP #59	SW3	13-Jan-92	T
AFP #59	SW4	13-Jan-92	NE			AFP #59	SW4	13-Jan-92	NE
AFP #59	SW4	13-Jan-92	K	0.7	ft/d	AFP #59	SW4	13-Jan-92	K
AFP #59	SW4	13-Jan-92	S			AFP #59	SW4	13-Jan-92	S
AFP #59	SW4	13-Jan-92	T	50	ft/d	AFP #59	SW4	13-Jan-92	T
AFP #59	SW5	12-Jan-92	NE			AFP #59	SW5	12-Jan-92	NE
AFP #59	SW5	12-Jan-92	K	0.8	ft/d	AFP #59	SW5	12-Jan-92	K
AFP #59	SW5	12-Jan-92	S			AFP #59	SW5	12-Jan-92	S
AFP #59	SW5	12-Jan-92	T	50	ft ² /d	AFP #59	SW5	12-Jan-92	T
AFP #59	SW6	12-Jan-92	NE			AFP #59	SW6	12-Jan-92	NE
AFP #59	SW6	12-Jan-92	K	0.05	ft/d	AFP #59	SW6	12-Jan-92	K
AFP #59	SW6	12-Jan-92	S			AFP #59	SW6	12-Jan-92	S
AFP #59	SW6	12-Jan-92	T	4	ft ² /d	AFP #59	SW6	12-Jan-92	T
AFP #59	SW7	13-Jan-92	NE			AFP #59	SW7	13-Jan-92	NE
AFP #59	SW7	13-Jan-92	K	NI		AFP #59	SW7	13-Jan-92	K
AFP #59	SW7	13-Jan-92	S			AFP #59	SW7	13-Jan-92	S
AFP #59	SW7	13-Jan-92	T	NI		AFP #59	SW7	13-Jan-92	T
AFP #59	SW8	13-Jan-92	NE			AFP #59	SW8	13-Jan-92	NE
AFP #59	SW8	13-Jan-92	K	23	ft/d	AFP #59	SW8	13-Jan-92	K
AFP #59	SW8	13-Jan-92	S			AFP #59	SW8	13-Jan-92	S
AFP #59	SW8	13-Jan-92	T	1800	ft ² /d	AFP #59	SW8	13-Jan-92	T
AFP #59	SW9	12-Jan-92	NE			AFP #59	SW9	12-Jan-92	NE
AFP #59	SW9	12-Jan-92	K	0.2	ft/d	AFP #59	SW9	12-Jan-92	K
AFP #59	SW9	12-Jan-92	S			AFP #59	SW9	12-Jan-92	S
AFP #59	SW9	12-Jan-92	T	15	ft ² /d	AFP #59	SW9	12-Jan-92	T
AFP #59	DW9	12-Jan-92	NE			AFP #59	DW9	12-Jan-92	NE
AFP #59	DW9	12-Jan-92	K	NI		AFP #59	DW9	12-Jan-92	K
AFP #59	DW9	12-Jan-92	S			AFP #59	DW9	12-Jan-92	S
AFP #59	DW9	12-Jan-92	T	NI		AFP #59	DW9	12-Jan-92	T

* NE cannot be determined from a slug test.

* S cannot be determined reliably from a slug test

** NI means no interpretation possible; recovered in less than one unit.

-NW means no withdrawal slug test performed

.003 ft/d

.03 ft²/d

Appendix C-5-E:

IRPIMS BCHGWD

Borehole Widths

ANL AFP#59 IRP SI				
USAF IRPIMS BOREHOLE WIDTHS				
AFIID	LOCID	BEG- DEPTH	END- DEPTH	WIDTH (INCH)
AFP#59	DW1	0.0	61.5	6.25
AFP#59	DW3	0.0	40.0	14.25
AFP#59	DW3	40.0	88.0	6.25
AFP#59	DW4	0.0	35.0	14.25
AFP#59	DW4	35.0	92.5	6.25
AFP#59	DW5	0.0	35.0	14.25
AFP#59	DW5	35.0	83.0	6.25
AFP#59	DW6	0.0	36.0	14.25
AFP#59	DW6	36.0	86.5	6.25
AFP#59	DW8	0.0	40.0	14.25
AFP#59	DW8	40.0	93.0	6.25
AFP#59	DW9	0.0	38.0	14.25
AFP#59	DW9	38.0	90.0	6.25
AFP#59	SW4	0.0	29.0	8.25
AFP#59	SW5	0.0	30.0	8.25
AFP#59	SW6	0.0	29.0	8.25
AFP#59	SW7	0.0	29.5	8.25
AFP#59	IW7	0.0	44.0	8.25
AFP#59	SW8	0.0	23.0	8.25
AFP#59	SW9	0.0	25.0	8.25
AFP#59	IW9	0.0	51.0	8.25
AFP#59	4H1	0.0	18.0	8.25
AFP#59	4H2	0.0	19.0	8.25
AFP#59	1H1	0.0	14.0	8.25
AFP#59	1H2	0.0	14.0	8.25
AFP#59	6H1	0.0	14.0	8.25

Appendix C-6:
Data Set for Potentiometric Surface

DATA SET FOR POTENTIOMETRIC SURFACE MAPS
--

AVERAGE POTENTIOMETRIC SURFACE DEEP AQUIFER	JANUARY 17-27, 1992
--	---------------------

EASTING	NORTHING	WATER LEVEL
---------	----------	-------------

666219	771231	814.26
665697	770548	814.02
664993	771285	813.72
666034	770353	814.36
664926	770357	814.16

STATIC POTENTIOMETRIC SURFACE DEEP AQUIFER	JANUARY 11-13, 1992
---	---------------------

EASTING	NORTHING	WATER LEVEL
---------	----------	-------------

666219	771231	814.28
664948	770534	813.76
665697	770548	814.14
664993	771285	813.41
664972	770831	813.67
666034	770353	814.33
664926	770357	813.75

AVERAGE POTENTIOMETRIC SURFACE SHALLOW AQUIFER	JANUARY 17-27, 1992
---	---------------------

EASTING	NORTHING	WATER LEVEL
---------	----------	-------------

666222	771240	814.23
665697	770553	813.85
664994	771289	813.72
664972	770358	816.9
664931	770357	813.81
664935	770253	813.51
665087	770231	813.84
665235	770227	814.17
665382	770214	814.5
665638	770196	815.05
665814	770189	815.42
665965	770179	815.8
666014	770164	816.7
666147	770217	817.4
666210	770333	817.69
666263	770460	818.02
666323	770576	818.31
666369	770688	818.57
666440	770917	819.12

STATIC POTENTIOMETRIC SURFACE SHALLOW AQUIFER	JANUARY 11-13, 1992
--	---------------------

EASTING	NORTHING	WATER LEVEL
---------	----------	-------------

666222	771240	814.35
664939	770535	813.46
665697	770553	814.16
664994	771289	813.42
664972	770837	813.41
665377	770565	813.53
666033	770358	816.82
664931	770357	813.58
664935	770253	813.51
665087	770231	813.84
665235	770227	814.17
665382	770214	814.5
665638	770196	815.05
665814	770189	815.42
665965	770179	815.8
666014	770164	816.7
666147	770217	817.4
666210	770333	817.69
666263	770460	818.02
666323	770576	818.31
666369	770688	818.57
666440	770917	819.12

Appendix D:
Surveying Data
Sampling Locations at AFP 59

**Surveying Data
Sampling Locations at P-59.**

Horizontal measures are in feet and on the State Plane Coordinate System.
Elevations are in feet above MSL.
Ground surface elevations are shown unless otherwise indicated.

WELLS					
Well ID Designation	Top of Casing	Ground Surface	NORTHING	EASTING	ELEVATION
DW1	x		771230.68	666218.81	834.57
SW1	x		771240.06	666221.54	834.48
DW1/SW1		x	771239.32	666221.26	831.93
SW2	x		770360.55	665434.49	830.79
SW2		x	770359.64	665434.38	828.83
DW3	x		770534.20	664948.18	829.04
SW3	x		770535.02	664938.89	830.97
DW3/SW3		x	770534.96	664939.76	829.46
DW4			770548.15	665697.03	828.78
SW4	x		770552.49	665696.94	828.85
DW4/SW4		x			829.05
DW5	x		771284.96	664993.06	835.97
SW5	x		771289.28	664993.62	835.84
DW5/SW5		x	771286.87	664993.43	836.24
DW6	x		770830.91	664971.51	828.51
SW6	x		770836.67	664971.59	828.49
DW6/SW6		x	770835.09	664971.62	828.95
SW7	x		770564.89	665376.59	831.89
SW7		x	770562.93	665376.83	828.88
DW8	x		770352.97	666034.40	829.70
SW8	x		770358.28	666033.37	829.85
DW8-SW8	x	x	770355.68	666033.65	830.20
DW9	x		770357.35	664925.85	831.31
SW9	x		770356.75	664931.10	831.38
DW9/SW9		x	770356.97	664928.47	828.80
IW9	x		770356.21	664937.50	831.52
IW9		x	770357.12	664935.20	828.62
DPW	(center)	x	770569.13	665392.16	828.88*

(Continued on next page)

*Derived

continued.

Named-Sites				
SITE No.	Sample No.	NORTHING	EASTING	ELEVATION
Site A-1	A1 H1	770415.57	665984.03	828.67
Site A-2	2L 1 *	770516.29	665765.83	829.34
Site A-3	A3 H1	770411.17	666012.08	828.58
Site A-4	A4 H1	770495.74	665711.75	829.19
Site A-4	A4 H2	770507.49	665711.81	829.27
Site A-6	A6 H1	771057.13	665881.34	832.03

Plugged, previous-study boreholes near ANL boreholes.				
Location		NORTHING	EASTING	ELEVATION
(old bore near A4H1)		770494.13	665711.24	829.22
(old bore near A4H2)		770509.34	665713.04	829.39
(old bore near A6H1)		771056.89	665886.29	832.01

Choconut Creek				
Location	Sample No.	NORTHING	EASTING	ELEVATION
(Regional background stream sampling locations upgradient from Johnson City.)				
CNC*	JCCNCAW	802750	669600	1300
CNS*	JCCNSCS	802750	669600	1300
(Local background stream sampling locations upgradient from P-59 outfalls.)				
CWS-1	CW 1	770268.08	666170.51	817.42
CSS-1	SD 1	770268.08	666170.51	817.42
(Stream sampling locations downgradient from P-59 outfalls.)				
CWS-2	CW 2	770251.94	664976.83	814.36
CSS-2	SD 2	770246.--	664976.--	814.--

Outfalls			
Location	NORTHING	EASTING	ELEVATION
OF1 invert	770263.89	665195.82	824.02
OF-2 invert	770205.07	665989.82	823.07
OF-3 invert	770311.15	665002.41	817.69

(Continued on next page)

*Derived

continued.

Background Soil and Groundwater Sampling Locations				
Media	Sample ID	NORTHING	EASTING	ELEVATION
soil	BG1	770417.87	864903.25	840.78
ground water*	BG2	773100	670150	840
(Background surface water is shown with creek samples above.)				

MEM Hand Sample Locations			
Location	NORTHING	EASTING	ELEVATION
HA01	770531.05	665317.62	829.35
HA02	770542.50	665315.44	829.42
HA03	770562.99	665315.76	829.28
HA04	770566.95	665309.02	829.00
HA05	770543.78	665307.42	829.42
HA06	770533.83	665307.47	829.41
HA07	770425.86	665923.69	828.29
HA08	770466.75	665878.37	827.54
HA09	770468.73	665807.69	827.61
HA10	770471.27	665726.49	828.17
HA11	770467.17	665662.48	828.28
HA12	770479.45	665404.37	827.75
HA13	770413.30	665460.33	829.56
HA14	770285.56	664997.87	817.95
HA15	770341.73	665717.91	828.24
HA16	770403.93	665941.78	828.36
HA17	770514.59	665765.83	833.88
HA18	(Not shown. See site map.)		

Appendix E:
Chain-of-Custody Forms

Chain of Custody Record

[illegible]

Page 1 of 1

TRIP3

[illegible]

TAIP 4

Company Name Argonne	Project Manager/Contact W. A. Harrison Barney Nashold	Project Name IRP Supplemental S.I.	Galson Laboratories 6601 Kirkville Road East E. Syracuse, New York 13057 315-432-0506 or 800-850-0506	Special QA/QC Protocol (Circle) EPA CLP EPA SW 846 NYS DEC NYS DOH NJ TIER I CALIFORNIA NJ TIER II OTHER (Specify)	PARAMETERS FOR ANALYSIS																		
Project No. AF-59																							
SAMPLE LOCATION / SAMPLE ID	Date	Time	TYPE	g/g	g/g	Other	A	B	C	D	E	F	G	H	I	J	K	Laboratory ID Number	SV	PCB/PEST	Metals	C_h	
JCSW6AS	16 Nov 91	1430	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
JCSW6BS	16 Nov 91	1530	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
JCCW7AW	17 Nov 91	1400	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
JCSW2AS	17 Nov 91	1430	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
JCCW7AW	17 Nov 91	1530	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
JCSW1AS	17 Nov 91	1600	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TRIP 4	18 Nov 91	1000	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
REMARKS: NYS DEC ASP. NOTE: TRIP BLANK Notified. Please label "TRIP 4" (Note: The 4th character in the 4th + 6th Sample ID's shown (JCSW...) is the letter D, not the letter O or universal zero.)																							
SAMPLERS: Barney Nashold SIGNATURE: Barney Nashold NAME: Barney Nashold																							
SAMPLES RELINQUISHED BY: NAME: Barney Nashold SIGNATURE: Barney Nashold NAME: Barney Nashold																							
SAMPLES RECEIVED BY: NAME: Barney Nashold SIGNATURE: Barney Nashold NAME: Barney Nashold																							
Received For Laboratory By: (Signature): Barney Nashold DATE: 11/18/91 TIME: 1430 Custody Seal Intact? ☒ Yes ☐ No Shipment Complete? ☒ Yes ☐ No Lab Stor. Location (Ref. #)																							

TRIP 5

[illegible]

11. 11. 19

Company Name ARGONNE		Project No. 100-59		Project Name BARNEY WASHOLD		Project Manager/Contact JOYAN HARRISON
Galson Laboratories 6601 Kirkville Road East E. Syracuse, New York 13057 315-432-0508 or 800-850-0508				NJ Tier I CALIFORNIA NYS DOH EPA CLP EPA SW 846 (Circle) Special QA/QC Protocol		NJ Tier II OTHER (Specify)	
SAMPLE LOCATION / SAMPLE ID 36-545722		Date 10/10/00		Time 10:30		TYPE Comp. ☐ Grab ☐ Aqueous ☐ Soil ☒ Other ☐	
Laboratory ID VOA		Laboratory ID SV		Laboratory ID PCB / PEST		Laboratory ID metals	
PARAMETERS FOR ANALYSIS		A B C D E F G H I J K		A B C D E F G H I J K		A B C D E F G H I J K	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
36-545722		36-545722		36-545722		36-545722	
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36-545722		36-545722					

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#TRIP10

FEDEX A8#132380098 Chain of Custody Record

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Company Name Argonne		Project Manager/Contact Wynne Harrison Barney Nashold		Special QA/QC Protocol (Circle) EPA CLP EPA SW 846 NYS DEC NYS DOH NJ TIER I CALIFORNIA NJ TIER II OTHER (Specify)		PARAMETERS FOR ANALYSIS																																																				
Project No. AFP-57		Project Name IRP Supplemental S.I.		Galsion Laboratories 6801 Kirkville Road East E. Syracuse, New York 13057 315-432-0508 or 800-950-0508		<table border="1"> <tr> <th>Co A</th> <th>SV</th> <th>PCB/PEST</th> <th>METALS</th> <th>Co A</th> <th>SV</th> <th>PCB/PEST</th> <th>METALS</th> </tr> <tr> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> </tr> <tr> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> </tr> <tr> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> </tr> <tr> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> </tr> </table>													Co A	SV	PCB/PEST	METALS	Co A	SV	PCB/PEST	METALS	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
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SAMPLE LOCATION / SAMPLE ID		Date		Time		TYPE		Aqueous		Soil		Oils		LABORATORY ID		Number																																										
JC1 HIAS		04 DEC 91		0940		G		☒		☒		☒		A		B																																										
JC1 HICS		04 DEC 91		1000		G		☒		☒		☒		C		D																																										
JC3 HIAS		04 DEC 91		1225		G		☒		☒		☒		E		F																																										
JC6 HIAS		04 DEC 91		1600		G		☒		☒		☒		G		H																																										
TRIP10		04 DEC 91		1745		G		☒		☒		☒		I		J																																										
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Chain of Custody Record

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TRIF 12

Chain of Custody Record

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Company Name Argonne		Project Manager/Contact Barney Nashold		Galson Laboratories 6601 Kirkville Road East E. Syracuse, New York 13057 315-432-0506 or 800-950-0506		Special QA/QC Protocol (Circle) ☒ EPA CLP ☐ EPA SW 846 ☒ NYS DEC ☐ NYS DOH ☐ NJ TIER I ☐ CALIFORNIA ☐ NJ TIER II ☐ OTHER (Specify)		PARAMETERS FOR ANALYSIS																	
Project No. ATP-59		Project Name TRIF Supplemental S.T.				VOC SV PCB/STP Metals																			
SAMPLE LOCATION / SAMPLE ID		Date	Time	TYPE	Comp.	Grab	Aqueous	Soil	Other	A	B	C	D	E	F	G	H	I	J	K	Laboratory ID Number	VOC	SV	PCB/STP	Metals
JCSBG2AW		10/29/11	1510																						
JCSW1AS		10/29/11	1740																						
JCSW1BS		10/29/11	1815																						
JCSW1ES-M		10/29/11	1815																						
TRIF 12		10/29/11	1630																						
REMARKS: NYS DEC ASP																						Task No.			
Sample JCSW1ES-M: MS/MSD																									
SAMPLERS NAME: Barney Nashold		SIGNATURE: Barney Nashold		Galson Code: D-055																					
SAMPLES RELINQUISHED BY:										SAMPLES RECEIVED BY:										Received For Laboratory By:				DATE: 11/1/11	
NAME: BARNEY NASHOLD					DATE: 10/29/11					NAME: L...					DATE: 11/1/11					(Signature) [Signature]				TIME: 1:30	
SIGNATURE: Barney Nashold					TIME: 1230					SIGNATURE: [Signature]					TIME: 1:30					Custody Seal Intact? Sample ☒ Yes ☐ No ☐ N.A.					
NAME: [Signature]					DATE: 11/1/11					NAME: [Signature]					DATE: 11/1/11					Shipment Complete? ☒ Yes ☐ No					
SIGNATURE: [Signature]					TIME: 1:30					SIGNATURE: [Signature]					TIME: 1:30					Lab Stor. Location (Ref. #)				2894	

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Chain of Custody Record

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Chain of Custody Record

Number of Containers
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TRIP 14

Company Name Argonne		Project Manager/Contact WYMAN HARRISON BARNEY NASHOLD		Galson Laboratories 6601 Kirkville Road East E. Syracuse, New York 13057 315-432-0506 or 800-850-0506		Special QAVQC Protocol (Circle) EPA CLP EPA SW 846 NYS DEC NYS DOH NJ TIER I CALIFORNIA NJ TIER II OTHER (Specify)		PARAMETERS FOR ANALYSIS															
Project No. AT-P-59	Project Name IRP Supplemental S.I.	SAMPLE LOCATION / SAMPLE ID		Date	Time	TYPE	Agencies	SOE	Other	A	B	C	D	E	F	G	H	I	J	K	Laboratory ID Number	Task No.	
		JCDW 3 A W		7 JAN 1980	1111																		
		JCDW 3 A W		7 JAN 1980	1111																		
		JCDW 9 A W		7 JAN 1980	1650																		
		JCSW 9 A W		7 JAN 1980	1727																		
		JCDW 4 A W		8 JAN 1980	1505																		
		JCDW 4 A W - M		8 JAN 1980	1505																		
		JCSW 4 A W		8 JAN 1980	1625																		
		JCSW 7 A W		8 JAN 1980	1710																		
REMARKS: Black greasy substance observed in JCDW 4 A W. It may be 'Grisco' used by childless. Teflon lid liners fell out of lids of containers for JCDW 4 A W SW + JCDW 4 A W - M PCB/TEST. Containers were closed without liners for about 15 minutes. New cans with liners were purchased.																							
SAMPLERS NAME:		SIGNATURE:																					
SAMPLES RELINQUISHED BY:				SAMPLES RECEIVED BY:																			
NAME: BARNEY NASHOLD		DATE: 8 JAN 1980		NAME: Barney Nashold		DATE: 8 JAN 1980		SIGNATURE:		DATE:		TIME:		Custody Seal Intact? Sample ☐ Yes ☐ No		Shipment Complete? ☐ Yes ☐ No		Lab Stor. Location (Rel. #)		2/89			
SIGNATURE:		TIME:		SIGNATURE:		TIME:		SIGNATURE:		DATE:		TIME:		A B C D E F G H I J K L									
NAME:		DATE:		NAME:		DATE:		SIGNATURE:		DATE:		TIME:											
SIGNATURE:		TIME:		SIGNATURE:		TIME:		SIGNATURE:		DATE:		TIME:											

Chain of Custody Record

10 JAN 91
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TRIP 14-15

Company Name ARJONCO		Project Manager/Contact J. J. J. J.		Galson Laboratories 6601 Kirkville Road East E. Syracuse, New York 13057 315-432-0506 or 800-950-0506		Special QA/QC Protocol (Circle) EPA CLP EPA SW 846 NYS DEC NYS DOH NJ TIER I CALIFORNIA NJ TIER II OTHER (Specify)		PARAMETERS FOR ANALYSIS												Number of Tests			
Project No. ARJONCO	Project Name TRIP 14-15					3	2	1	1	2	2												
SAMPLE LOCATION / SAMPLE ID		Date '92	Time	TYPE	Comp.	Grab	Aqueous	Soil	Other	A	B	C	D	E	F	G	H	I	J	K	Laboratory ID Number		
JC DUG A W		1/14	14:30				✓															✓	DOSS
JC DUG B W		1/14	14:30				✓															✓	DOSS
JC DUG C A W		1/14	15:10				✓															✓	DOSS
JC DUG A W		1/14	15:51				✓															✓	DOSS
TRIP 15		1/15	09:50				✓															✓	DOSS
REMARKS: 1/15 CC A3P																						Task No.	
SAMPLERS NAME: Barney Nash		SIGNATURE: B. Nash																					
SAMPLES RELINQUISHED BY:				SAMPLES RECEIVED BY:				Received For Laboratory By:				DATE: 1/17/91											
NAME: BARNEY NASH				DATE: 10/14/92				NAME: J. J. J. J.				DATE: 10/14/92				Custody Seal Intact? Sample ☒ Yes ☐ No ☐ N.A.							
SIGNATURE: B. Nash				TIME: 09:50				SIGNATURE: J. J. J. J.				TIME: 05:50				Shipment Complete? ☒ Yes ☐ No							
NAME: J. J. J. J.				DATE: 10/14/92				NAME: J. J. J. J.				DATE: 10/14/92				Lab Stor. A B C D E F G H I J K L							
SIGNATURE: J. J. J. J.				TIME: 12:25				SIGNATURE: J. J. J. J.				TIME: 12:25				Location (Ref. #)							
NAME: J. J. J. J.				DATE: 10/14/92				NAME: J. J. J. J.				DATE: 10/14/92				289							
SIGNATURE: J. J. J. J.				TIME: 12:25				SIGNATURE: J. J. J. J.				TIME: 12:25											

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