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

Volume 2: Appendices A - E

Jan 101614

**Energy Systems Division Argonne National Laboratory** 



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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. Shephard, L. Reed, E. Schug, and T. Sydelko

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

January 1994

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<sup>\*</sup>Nashold is affiliated with the Environmental Research Division; Rosenblatt, 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

Appendix A-1:

Data Validation

#### 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 it's 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.

Date	SDG	Analysis'
25 FEB 92	1	VOC
26 FEB 92	1	SVOC
25 Feb 92	1	P/P
26 FEB 92	1	MET
26 FEB 92	2	VOC
26 FEB 92		SVOC
26 FEB 92		P/P
26 FEB 92		MET
17 MAR 92	3	VOC
16 MAR 92	3	SVOC
17 MAR 92	3	P/P
17 MAR 92	3	MET
13 MAR 92	5	VOC
14 MAR 92	5	SVOC
13 MAR 92	5	P/P
16 MAR 92	5	MET
25 MAR 92	6	VOC
25 MAR 92	6	SVOC
25 MAR 92	6	P/P
25 MAR 92	6	MET
24 MAR 92	7	VOC
24 MAR 92	7	SVOC
25 MAR 92	7	P/P
25 MAR 92	7	MET
	25 FEB 92 26 FEB 92 17 MAR 92 17 MAR 92 17 MAR 92 17 MAR 92 18 MAR 92 18 MAR 92 18 MAR 92 18 MAR 92 19 MAR 92 20 MAR 92 21 MAR 92 22 MAR 92 24 MAR 92 24 MAR 92 25 MAR 92 24 MAR 92 25 MAR 92	25 FEB 92 1 26 FEB 92 1 25 Feb 92 1 26 FEB 92 2 26 FEB 92 2 26 FEB 92 2 26 FEB 92 2 26 FEB 92 3 17 MAR 92 3 16 MAR 92 3 17 MAR 92 3 17 MAR 92 3 13 MAR 92 5 14 MAR 92 5 14 MAR 92 5 15 MAR 92 5 16 MAR 92 5 25 MAR 92 6 25 MAR 92 6 25 MAR 92 7 24 MAR 92 7

<sup>\*</sup> MET=inorganics P/P=PCB's and pesticides

Appendix A-1: Data Validation

Report 1

# 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: SDG No: NONE 1-5554

Volatiles:

**JCCNSCS JCDW1AS** JCDW1BS JCDW1CS JCDW3AS JCDW3BS JCSD1AS JCSD2AS JCSW4BS JCSW4CS JCSW4AS 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

AFP59V-1

- \* 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 <u>CLP Organics Data Review and Preliminary Review</u>, 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:

BLANK ID.	COMPOUND	CONCENTRATION	ACTION LEVEL
JCQC1TW	acetone	11	110
	1,1,1-trichloroethan	e 5 .	25
JCQC2BW	acetone	11	110
	1,1,1-trichloroethan	e 2	10
JCQC3XW	acetone	12	120
	1,1,1-trichloroethan	e 4	20

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

Associated samples with positive values reported <u>below</u> the action | level are:

RINSATE I	BLANK ID.	<u>ASSOCIATED SAMPLES</u>
JCQC1TW	JCQC2BW	JCDW1CS
		JCSW4CS
		JCSW8AS
		JCSW8BS

#### Action:

o associated sample results \(\geq CRQL\) and \(<a tion level \) (flagged B) are flagged as not detected at the sample value (U)</p>

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

#### GC/MS TUNING:

Form 5A for Instrument  $B(\frac{1}{2})$  tune performed on  $\frac{11}{13}/91$  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, PhD Vice President

enclosures

#### Air Force Plant 59 Case No. NONE

#### Table I. Validation Action Summary

Sample No. JCCNSCS JCDW1AS	<u>VOA</u>
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 1,1,1trichloroethane 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 noncompliant 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

AFP59V-1

- J7 estimate positive values (J) for ( ) due to noncompliant internal standard stability
- 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

SAMPLE PREPARATION AND ANALYSIS SUMMARY FOR NYSDEC ECHEM INC.

SITE: Hie Force Plant 59 SDG NO / KSSSY CLIENT: Hranne Na. CASE NO.

CASE NO.			SDG NO. 7 2533 7	7000		ANALYTICAL FRACTION: Volatiles	ACTION: Volati	89
CLIENT	EPA							
SAMPLE	SAMPLE	SAMPLE	MATRIX	DATE	DATE	DATE	HOLD	É
0	NO,	O)		COLLECTED	RECEIVED	ANALYZED	COLLECT	RECEIPT
Techses		5832-007	50,1	11-20-91	11-21-91	11-28-91	8	6
JCDW145		5832-008		11-21-91	16-17-11	16-82-11	7	L
TODW/18S		5834-009		11-21-91	16-12-11	16-82-11	7	4
TCDWICS		5833-010		11-21-91	16-12-11	16-82-11	7	$\iota$
Trawa4S		5603-001		11-05-91	11-05-91	16-80-11	E	3
TCDUIS BS		57003-00A		11-05-91	16-50-11	16-80-11	3	3
TrsnzAs		5770-006		11-17-91	16-81-11	16-27-11	2	7
Tesbans		5770-004		11-17-91	16-81-11	16-27-11	5	<i>h</i>
TeswyAS		100-6065		11-26-91	16-77-11	11-30-91	4	h
JPsw 485		5909-003		11-26-91	11-26-91	16-08-11	4	H
Jesw 4CS		5909-003		11-26-91	16-92-11	16-52-11	7	7
TCSW545		5832-001		11-20-91	16-12-11	16-82-11	8	7
705W58S		5833-003		11-20-91	16-12-11	11-28-91	8	7
Jaswas		5770-001		11-16-91	16-81-11	11-22-91	7	4
Tr. Su) 6 BS .		5770-002		11-16-91	16-81-11	11-22-91	e	d
JC.SW8AS		1254-001		11-04-91	16-50-11	11-08-81	4	3
Teswiges		5554-002		11-04-61	16-50-11	16-60-11	5	4
TCOCITW		5602-003		11-06-91	16-90-11	15-80-11	7	3
TC0C 28W		5602-004		11-06-91	11-01-91	16-60-11	3	7
JCac.3xw)		5680-001		11-07-91	16-80-11	16-61-11	7	/
TRIP BLANK I		5554-003		11-00-11	11-05-91	16-80-11	4	رح.
TRIP BLANK 2 .		5603-005		11-00-01	11-06-91	16-80-11	2	7
TRIP BLANK 3		5636-002		11-07-91	16-89-11	16-60-11	7	/
TRIP BLANK LO		5832-011		11-21-91	16-18-11	11-28-91	7	7
TRIP BLANK 8		5409-004		16-90-11	11-26-91	16-82-11	Y	И

# COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT # DATE RECEIVED MINUS DATE ANALYZED

#### ECHEM INC. ORGANICS

COMPLETENESS LOG CLIENT: Argonne Notillabs SITE: AIR Force 8DG# |-5554 CASE # 8 A TeSW 485 108W585 JCS4645 Tes w 445 csw5AS Ħ Teswe & TCSDLA P  $\mathcal{ICSD}$ L 1E <u> 2A</u> 23 3**A** 3B 4A **5**A **6**A 7A 8A 13 10 2C 2D 3C 3D 4B SVOA 5B **6B** 6C **7B** 7C 8B 8C 1D 22 2F 3 E PEST 3**F** 4C 8D 8E 9 10 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

Appendix A-1:

Report 2

# 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

Semivolatiles: JCCNSCS JCDW1AS JCDW1BS JCDW1CS

JCDW3AS JCDW3BS JCQC1TW 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/MS tuning
  - calibration
- \* internal standards performance
- \* field duplicates
- \* TCL compound identification
- \* tentatively identified compounds
- \* system performance
- \* compound quantitation and reported detection limits

1

\* - sample result verification

\* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II <u>CLP Organics Data Review and Preliminary Review</u>, 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.

	HOLDING TIME	(DAYS) FROM
SAMPLE	SAMPLE COLLECTION	RECEIPT BY LAB
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 <u>either</u> 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:

			PERCENT	RECOVERIES		
	BASE-NEU	TRAL	FRACTION	ACID	FRAC	TION
SAMPLE JCSW4CS	NBZ	FBP	<u>TPH</u>	. <u>PHL</u> 21	<u>2FP</u> 11	TBP
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 >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

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

Deviations from the above calibration criteria are tabulated below.

#### CONTINUING CALIBRATION

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

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

## Associated samples:

<u>Instrument</u> GCMSD(#4)	<u>DATE/TIME</u> 11-15-91/16:28	SAMPLE NO. JCSW8BS JCDW3AS JCDW3BS				
	11-19-91/13:40	JCSW8AS				
	11-20-91/09:47	JCQC1TW JCQC2BW				
	12-14-91/13:26	JCSW6AS JCDW1AS JCDW1BS JCDW1CS				
GCMSD(#4)	12-16-91/16:23	JCSW4AS JCCNSCS JCSW4BS JCSW4CS				

#### Action:

none, associated sample results reported as either  $<\!$ CRQL J or CRQL U

Sincerely, ECHEM INC.

Bruce K. Wallin, PhD Vice President

enclosures

#### Air Force Plant 59 Case No. NONE

#### Table I. Validation Action Summary

Sample No. JCDW1AS	SVOA		
JCDW1BS			
JCCNSCS (RE)	R2, (R1	.)	
JCDW1CS			
JCDW3AS			
JCDW3BS			
JCQC1TW			
JCQC2BW			
JCQC3XW			
JCSD1AS			
JCSD2AS			
JCSW4AS	J3		
JCSW4BS			
JCSW5AS		•	
JCSW5BS			
JCSW6AS			
JCSW4CS			
JCSW8AS			
JCSW8BS			
JCSW6BS			

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
- 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 noncompliant 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. ORGANICS COMPLETENESS LOG SITE: Air Force Plant 59 CLIENT: Argonne Nost'I Labs 8DG# 1-5554 CASE # 8  $\mathcal{B}\mathcal{E}$ Jeswycs 85 7CS(1)5AS A TC DUJ3 AS JCDWICS TC DW3BS TCGCAKW JCSW4AS CSW4B 17 SDIAS 125 D2A SCOC IT M B csw5 CNSC P Jesus SCAC L E 1E <u> 2A</u> <u> 23</u> **3**A 3B 4A 5A бA 7A 8A 13 10 1F 20 2D 3C 3D **4B** 5B **6B** 6C 7B 7C 88 8C 1D 2E 2F 3 E 3P 4C 8D 8E 10

Quant Reports

/ MASS SPECS

/ TIC Compounds

/ Laboratory Blank (Form 1's)

/ M8/MSD (Forms 1's)

Total Solids Log (if applicable)

Injection Log

/ Chain of Custody

/ Case Narrative

VOA:

SVOA

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

> CLIENT: Argenne Not'l CASE NO.

1-5254 SDG NO.

ANALYTICAL FRACTION: Semivolatiles SITE: AIR Force Plant S9

RECEIPT TO EXTRACTION HOLD TIME COLLECT **り** b (c**/** W **EXTRACTED** 1-26-91 1-30-9 6-15-1-26-9 1-10-1-6 -21-9 -30-91 -26-9 1-26-9 16-72--08-81 6-18-130-9 16-11-16-80-1 DATE 1-26-9 1-07-01 16-20-11 1-02-61 1400-61 RECEIVED 6-12-1 11-08-9 10-25-11 1-31-9 11-21-91 11-26-91 11-02-6 6-81-1 6-81-11 13-17-1 DATE 16-87-11 COLLECTED 11-21-91 11-21-91 DATE 16-12-11 16-50-11-26-91 11-04-6 6-50--24-9 11-20-9 1-00-1 16-90-1 1-02-0 11-17-9, 9-98-- 20 - 9 11-20-91 1-00-1 16-91-11 16-91-1 11-17-91 MATRIX 5554-00 A 5770-002 5832 -007 SAMPLE 5832-009 5909-002 5554-001 6608-003 5003-003 5832-006 5832-010 5770 - 006 400 - 100م 5832-00 5832-002 5609-001 1608-COY 5630-001 5909-003 5909-001 5770-001 **7**8 SAMPLE EPA 9 JCCNSCS C0C3 XW TCDWIBS JUL WIRS TCOC 28W JCDWICS JCSW485 **ZESWARS** TCDW3BS ICSIANAAS CLIENT SAMPLE **ICDW3AS** JCQC ITW ICSD2 AS Jesmyes ICSW545 Trsw585 TC 343885 CSW8AS ICSWHAS JCSDIAS **□** 

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

Appendix A-1:

Report 3

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# 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 JCDW1CS JCDW3AS JCDW3BS JCQC2BW JCQC1TW JCQC3XW JCSD2AS JCSD1AS JCSW4AS JCSW4BS JCSW4CS JCSW5BS JCSW6AS JCSW5AS

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 <u>CLP Organics Data Review and Preliminary Review</u>, 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:

SAMPLE JCSW6AS DBC RECOVERY (%)

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:

RECOVERY (%)

SAMPLE Q1-0058 (MSB) LIN HEP ALD DIEL END

140/136

DDT

#### Action:

o none, sample results reported as CRQL U

Sincerely, ECHEM INC.

Bruce K. Wallin, PhD

Vice President

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#### U.S. Steel Site Case 1-5554

#### Table I. Validation Action Summary

Pesticide/PCB

SAMPLE NO.

JCCNSCS

J6

J7

compliant internal standard stability

estimate positive values (J) for ( ) due to non-

estimate positive values (J) and detection limit values (UJ) for  $(\ )$  due to non-compliant calibration 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%2

SAMPLE PREPARATION AND ANALYSIS SUMMARY ECHEM INC.

**FOR NYSDEC** 

CLIENT: Arganne Notil Labs CASE NO.

SDG NO. 1-5554

ANA! YTICA! FRACTION: Pasticida/PCRs SITE. Air Force Plant 59

cide/PCBs	TIME	ACTION	RECEIPT	h	H	ħ		1	h	ħ	3	7	7	- $h$	h	ħ	t	ħ	7.	7	E	8			
IACTION: Pestic	HOLD TIME	TO EXTRACTION	COLLECT	4	4	ħ	3	Ŋ	5	.5	h	63	3	7	<i>h</i> .	$\phi$	5	5	<u>7</u>	4.	4	<b>.</b> 4	•		
ANALYTICAL FRACTION: Pesticide/PCBs		DATE	EXTRACTED	11.25-91	11-25-91	11-25-91	11-08-91	11-00-11	16-11-11	11-11-41	11-11-91	11-20-91	11-20-91	11-30-91	11-30-91	11-30-91	11-52-91	11-52-91	11-22-91	16-02-11	11-08-0-11	11-08-011			
		DATE	RECEIVED	11-21-91	11-21-91	116-12-11	16-20-11	16-20-11	16-20-11	16-20-11	16-80-11	16-81-11	16-81-11	16-72-11	16-92-11	16-92-11	16-12-11	16-17-11	16-81-11	16-81-11	16-50-11	11-65-91			
1000		DATE	COLLECTED	16.02.11	11-21-91	11-21-91	11-05-91	11-05-91	11-06-91	11-06-91	11-07-91	11-17-91	11-17-91	11-26-91	11-26-91	16-92-11	11-20-91	11-20-91	11-16-91	11-16-91	16-49-11	16-10-11			
SDG NO. 1 - 2 3 5		MATRIX		Soil	Soil	Soil	So.11	So:11	WATER	LUBTER	LINATER	7705	SOIL	Soll	Soil	710S	S01L	5011	77000	Soil	2016	Soul			
	LAB.	SAMPLE	D	5832-007	5832-008	5132-010	5602-001	5603-002	700-6095	500-2003	5630-001	5770-006	5770-004	2909-001	5909-00B	5909-603	5882-001	5832 - 008	5770 - 001	5770-00a	5554-002	100-7555			
	EPA	SAMPLE	NO,																						
CASE NO.	CLIENT	SAMPLE	ID .	JCCNSCS	JCPW145	TCDWICS.	TCDW345.	TCDW3RS'	JCacaBW	TCOC. ITW	TCacaxi	TCSDIAS	JCSDZAS ,	JCSW4AS'	TC 51495'	Taswics	TCSWSAS	TCSW5BS	JCSW6AS	JesmaBS	TCS W8BS	Trsw845			

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

## ECHEM INC. ORGANICS

SITE: Air Fore Plant 59 CLIENT: Argonne Nat'l Labes CASE # 8 Bω A TCSWYB TRACITY TCQC3XW SCSDZAS CSDIAS JCCN3CS TCSWSA TCSW4A M TCSWY P B Jan. <u>17</u> 1E <u> 2A</u> **2B 3**A VOA 3B 4A 5A 6A **7**A 8A <u>1B</u> 10 1F 2C 2D 3C 3D SVOA 4B 5B 6B 6C 7B 7C 8B 8C <u>1D</u> 2E 2F 3 E PEST 3F 4C 8D 8 E 10 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

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

Laboratory:

Air Force Plant 59

Galson Laboratories

Case No: NONE SDG No: 1-5554

TAL Inorganics:

JCSW8BS JCCNSCS JCSW6AS JCDW1AS JCDW1CS JCDW1BS 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 <u>Evaluation of Inorqanic Data for the Contract Laboratory Program</u>, 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 ≥IDL and their associated action levels are tabulated below:

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

Associated samples with positive values reported <u>below</u> the action level are tabulated below:

CAL BLANK ID	<u>PARAMETER</u> beryllium	SAMPLE NO. JCSW8AS
	sodium	JCSW8AS JCSW8BS
CCB3	beryllium	JCSW5AS JCCNSCS JCSW5BS JCDW1AS JCDW1BS JCSW4AS JCSW4BS

CAL BLANK ID CCB3	<u>PARAMETER</u> sodium	SAMPLE NO. 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:

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

Associated samples with results reported <10IDL: NONE

#### 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:

AFP59-I1

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

#### Action:

- o for recoveries <30%, results ≥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 <u>all</u> samples of the same matrix associated with this SDG.

#### FURNACE ATOMIC ABSORPTION RESULTS:

#### 1. Post-digestion spike

Samples with post-digestion spike recoveries ≥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:

SAMPLE	ELEMENT	<pre>% RECOVERY</pre>
JCDW1CS	selenium	76
<b>JCDW3AS</b>	selenium	81
<b>JCSW6AS</b>	selenium	65
JCSW6BS	selenium	82
JCSD1AS	selenium	75
<b>JCSD2AS</b>	selenium	80
<b>JCSW5AS</b>	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 >IDL are flagged as estimated (J)

AFP59-I1 ECHEM INC.

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:

SAMPLE ELEMENT 3D JCSW5BS zinc 12.4

#### Action:

o results are flagged as estimated (J)

#### Comments:

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

Sincerely, ECHEM INC.

Bruce K. Wallin, PhD

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		Sel <b>e</b> nium	<b>J</b> 7
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.

- Al 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.

#### ECHEM INC. INORGANICS COMPLETENESS LOG

SITE:	Air #	Ŧ	orc	e	Ŧ	la	Λ‡	5	9				c	IL)	EI S#	TT:		1/2	105	ne	_ \	V	2+1	Ц	لم
	S A M P L	resweas	reswebs	TCCNSCS	TCDWIAS	TCDW 7.85	TCDW 1CS	JCDW345	TCDW385	reacted	SCOLBYW	rcsD1AS			·0						STACABW				
1		×	X	놧	X	Ż	Ż	$\overline{\mathbf{x}}$	ij	ÿ	X	X	ij	J)	X	Ż	Ž	V	Ż	Ż	$\Rightarrow$	1	_		$\dashv$
2 <u>A</u>		×	X	7	Ż	X	Z	V	$\overline{\mathbf{v}}$	Z	X	又	Ż	X	Ź	Χŀ	文	V	X	V	J	-			
2B		×	文	×	X	Ź	X	Ź	Ź	Ž	X	7	X	X	Ż	X	7	Ż	$\overline{\mathbf{x}}$	Ż	Ż				
3		<u> </u>	又	又	又	7	又	X	ব্য	Х	X	X	Ź	X	Z	X	X	V	Ź	X	V				$\Box$
4		×	×	V	又	Ź	又	V	Ż	X	Z	Z	×	V	X	X	X	X	Ż	X	Ż			,	$\Box$
5 <b>A</b>		×	×	×	X	Х	X	又	X	X	X	X	N.	×	X	X	X	X	X	X	X				$\Box$
5B																									
6		×	又	V	V	X	X	$\times$	$\times$	X	Χ	×	×	V	×	又	ヌ	又	Z	×	又	Г			
7.		$\searrow$	ヌ	V	X	X	X	X	X	Х	X	X	X	×	Ŋ	又	X	フ	$\supset$	17	X	L			
8		X	X	$\times$	×	X	Ž	V.	X	X	X	X	$\times$	X	بح	X	X	X	X	$\times$	$\times$				
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10		X	X	V	と	X	Ķ	X	X	X	X	X	X	$\sqrt{2}$	X	X	X	X	X	>	X	1			
11A		X	X	X	X	X	X	X	X	X	X	$\geq$	Z	$\times$	X	X	X	X	$\times$	X	$\times$				
11B																									
12		X	7	X	$\times$	X	X	X	Ķ	X	X	Z	1	$\vee$	V,	X	X,	X	X	X	$\geq$	}_			
13		X	X	$\succeq$	X	X	X	$\times$	X	X	X	$\searrow$	K	$\succeq$	$\mathbb{X}$	X	X	X	X	×	Į.	1			
14		Z	区	V	$\nabla$	X	X	X	X	X	X	V	X	SZ	V	Z	X	X	1 <del>7</del>	V	又	Ψ.			П

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

55 th	lercury		CT   RECEIPT		J.	/3	73	(3	//3	,	"	9	<i>,</i>	e	7	7	8	В	8	(3	/3	7	>		
46.0	AACTION: M	S	COLLECT	6	9	//	/3	/3	/3	8	8	7	7	e	8	8	8	6	۵	///	14	6	4	,	
SITE: Aig Freis Plant S9	ANALYTICAL FRACTION: Mercury	DAY C	ANALYZED	16-38-11	11-13-41	16-60-81	16-60-81	12-04-61	16-60-81	16-81-11	16-81-11	16-81-11	11-13-91	16-81-11	11-25-91	11-25-91	12-04-91	12-04-91	18-64-61	18-04-81	12-04-91	11-35-91	16-81-11		
			RECEIVED	16-81-11	11-05-91	11-21-91	11-21-91	11-21-91	11-21-91	11-07-91	11-07-91	11-07-91	11-07-41	11-01-91	11-11-11	11-18-91	16-26-11	11-26-91	11-26-91	16-16-11	11-21-91	16-81-11	11-05-91		
FOR NYSDEC	SDG NO. 1-5554	LH C	COLLECTED	16-91-11	16-60-11	11-20-91	16-16-11	11-21-91	11-21-61	16-50-11	16-50-11	16-90-11	16-00-11	16-20-11	16-11-11	11-17-91	16-98-11	16-98-11	16-98-11	16-08-11	16-00-11	16-011-11	16-40-11		
FORN	SDG NO.	SIGER	MAIHIX	- - - -				_		<b>*</b>	7.18	Water	Water	Water	1.35								•		
			SAMPLE	5770-001	5354-008	5632-007	2882-008	5832-009	010-8885	100-8095	200-8095	5602 - 003	400- 6079	100-0875	5770-006	400-0615	100-6069	200-6065	5909-003	100-8885	200-2883	5770-002	100-4555		
CHENT Anguage Not'l Cobs		EPA	SAMPLE NO.													•									
	4 II	<del></del>		-		1/1		٠. د		<u>/</u>			7	;		1.11		`>	1.71		/	<u>`</u>	-	-	

# COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

ECHEM INC. SAMPLE PREPARATION AND ANALYSIS SUMMARY

SITE: Air Fore Plant 59

SDG NO. /-5554 FOR NYSDEC CLIENT: Argonne Not'l Labs CASE NO.

<b>de</b>		TIME	RECEIPT	Z	,	7	•	9	6	20	9	9	7	3	.3	10	10	01,	9	9	3	8	6		
ANALY HCAL PHACTION: Cyanide		HOLD TIME	COLLECT	5	9	7	9	7	6	7	8	7	6	4	4	07	01	10	7	6	۲.	6	7		
ANALY HIGAL PP		DATE	ANALYZED	11-21-91	11-15-91	11-27-91	11-27-91	11-27-91	11-27-91	11-27-91	11-13-91	11-13-91	11-13-91	11-21-91	11-31-91	18-00-61	12-06-91	12-06-91	11-27-91	11-37-41	11-31-91	11-13-91	11-13-91		
		DATE	RECEIVED	116-81-11	11-45-91	11-21-91	11-21-91	11-21-91	11-21-91	16-12-11	11-07-11	16-10-11	16-10-11	16-81-11	16-81-11	11-98-11	16-98-11	11-36-91	11-21-91	11-31-91	16-81-11	11-05-91	11-07-91		
7000-		DATE	COLLECTED	16.71-11	11-04-91	16-02-11	11-11-91	11-21-91	11-21-91	16-50-11	11-05-91	16- 70-11	16-00-11	16-110-11	16-0-11		_	11-86-91	11-30-91	16-08-11	12-97-11	11-014-31	16-80-11		
SUG NO. 7-000 7		MATRIX		1. 8						*	1.03	WATER		1.78							*	1.3	WATCR		
	'BY'	SAMPLE	O	100-0113	5554-00 B	5832- 007	5832 -008	5832-009	5839-00	100-600	800-0005	800-8095	51.30-001	200-06	400-0113	5909-001	5909-008	5909-003	5832-001	5132-002	5770-002	100-4555	5600-004		
	EPA	SAMPLE	NO.																						
CASE NO.	CLIENT	SAMPLE	QI	JCSWGAS	TCSW845	TCCNSCS	TCDW 1AS	TCDW18S	JCDWICS	TCDW34S	TC.2 W385	TC00.17W	TCOCREW	JCSD1AS	JCSD 2 45	70.5W44S	TCSWHASS	TOSW HES	TCSWSAS	TCSW5AS	168.06.33	TOSW8AS	Traczan		

# COMMENTS:

HOLD TIME COLLECT # DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

REV. K

Appendix A-1:

Report 5

## 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: Laboratory: Air Force Plant 59

Galson Laboratories

Case No: SDG No:

NONE 2-5807

Volatiles: (USEPA 524.2)

JCCNCAW JC0F1AW

JCCW1AW JC0F2AW JCCW2AW 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

AFP59SV2

- \* 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 <u>CLP Organics Data Review and Preliminary Review</u>, 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:

	PERCENT	RECOVE	RIES
<u>SAMPLE</u>	<b>D4DCE</b>	<u>D8T</u>	<u>BFB</u>
JCCW2AW	121		
JCCW1AW	126		
JC0F2AW	123	•	

#### Action:

- o for sample JCOF2AW recovery ≥10%; sample results ≥MDL are flagged as estimated (J)
- o for samples JCCW2AW and JCCW1AW none, results reported as MDL 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:

	RECOVERY (%)										
SAMPLE	DCE	TCE	BENZ TOL	<u>CLB</u>							
JC0F2AW		30									

#### Action:

o sample results  $\geq$ MDL for the compound are flagged as estimated (J)

AFP59SV2 ECHEM INC.

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

RPD (%)
SAMPLE DCE TCE BENZ TOL CLB
JC0F2AW 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:

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

#### Action:

o none, sample results are reported as MDL U

#### **BLANKS**:

Positive blank results and associated action levels are tabulated below:

BLANK ID.	COMPOUND	CONCENTRATION	ACTION LEVEL
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

<sup>\*</sup> Method blank levels below the NYSDEC ASP requirements.

Associated samples with positive values reported <u>below</u> the action level are:

TRIP BLANK ID.	ASSOCIATED SAMPLES
TRIP BLANK4	JCCW1AW
	JCCW2AW
TRIP BLANK7	JC0F1AW
	JC0F2AW

AFP59SV2

ECHEM INC.

#### Action:

- o associated sample results <MDL (flagged J); changed to MDL (U)
- o associated sample results <a href="MDL">MDL</a> and <a href="action level">action level</a> (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:

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

#### Associated samples:

INSTRUMENT	CAL DATE	SAMPLE NO.
C	11-19-90	JCCNCAW JCCW1AW
		JCCW2AW JC0F1AW
		JC0F2AW
		TRIP BLANK4
		TRIP BLANK5
		TRIP BLANK7

#### Action:

- o for AVG RRF  $\leq$ 0.10, results  $\geq$ MDL for the compound are flagged as estimated (J) and detection limit values (MDL U) are flagged as unusable (R)
- 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 validator 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 thought 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  $\mu$ g/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  $\mu$ g/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:

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

INSTR.	CAL DATE/TIME	COMPOUND	RRF \{\frac{1}{2}D}
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> C	<u>CAL DATE/TIME</u> 11-21-91/23:52	<u>SAMPLE NO.</u> JCCW2AW JCCW1AW
	11-27-91/13:47	JC0F1AW JC0F2AW
	11-30-90/12:40	TRIP BLANK7
В	11-22-91/16:28	JCCNCAW TRIP BLANK5 TRIP BLANK4

#### Action:

- o for RRF ≤0.10, results ≥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.

Draw Wallo Bruce K. Wallin, PhD

Vice President

enclosures

AFP59SV2

ECHEM INC.

## Air Force Plant 59 Case No NONE

#### Table I. Validation Action Summary

Sample No.	<u>VOA</u>
JCCNCAW	R4
JCCW1AW	A1,R4
JCCW2AW	A1,R4
JC0F1AW	A1,R4
JC0F2AW	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 noncompliant 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

AFP59SV2 ECHEM INC.

- 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

ECHEM INC. ORGANICS

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V HASS V TIC V Labo MS/I N.A. Tota	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																									
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ECHEM INC. DATA VALIDATION LOG

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Facce ?	ITS INORG	3/17	2/5	•					·					
SITE: AIR	VALIDATION UNITS SVOA   PEST/PCB   INORG   SÁS   DIC	3/10	9/5											
	VAL	0/20	%ح											
	VOA	45/0	9/8											
ام.	DATE REC'D	1-1-92	1-8-92											
Natilab	SDG NO.	1.5554												
CLIENT: Argonne Nat 1 Labs	CASE NO.					-				-,				

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

MEV. SVRI

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argonne Not 1 Labs

SITE: He Force Plant 59 11087

les		TIME RECEIPT	3	4	<i>†</i>	ħ	ħ	7	ક	6									
<b>ANALYTICAL FRACTION: Volatiles</b>		HOLD TIME	h	75	75)	ħ	.>	30	7	7									
<b>ANALYTICAL FF</b>		DATE ANALYZED	11-22-91	16-27-11	16-27-11	16-62-11	16-12-11	11-23-91	16-22-11	11-30-91									
		BECEIVED	16-61-11	16-81-11	16-81-11	11-23-91	11-23-91	16-81-11	16-61-11	11-23-91								•	
2-580%	1	COLLECTED	16-81-11	16-61-11	16-11-11	11-23-91	11-23-91	16-81-11	16-81-11	11-23-91									
SDG NO. 2-5801	711C-2777	MAIHIX	11) ATER	4.)ATER	WATER	WATER				WATER									
	LAB.	SAMPLE	5008-001	5107-003	5807-001	5868-001	5868-000	5807-003	5-808-608	200-8985									
	EPA	SAMPLE	<b>*</b>																
CASE NO.	CLIENT	SAMPLE	TCCNCAU	JC/WIAW	JCCWAAW	JCOFIAW	JCOFZAW	TRIP BLANKY	TRIP BLANK S	TRIP BLANK 7									

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

REV. 361

Appendix A-1:

Report 6

1

# 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: SDG No:

NONE 2-5807

Semivolatiles:

JCCNCAW JCCW1AW JC0F1AW

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 <u>CLP Organics Data Review and Preliminary Review</u>, 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
- 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.

				RECO	VERY	(%)		
SAMPLE JC0F2AW	PHE	CLPH DCB	DNP	 		<u>NPH</u> 99		

#### Action:

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

#### **BLANKS**:

For sample JCOF1AW 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

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

Deviations from the above calibration criteria are tabulated below.

#### CONTINUING CALIBRATION

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

#### Associated samples:

INSTRUMENT GCMSD(#4)	<u>DATE/TIME</u> 12-16-91/16:23	SAMPLE NO. NONE
	12-17-91/08:07	JCCW2AW JCCW1AW JCCNCAW
	12-18-91/07:25	JC0F1AW

#### Action:

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

3

#### 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

Same JCCN JCCN JCOE JCOE JCCN	law law 2aw	у. <u>5VOA</u> J8
If t	he fi	eld 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
<b>J2</b>	-	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
<b>J</b> 5	-	estimate positive values ( $J$ ) for ( ) due to calibration not meeting minimum RF criteria
<b>J</b> 6	-	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, result flagged as unusable (R)

SAMPLE PREPARATION AND ANALYSIS SUMMARY FOR NYSDEC ECHEM INC.

CLIENT: Argonne Nat'l L

PNY 2-C ON SUS

SITE: ALR FORCE Plant ST

olatiles	TIME	ACTION	RECEIPT	3	B	7	7	3										
<b>ACTION: Semiv</b>	HOLD TIME	TO EXTRACTION	COLLECT	5	ጎ	3	3	Ч										
<b>ANALYTICAL FRACTION: Semivolatiles</b>		DATE	EXTRACTED	11-21-91	11-21-91	11-26-91	16-92-11	16-12-11										
	_	DATE	RECEIVED	16-81-11	11-18-91	11-24-91	16-72-11	11-18-91										
1.085-1		DATE	COLLECTED	11-18-91	11-17-91	11-27-91	16-53-91	11-17-91										
SDG NO. 2-5807		MATRIX		WATER	WATER		_	Н										
	LAB	SAMPLE	ID .	5808-001	~		5868-002											
	EPA	SAMPLE	NO.															
CASE NO.	CLIENT	SAMPLE	ID .	TCCNCAW	Icanam	JCOFIAW	JCOFAAW	JCCWARW										

# COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

**ORGANICS** SITE: Air Force Plant 59
CASE # CLIENT: Amonne Nat'l Labs 8DG# 2-5805 COMPLETENESS LOG 8 <del>memour</del> TCCNCAW SCCENTAW SCCENAW TCOFARW A M P L B 1A 1E <u>2A</u> <u>2B</u> <u> 3A</u> VOA **3B** <u>4A</u> <u>5A</u> **6**A 8A 1B 1C 1P <u> 2C</u> 2D 3C <u>3D</u> 4B SVOA 5B 6B 6C 7B <u>7C</u> 8B 8C 1D 2 E 2F

COC NARRATIVE

PEST

3E

3F 4C 8D 8E 9 Appendix A-1:

Report 7

# 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 <u>CLP Organics Data Review and Preliminary Review</u>, 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
- 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.

RECOVERY (%)

SAMPLE LIN HEP ALD DIEL END DDT 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

JCC JCC JCC	iple No. INCAW IW1AW IW2AW OF1AW OF2AW	<u>Pesticide/PCB</u>
If	the fie	eld is blank, no qualifiers were necessary.
<b>A1</b>	-	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
<b>J</b> 3	-	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
<b>J</b> 5	-	estimate positive values (J) for ( ) due to calibration not meeting minimum RF criteria
<b>J</b> 6	-	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 NA+ 1 Labs

SDG NO. 2-5807

SITE: ALK FORE PLANE 59 ANALYTICAL FRACTION: POSTICIDG/PCBS

cide/PCBs	TIME	TO EXTRACTION	RECEIPT	3	h	h	h	h											
ANALY I CAL PHACTION: PESTICIDE/PUBS	HOLD TIME	TO EXTR	COLLECT	h	S	5	h	þ											
ANALY HICAL PI		DATE	EXTRACTED	16-22-11	11-22-91	16-22-11		1											
		DATE	RECEIVED	16-61-11	11-18-91	11-18-91	16-52-11	11-23-91											
1 282		DATE	COLLECTED		11-17-91		16-82-11	11-23-91											
SUG NO. A CO		MATRIX		WATER	WATER	WATER	WATER	WATER											
	LAB.	SAMPLE	ID .	100-8085	5807-003	5207-001	100-8985	5868-002			•								
	EPA	SAMPLE	NO.										-						
CASE NO.	CLIENT	SAMPLE	O	JCCNCAW	Technique	Techani	JCOFIAW	Trofam											

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

## ECHEM INC. ORGANICS

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REV. 391

Appendix A-1:

Report 8

# 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

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.

AFP59-I2 ECHEM INC.

Table I summarizes the validation actions, which were in accordance with USEPA Region II <u>Evaluation of Inorqanic Data for the Contract Laboratory Program</u>, 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
- 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:

	HOLDING	TIME (DAYS) FROM
SAMPLE	COLLECTION	RECEIPT BY LABORATORY
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:

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

Associated samples: NONE

#### **BLANKS:**

Positive Blanks

Blanks providing results ≥IDL and their associated action levels are tabulated below:

AFP59-12

			ACTION LEVEL
BLANK ID	PARAMETER	CONCENTRATION	WATER SOIL
CCB6	barium	15	75
	calcium	33	165
	copper	8	40
	manganese	1 7	5
	nickel	7	35
	zinc	7	35
ССВ7	barium	13	65
	calcium	31	155
	copper	10	50
	iron	6	30
	manganese	2 8 5	10
	nickel	8	40
	vanadium		25
	zinc	15	75
CCB8	barium	17	85
	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 <u>below</u> the action level are tabulated below:

CAL BLANK ID CCB6	<u>PARAMETER</u> barium copper zinc	SAMPLE NO. JCCW1AW JCCW2AW
	vanadium	JCCW2AW
CCB7	barium	JC0F2AW
	copper nickel vanadium	JC0F1AW JC0F2AW
CCB7	zinc	JC0F1AW
CCB8	barium	JCCNCAW

#### Action:

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

#### Negative Blanks

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

BLANK ID ICB1	PARAMETER calcium iron	CONCENTRATION -45 -15
CCB1	calcium	-60
CCB2	antimony calcium iron vanadium	-4.6 -93 -24 -10
ССВЗ	iron	-13
CCB5	antimony calcium	<b>-4.5</b> <b>-48</b>
CCB7	antimony	-4.1
CCB11	zinc	-19
PB1	calcium	-41

Associated samples with results reported <10IDL: NONE

#### <u>DUPLICATE SAMPLE ANALYSIS:</u>

Field duplicates:

No field duplicates were identified for this SDG.

#### FURNACE ATOMIC ABSORPTION RESULTS:

Post-digestion spike

Samples with post-digestion spike recoveries ≥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:

AFP59-12

<u>SAMPLE</u>	ELEMENT	RECOVERY
JCCW1AW	arsenic	117
JC0F2AW	arsenic	118

## Action:

o none, sample results reported as IDL U

Sincerely, ECHEM INC.

Direc K. Wallin, PhD Vice President

enclosures

#### Air Force Plant 59 Case No. NONE

## Table I. Validation Action Summary

Aluminum	•	Magnesium	
Antimony		Manganese	
Arsenic		Mercury	
Barium	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.

- Al 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.

ECHEM INC.

SAMPLE PREPARATION AND ANALYSIS SUMMARY FOR NYSDEC

CLIENT: Argonne Not 1 Labs SDG NO. 2.

SDG NO 2-5407

SITE: AIR FORCE + Ant SG ANALYTICAL FRACTION: CYANIGO

de		TIME	RECEIPT	/	7	7	3	/4/										
ACTION: Cyanic		HOLD	COLLECT   RE	7	3	8)	3	h/	,									
ANALYTICAL FRACTION: Cyanide		DATE	ANALYZED	11-20-91	11-20-41	11-20-91	11-210-91	12-7-91										
			RECEIVED	16-61-11	11-18-91	11-18-91	11.23-91	16-82-11										
2-5407		DATE	COLLECTED	11-18-01	11-17-91	11-17-91	11-23-91	11-23-91										
SDG NO. 2-5407		MATRIX		WATER	WATER	WATER	BATER	WATER										
	LAB,	SAMPLE	O	5808-001	5807-003	5807-001	100-8915	5868-008										
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CASE NO.	CLIENT	SAMPLE	Ω	TCCNCALD	TCCWIAW	Trugani	TOPFIALL	Trofablu										

# COMMENTS:

HOLD TIME COLLECT ■ DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

SAMPLE PREPARATION AND ANALYSIS SUMMARY ECHEM INC.

**FOR NYSDEC** 

CLIENT: Argoina Natil Labs

SITE: ALE FACTION: MOTCULY

RECEIPT 19 HOLD TIME COLLECT 50 25 ANALYZED 12-7-91 6-4-21 12-7-9 12-7-9 12-7-91 11-18-91 11-23-91 RECEIVED 11-19-91 11-23-9 11-18-9 11-23-91 COLLECTED 11-23-91 16-61-16-81-11 11-17-9 DATE SDG NO. 2-5807 WATER MATRIX WATER WATER WATER WATER 5868-002 5807-002 5-868-001 5807 - 001 5808-001 SAMPLE LAB. SAMPLE EPA JCC WAAU Techilow ACC NOAW TCOFARL CLIENT JCOF (AC) SAMPLE CASE NO.\_

# COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

#### ECHEM INC. INORGANICS COMPLETENESS LOG

SITE: ALC CASE #	Force	Plant 59	CLIENT: Argonne SDG# 0-5807	Nat'l Lab
S A M P L E	JCCNCAW JCCWIAW	JCOF 19AW)		
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11A	XXX			
11B				
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14	<b>ZXX</b>			

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: SDG No:

NONE 3-5983

Volatiles:

JCBG1AS JCSW7AS JCSW7BS JCSW9AS JCSW9BS JC1H1AS JC1H1CS JC3H1AS

JC4H1AS JC4

JC4H2AS JC6H1AS

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

AFP5983V ECHEM INC.

- \* 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 <u>CLP Organics Data Review and Preliminary Review</u>, 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:

COMPOUND	RECOVERY
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

COMPOUND	<pre>\$RSD (max.)</pre>	AVG RRF (min.)
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

INSTRUMENT B#2

DATE 12-10-91 2-butanone

COMPOUND

**%RSD** 

AVG. RRF

.069

Associated samples:

INSTRUMENT B#2

DATE 12-10-91 SAMPLE NO. JC1H1CS

Action:

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

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. JCBG1AS JCSW7AS JCSW7BS JCSW9AS JCSW9BS JC1H1AS JC1H1CS JC3H1AS JC4H1AS JC4H1AS JC4H1AS JC4H1AS TRIP BLANK HOLD BLANK HOLD BLANK TRIP BLANK TRIP BLANK	10 11 9 10
If the fie	ld is blank, no qualifiers were necessary.
	change positive values for ( ) to revised detection limit due to blank contamination
	estimate positive values (J) and detection limit values (UJ) due to holding time violations
	estimate positive values (J) and detection limit values (UJ) due to non-compliant volatile surrogate recoveries
	estimate positive values (J) and detection limit values (UJ) due to non-compliant (acid) (base-neutral) fraction surrogate recoveries
	estimate positive values (J) for ( ) due to non- compliant matrix spike recoveries
	estimate positive values (J) for ( ) due to calibration not meeting minimum RF criteria
	estimate positive values (J) and detection limit values (UJ) for ( ) due to non-compliant calibration stability
	estimate positive values (J) for ( ) due to non- compliant internal standard stability

AFP5983V ECHEM INC.

- 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)

ECHEM INC.

SAMPLE PREPARATION AND ANALYSIS SUMMARY

**FOR NYSDEC** 

SITE: IRP Supplemental S. Tana 1, ms 1,5983 sang NO.3 - 5983 CLIENT: AMONNE Nay / Lab

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ACTION: Volati		HOLD TIME	COLLECT	5	5	þ	ħ		8	9	5	૪	ゃ	5	K	۲	65	J	ď	8				
ANALYTICAL FRACTION: Volatiles		DATE	ANALYZED	16-11-21	16-11-21	16-11-2	15-14-21	15-11-21	16-90-21	16-01-21	12-09-91	12-05-91	12-05-91	12-09-91	12-05-91	12-06-91	15-60-21	12-05-91	12-06-91	12-04-91				
		DATE	RECEIVED	12-04-91	12-09-91	12-69-91	15-10-21	16-01-21	16-50-21	16-50-21	12-05-91	15-00-21	16-60-21	12-05-91	16-40-21	16-50-21	16-60-21	16-40-21	12-20-91	12-00-51				
. 577.3		DATE	COLLECTED	12-06-91	12-60-21/16. 20-21	15-01-21	12-10-91	12-10-91	12-04-91	12-04-91	12-64-91	12-03-91	12-03-91	12-04-91	12-03-91	12-04-91	12-00-91	12-03-91	12-04-91	12-010-91				
78 5 SDG NO.3 - 57 8 3		MATRIX		SOIL										•						•				
041/6001/378	LAB.	SAMPLE	OI	1,044-003	100- PhV9	6044-000	100-6909	200-601001	1007-001	6007-002	600-1003	5983-001	5983-002	6657-004	5983-004	6007-006	500-1101	5983-003	\$00-100g	10044 - DOOL				
NO: 6044 / 6	, VA3	SAMPLE	NO.																					
CASENO. JTHSK NO: 6044 / BOCF / 6067/3	CLIENT	SAMPLE	0	JC 89185	JCSW7AS	JCSW7BS	JCSW9AS	TCSW9BS	JCIHIAS	JCHICS	Jeshias	TCHHIAS	JCHHARS	JC. 6 HIAS	HOLD BLANKS	HOLD BLANK ID	HOLD BLANK 11	TRIP BLANK 9	TRIP BLANK III	TRIP BLANK-11				

# 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 <u>CLP Organics Data Review and Preliminary Review</u>, 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.

		VERY	(१)							
<u>SAMPLE</u>	PHE	CLPH DCB	DNP	TCB	CRE	<u>ACE</u>	<u>NPH</u>	DNT	PCP	PYR
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:

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

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

## Associated samples:

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

INSTRUMENT GCMSD#4	<u>DATE/TIME</u> 12-20-91/08:37	•	JC6H1AS JCSW7AS
	12-23-91/11:00		JCSW7BS JCBG1AS JC3H1AS
	12 23 31/11.00		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

Sample No.	SVOA
JC1H1AS	
JC1H1CS	•
JC3H1AS	<b>J</b> 6
JC4H1AS	R8
JC4H2AS	R8
JC6H1AS	J6,R8
JCBG1AS	J6
JCSW7AS	<b>J</b> 6
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 noncompliant matrix spike recoveries
- J5 estimate positive values (J) for () due to calibration not meeting minimum RF criteria
- 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 noncompliant 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)

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

CLIENT: Argonne Nat 1 ( a b

5402-5 0NO

rolatiles	TIME	ACTION	RECEIPT	•		_	_	_	_	_	_	1	5	Ŋ						
<b>ANALYTICAL FRACTION: Semivolatiles</b>	HOLD TIME	TO EXTRACTION	COLLECT	ત	7	ત	Ą	2	3	t	<i>ት</i>	ħ	S	S						
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3-5983		DATE	COLLECTED	12-04-91	12-04-91	12-04-91	12-03-91	12-03-91	12-03-91	12-00-91	16-90-21	12-00-21	12-10-91	12-10-91						
SDG NO. 3-5983		MATRIX		So 16										<b>*</b>						
	LAB.	SAMPLE	O	600-1-001	200-1009	10001-1003	5913-001	5983-002	400-L009	600-4409	199-1709	200-4409	100-6909	6069-002						
	EPA	SAMPLE	NO.																	
CASE NO.	CLIENT	SAMPLE	D	JCIHIAS	JC141CS	TC3HIAS	JCHHIAS	5C4 H2AS	JC6 HIAS	JC BG IAS	T15W7AS	JC5W785	365W9AS	105W9B5					-	

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

Appendix A-1:

Report 11

# 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

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 <u>CLP Organics Data Review and Preliminary Review</u>, 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.

RECOVERY (%)

SAMPLE LIN HEP ALD DIEL END DDT JCSW9BS 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 N JCBG1AS JCSW7AS JCSW9AS JCSW9BS JC1H1AS JC1H1CS JC3H1AS JC4H1AS JC4H1AS	o. Pesticide/PCB
JC4H2AS	
If the f	ield 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 <del>-</del>	estimate positive values (J) for ( ) due to non- compliant matrix spike recoveries
J5 <del>-</del>	estimate positive values (J) for ( ) due to calibration not meeting minimum RF criteria
J6 <b>-</b>	estimate positive values (J) and detection limit values (UJ) for ( ) due to non-compliant calibration stability
J7 <b>-</b>	estimate positive values (J) for ( ) due to non-compliant internal standard stability
J8 <del>-</del>	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
AFP5983P	3 ECHEM INC.

#### 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%

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

CLIENT: Hrapine Matil Lab

ANALYTICAL FRACTION: Pesticide/PCBs SITE: IRP Supplemental S.

RECEIPT TO EXTRACTION HOLD TIME COLLECT 39 16-51-12-06-91 EXTRACTED 5-12-3 12-05-9 2-010-9 16-90-2 2-05-9 2-10-9 2-06-91 12-10-9 6-01-21 DATE 7 RECEIVED 2-04-91 16-60-21 12-09-9 16-01-12-05-91 12-05-9 12-00-21 16-50-2 12-05-91 12-10-9 16-20-21 DATE 2 COLLECTED 12-00-51 12-63-91 15-90-21 16-01-21 15-10-21 15-90-21 15-00-21 2-03-91 12-03-91 12-04-9 12-04-9 DATE SDG NO. 3-5983 MATRIX 5011 5983-00A 6044-003 700 - Pho 200-6-002 2007-002 2007-003 5933-00 SAMPLE 00-800c 100-1000 1007-004 022 - 12400 ₽ SAMPLE EPA 2 CSW785 JC4 HIBS JC4 HZAS TC SW 785 ICSW9A.S Jes 2985 CHICS 3C BG 18 C3HIAS TCCHIBS JC IHIAS CLIENT SAMPLE Ω TRSKCABENO.

# COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

# ECHEM INC. ORGANICS

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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 Galson Laboratories

Case No:

Laboratory:

NONE

SDG No:

3-5983

TAL Inorganics:

JCSW7BS JCSW9AS JCBG1AS JCSW7AS 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.

AFP5983I

Table I summarizes the validation actions, which were in accordance with USEPA Region II <u>Evaluation of Inorqanic Data for the Contract Laboratory Program</u>, 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 ≥IDL and their associated action levels are tabulated below:

			ACTION LEVEL
BLANK ID	<u>PARAMETER</u>	CONCENTRATION	WATER SOIL
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

AFP5983I

			ACTION LEVEL
BLANK ID	<u>PARAMETER</u>	CONCENTRATION	WATER SOIL
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 <u>below</u> the action level are tabulated below:

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

#### Action:

o associated sample results ≥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:

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

AFP5983I ECHEM INC.

#### Action:

- o for recoveries <30%, results ≥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 <u>all</u> samples of the same matrix associated with this SDG.

#### **DUPLICATE SAMPLE ANALYSIS:**

#### 1. Laboratory replicates:

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

SAMPLE NO.	ELEMENT	RPD &	CRDL	<u>s - D</u>
JCSW9BS	lead	37		

#### Action:

o results are flagged as estimated (J)

#### Comments:

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

#### FURNACE ATOMIC ABSORPTION RESULTS:

#### 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:

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

#### Action:

o sample results are flagged as estimated (J)

AFP5983I ECHEM INC.

#### 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:

SAMPLE JCSW7BS ELEMENT arsenic

<u>r</u> 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.

- Al 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.

AFP5983I • ECHEM INC.

- 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.

# ECHEM INC. DATA VALIDATION LOG

5.4		> DIOX												
Plant		SAS												
SITE: AIR FORCE, Plant S9	IITS	INORG	9/11	91/0										
SITE: AIC	IDATION UN	SVOA PEST/PCB NORG	9/81	11/0										
	IVA NOT	SVOA	9/81	11/0	,									
		VOA	2/46	0/41										
		DATE REC'D	2-11-92	1-24-92										
ac Natil		SDG NO.		5-5-83										
CLIENT: AVGORAC Nat'	n	CASE NO.											•	

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

**PC. 38** 

### ECHEM INC. INORGANICS COMPLETENESS LOG

SITE: IR	P S	Su	ρρ	ler	rer	Ha	1	5		T_		<u>_</u> ;	EDC	EI S#	TT:	<u> </u>	-}r		3	<u>e</u>	7	ht	١,	L	اه
S A M P L	JC.66, 18 S	JCS W7 AS	JCSW185	xcs waa as	Jeswabs	JUHICS	JC3HIAS	JCH HIAS	Ted HZAS	SC6 HIAS					٩										
1	X	X	X	X	X	X	X	~	X	X															
2A	IXI.	V	X	Χ	X	X	X	N	N.	×															Γ
2A 2B	$\times$	$\prec$	X	X	X	X	又	×	X	ヌ															Γ
3	lacksquare	Z	X	X	X	X	Z	X	$\overline{\mathbf{x}}$	Z															t
	X.	X	X	Х	Ŋ	×	X	<b>X</b>	N.	X		Т											1.		†
5 <u>A</u>	N.	X	X	X	X	×	$\times$	X	X	X	_								_			_			t
5B										_	_						_		_		_	_			†
6		V	$\overline{\times}$	X	$\overline{\mathbf{x}}$	×	$\times$	又	$\mathbf{x}$	×				_				_	_		_				t
5A 5B 6	M	X	Ź	$\hat{\chi}$	X	$\overline{\chi}$	X	X	V	$\dot{\mathcal{L}}$		_		_			<del>-</del>		-		_	_			t
8	幺	X	Ì	X	Ì	Ż	$\stackrel{\frown}{\times}$	X	$\widehat{\lambda}$	×							_		-	┪	_	┪			t
9	X	Z	X	$\langle \cdot \rangle$	Ź	X	X	7		×							_	_			_	_			t
10	ZŤ	۷	X	X	X	$\stackrel{\sim}{\sim}$	X	文	文	×									$\vdash$			_		•	t
9 10 11A 11B 12 13	₩.	$\overline{\mathbf{x}}$	X	X	X	$\stackrel{()}{\times}$	X	X	×	1												_			†
11B			<b>(</b> )				_																1		†
12	IXI	$\overline{\mathbf{x}}$	$\times$	$\overline{x}$	X	$\nabla$	$\times$	V	×	V					-				4				1		t
13	X	X	Ż	$\hat{\mathbf{x}}$	$\mathbf{x}$	X	$\nabla$	交	$\nabla$	١	_	-	_				-		۰	_	-	_			t
14	X,	X	X	X	X	Ź	Ŷ	$\boxtimes$	文	×															ļ

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

7	gg (		TIME	COLLECT   RECEIPT	7	78	مه	Ø	Š	e	e	1	6	þ							
J. Juneary	ACTION: Cyani		HOLD TIME	COLLECT	5	5	5	8	ð	6	7	>-	6	7							
T > 1 Ll Carland	ANALYTICAL FRACTION: Cyanide		DATE	ANALYZED	12-11-91	16-11-21	15-11-21	15-18-01	16-81-11	15-11-21	15-11-21	15-11-21	16-11-21	16-11-21							
			DATE	WW.	15-60-21	12-00-91	16-60-21	16-11-21	16-01-21	16-59-21	16-50-21	16-40-41	16-40.21	16-50-21							
FOR NYSDEC	SDG NO. 3 - 598 3		DATE	COLLECTED	1206-91	12.06-91	16-00-21	15-10-41	16-01-71	16-40-21	16-40-21	12-63-91	12 53-91	12-04-91							
FORN	SDG NO.		MATRIX		Sou	_								•							
		[AB	SAMPLE	- ID	Boyl - DO3	100-14001	100 - 44 cod	100- 601001		1	800-Lan	100-8865	5983-002	1000 4-00g							
7 1 1, Py	1 A A A A A A A A A A A A A A A A A A A	EPA	SAMPLE	NO.																	
CHENT. Brown of May " I L	CASE NO.	CLIENT	SAMPLE		JC. BG1. AS	Jrsw785	JCS W78.5	TESWABS	305W98.5	TCIHICS	JC34195	3CY HIAS	JCYHAAS	JCLUHIAS						•	

# COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

SAMPLE PREPARATION AND ANALYSIS SUMMARY ECHEM INC.

**FOR NYSDEC** 

RECEIPT SITE: IRP Supplemental S. L. ANALYTICAL FRACTION: Mercury HOLD TIME COLLECT ANALYZED 12-110-9 DATE 16-50-21 12-04-91 2-05-91 RECEIVED 12-10-91 16-60-21 12-05-9 12-09-9 12-09-9 12-10-91 12-09-91 COLLECTED 16-40-21 16-60-21 2-03-91 16-60-21 12-04-91 12-06-91 12-010-21 12-06-91 6-01-71 DATE 2-10-9 SDG NO. 3 - 5983 MATRIX 2 |S 200-690 5983-002 600-1003 100-100Z 5983-001 6044-003 100-6900 SAMPLE 1007-004 00-750g LAB. CLIENT: Eliganae Nay 1 Lah EPA SAMPLE 0 2 JCSW 785 105W78S teylaas TOHICS CLIENT JC3HIAS SAMPLE Jr.5W945 JC4 41AS TCUHINS JC 391AS

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

REV. XI

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

Laboratory:

Air Force Plant 59 Galson Laboratories

Case No: NONE SDG No: 5-6384

Volatiles: JCBG2BW JCDPWAW

(USEPA 524.2) JCDW4AW JCDW5AW JCDW6AW JCDW8AW JCDW8RW JCDW9AW JCSW1AW **JCSW3AW** JCSW5AW JCSW6AW
TRIP BLANK13 TRIP BLANK14
TRIP BLANK15 HOLD BLANK13 **JCSW7AW** JCSW4AW JCSW8AW JCSW9AW

JCDW1AW

JCDW3AW .

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 <u>CLP Organics Data Review and Preliminary Review</u>, 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:

	PERCENT	RECOVERI	ES
SAMPLE	<b>D4DCE</b>	<u>D8T</u>	<u>BFB</u>
JCBG2BW			86
JCSW3AW			86
JCDW9AW			86

#### Action:

o recovery ≥10%; sample results ≥MDL are flagged as estimated (J)

#### LABORATORY FORTIFIED BLANK:

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

COMPOUND	<b>% RECOVERY</b>
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 <u>all</u> samples of the same matrix associated with this SDG.

#### **BLANKS:**

Positive blank results and associated action levels are tabulated below:

BLANK ID.	COMPOUND	CONCENTRATION	ACTION LEVEL
TRIP BLANK14	methylene chloride	0.2	2.0
TRIP BLANKIS	methylene chloride	1.0	10.0

<sup>\*</sup> Method blank levels below the NYSDEC ASP requirements.

Associated samples with positive values reported <u>below</u> 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:

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

#### Associated samples:

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

AFP6384V

ECHEM INC.

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

#### Action:

- o for AVG RRF ≤0.10, results ≥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> C	<u>CAL DATE/TIME</u> 01-07-92/08:42		<u>RRF</u> .039 .025	<u>\$D</u>
		2-hexanone	.089	
	01-08-92/10:17		.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	

INSTRUMENT	CAL DATE/TIME	COMPOUND	<u>rrf</u>	<u> <b>₹D</b></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:

INSTRUMENT	CAL DATE/TIME	SAMPLE N	0.
c	01-07-92/08:42	HOLD BLANK13	JCDW1AW
		TRIP BLANK13	JCSW1AW
	01-08-92/10:17	JCDW5AW	JCSW5AW
		JCSW3AW	JCDW9AW
	01-09-92/09:58	JCBG2BW	<b>JCDW3AW</b>
		JCSW3AW	JCDW9AW
	01-10-92/08:55	JCDW4AW	
	01-14-92/05:43	HOLD BLANK14	JCSW9AW
		TRIP BLANK14	JCSW4AW
		JCSW7AW	JCDW8RW
	01-15-92/05:46	HOLD BLANK15	JCSW8AW
	01-16-92/01:40	JCSW8AW	JCDPWAW
		TRIP BLANK15	

#### Action:

o for RRF ≤0.10, results ≥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

Sample No.	<u>voa</u>
JCBG2BW	J2,R4,J9
<b>JCDPWAW</b>	R4,J9
JCDW1AW	R4,J9
<b>JCDW3AW</b>	R4,J9
JCDW4AW	R4,J9
JCDW5AW	R4,J9
JCDW6AW	R4,J9
JCDW8AW	R4,J9
JCDW8RW	R4,J9
JCDW9AW	J2,R4,J9
<b>JCSW1AW</b>	R4,J9
<b>JCSW3AW</b>	J2,R4,J9
JCSW4AW	R4,J9
JCSW5AW	R4,J9
JCSW6AW	R4,J9
JCSW7AW	R4,J9
JCSW8AW	R4,J9
JCSW9AW	R4,J9
TRIP BLANK	L3 R4,J9
TRIP BLANKI	L4 R4,J9
TRIP BLANKI	L5 R4,J9
HOLD BLANKI	L3 R4,J9
HOLD BLANKI	,
HOLD BLANKI	L5 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 noncompliant matrix spike recoveries

AFP6384V ECHEM INC.

- 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 noncompliant internal standard stability
- J8 estimate positive values (J) due to non-compliant field duplicate precision
- J9 estimate detection limit value (UJ) for 1,2dichloroethene, cis-1,3-dichloropropene, benzene and styrene due to non-compliant check standard results
- 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, 2hexanone 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

SAMPLE PREPARATION AND ANALYSIS SUMMARY ECHEM INC.

**FOR NYSDEC** 

4-6384

CLIENT: Arganne Nat 1 Lab

CASE NO.			SDG NO.	16314		ANALYTICAL FRÁCTION: Volatiles	<b>Á</b> ĆTION: Volatil	BS
CLIENT	EPA	LAB.		*				
SAMPLE	SAMPLE	SAMPLE	MATRIX	DATE	DATE	DATE	HOLD	TIME
D	NO.	OI .		COLLECTED	RECEIVED	ANALYZED	COLLECT	RECEIPT
JCBGABW		100-51169	WATER	1-7-92	1-9-92	1-9-92	رد	ı
JCDPWAW J		1000 - 9740		1-9-92	(-10-92	1-16-92	7	9
TCDWIAW		6384-001		1-5-93	1-6-93	1-7-92	2	
J.C. DINSAIN		6415-002		1-7-92	1-8-92	1-9-93	2	
TLDWGAW		6415-006		26-8-1	66-8-1	1-10-92	2	d
JCDWSAW		6384-003		1-5-92	1-6-92	1-8-92	3	٦
TC DWG AW		10384-005		1-6-92	1-6-92	1-8-92	2	7
TCDWISAW		6446-001		1-9-92	1-10-93	1-15-92	(0	S
JCDWRRW		600- JUVA		1-9-92	Cb-8-1	1-14-92	5	(0
Jan 198 W		100 - SIM9		1-7-92	1-8-92	1-9-92	2	)
JCSWIAW		6304-002		1-5-92	1-10-92	1-7-92	8	1
365W39W		10415-003		1-7-92	1-8-92	1-9-92	2	-
JUSWARW		100.3140		1-8-62	1-8-92	1-14-92	(0)	9
Trswsau		6384-004		1=5-92	1-10-93	1-8-92	3	2
JCSWARIN		6384-000		1-6-93	1-6-93	1-8-92	2	٦
JUSW 1RW		010-51199		1-8-92	1-8-92	1-14-92	e.	و
JC.S(1)84W)		10446 - 003		1-8-92	1-10-92	1-16-92	۵.	e
7cswggw		1000-5140		1-7-92	1-8-92	1-14-92	7	0
TRIP BY ANK 13		1384-007		1-6-92	1-6-92	1-7-92	1	
TRIP BY ANK 14		110-5149		1-8-92	1-8-92	1-14-92	د	و
TRIP PUBLIC IS		500-0100		1-10-92	1-10-92	1-16-92	(0	و
HOLD BYANK 13		6384-008		N.A.	1-6-92	1-7-92		
HOLD BIANK 14		610-5140		N. A	1-8-92	1-14-92		
HOLD BLANK 15		10446-000	<b>→</b>	N. M	1-10-93	1-15-92		

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

received is 1-10-92 cccording to Field records.

(SWM (ANL) 15 50L 92 \* Note: The correct date

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

Laboratory:

Air Force Plant 59

Case No:

Galson Laboratories

NONE SDG No: 5-6384

Semivolatiles: JCBG2BW

JCDPWAW JCDW1AW **JCDW3AW** JCDW4AW JCDW5AW JCDW6AW JCDW8AW **JCSW1AW** JCDW8RW JCDW9AW **JCSW3AW JCSW7AW** 

JCSW4AW JCSW5AW JCSW6AW 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 <u>CLP Organics Data Review and Preliminary Review</u>, 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.

RECOVERY (%)

SAMPLE PHE CLPH DCB DNP TCB CRE ACE NPH DNT PCP PYR
Q1-0086 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 CLP (Vol. VIII, E-48-51), or federal criteria (\*), are tabulated below.

#### CONTINUING CALIBRATION CRITERIA

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

Deviations from the above calibration criteria are tabulated below.

#### CONTINUING CALIBRATION

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

# Associated samples:

INSTRUMENT	<u>DATE/TIME</u>	SAM	PLE NO.
GCMSD#4	01-30-92/10:25	JCSW5AW	JCSW6AW
	•	<b>JCSW3AW</b>	JCDW6AW
		<b>JCDW3AW</b>	JCDW9AW
		JCBG2BW	
	01-30-92/22:33	JCDW4AW	JCDW8AW
	•	<b>JCDW8RW</b>	JCSW4AW
		<b>JCSW7AW</b>	JCSW8AW
		TCSW9 AW	TCDPWAW

#### 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 JCBG2BW JCDPWAW JCDW1AW JCDW4AW JCDW5AW JCDW6AW JCDW8AW JCDW8AW JCDW9AW JCSW1AW JCSW1AW JCSW4AW JCSW4AW JCSW5AW JCSW5AW JCSW6AW JCSW6AW JCSW7AW JCSW8AW JCSW9AW	• SVOA
If the fi	eld 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 <del>-</del>	estimate positive values (J) for ( ) due to non-compliant matrix spike recoveries
J5 <b>-</b>	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)

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argenne Not! Lab

SDG NO. 5-6384

SITE: IRP Supplementa | 3.I. ANALYTICAL FRACTION: Semivolatiles

CASE NO.			SDG NO. S	5-6584		<b>ANALYTICAL FRACTION: Semivolatiles</b>	ACTION: Semiv	rolatiles
CLIENT	EPA	LAB.			•		HOLD TIME	TIME
SAMPLE	SAMPLE	SAMPLE	MATRIX	DATE	DATE	DATE	TO EXTRACTION	ACTION
O	NO,	CI		COLLECTED	RECEIVED	EXTRACTED	COLLECT	RECEIPT
JC BG 13W		100-5116	WATER	1-7-92.	1-09-92	1-09-92	8	0
JCDPWAW		100-9H10	-	1-9-92	66.01-1	1-13-92	4	77
1CDWIAW		100- 7887		1-5-92	1-06-92	1-09-92	4	8
TCDW3AW		6415-002		1-7-92	1-09-92	1-09-92	Ź	0
JCDW4RIA		6415-006		1-8-92	CP-60-1	1-09-92		0
JCDWSAW		1284-003		1-5-92	1-06-92	1-09-92	4	3
TCDW6AW		6304-005		1-10-92	1-00-92	1-09-92	χ.	M
TCDW 8AW		100-14h		1-9-92	1- 10-9a	1-13-92	4	Ŋ
JCDW8RW		10446-002		1-9-92	1-10-92	1-13-92	4	m
TCDWGAW		6415-204		1-7-92	1-09-92	1-09-92	6	0
Teswiaw		6384-003		1-5-92	1-06-92	1-00-1	7	~
ŤCSW3AW		10415-003		1-7-92	1-09-92	1-09-92	ч	0
Trswyaw		1415-009		1-8-92	1-09-92	1-04-9a	7	0
Trswsaw		10384-004		1-5-92	1-06-93	1-09-92	4	3
Jesman		12384-006		1-6-92	1-06-92	1-09-92	M	33
JCSW7AW		10415-010		1-0-92	1-09-92	1-09-92	-	0
TCSW8AW		6446-003		1-9-92	1-10-92	1-13-92	7	87
Trswam	•	6415-005	<b>→</b>	1-7-92	1-09-92	1-09-92	ત	0

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

AEV. 341

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

ke: Laboratory: Air Force Plant 59

Laboratory: Case No:

Galson Laboratories

Case No:

NONE 5-6384

Pesticides/PCB's:

JCBG2BW JCDPWAW JCDW1AW JCDW3AW JCDW4AW JCDW5AW JCDW6AW JCDW8AW 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 <u>CLP Organics Data Review and Preliminary Review</u>, 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
- 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.

L

RECOVERY (%)
LIN HEP ALD DIEL END

END DDT 128/126

JCDW4AW

SAMPLE

Action:

o none, sample results reported as CRQL U

Sincerely, ECHEM INC.

Dime J. Wall Bruce K. Wallin, PhD

Vice President

enclosures

#### Air Force Plant 59 SDG. No. 5-6384

## Table I. Validation Action Summary

Samp JCBG JCDW JCDW JCDW JCDW JCDW JCBW JCSW JCSW JCSW JCSW JCSW JCSW JCSW JCS	HAW HAW HAW HAW HAW HAW HAW HAW HAW HAW	Pesticide/PCB
If t	he fi	eld 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
<b>J</b> 6	-	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%

AFP6384P 4 ECHEM INC.

SAMPLE PREPARATION AND ANALYSIS SUMMARY ECHEM INC.

CLIENT: Argonne Nat' Lab

**FOR NYSDEC** 

SITE: IRP Supplemental S.I.

CASE NO.			SDG NO.	SDG NO. 5-6384		ANALYTICAL FRACTION: Pesticide/PCBs	AČŤION: Pestic	ide/PCBs
CLIENT	EPA						HOLD TIME	TIME
SAMPLE	SAMPLE	SAMPLE	MATRIX	DATE	DATE	DATE	TO EXTRACTION	ACTION
<b>Q</b>	<b>.</b>	O		COLLECTED	RECEIVED	EXTRACTED	COLLECT	RECEIPT
JCBGJBW		10-5119	WATER	76-6-1	1-08-92	1-13-92	9	h
JCDPWAW		16446-004	-	76-6-1	1-10-92	1-13-92	7	η
JCDWIAW		6384-001		26-5-1	1-00-92	1-08-92	M	く
JCDW3AW		6415-002		76-1-1	1-08-92	1-13-92	9	6
JCDW4AW		1001-5119		26-8-1	1-08-92	1-13-92	Ŋ	∖₁
TEDWSAW		6384-003		1-5-92	1-00-92	1-08-92	М	٦
JCDW6 AW		6384- 005		26-9-1	1-06-92	1-08-92	ራ	ત
JCDW8AW		100-9/11		26-6-1	1-10-9a	1-13-92	14	62
JCDW8RW		6446-002		26-6-1	1-08-92	1-13-92	ر ر	Ŋ
JCDW9AW		16415-004		1-7-92	1-00-9a	1-08-92	- }	ત
JCSWIAW		1384-000		1-5-92	1-06-92	1-08-92	က	ત
JCSW3AW		6415-003		1-7-92	1-08-92	1-13-92	3	ν,
Icswan		10415-009	•	1-8-92	1-08-92	1-13-92	۲۰	ζ
TCSWSAW		6384-004		1-5-92	1-06-92	1-08-92	3	ત
JCSWGAW		6284-006		1-6-9-	1-06-92	1-08-92	ઋ	ત
TCSW7AW		10415-010		1-8-92	1-08-92	1-13-92	b	نې
JCS 128 AW		6446-003		1-9-92	1-10-92	1-13-92	7	n
JC3W9AW		10415-005	•	26-1-1	1-08-92	1-13-92	د.	5

# COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE EXTRACTED

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ECHEM INC. ORGANICS

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	6C	1X	V	X	X	X	X	X	X	X	Х	X	XI	X	X	X	X	X	X		$\Box$				•
	7B	区	X	X	X	X	X	N.	X	X	۸	X	X	又	X	X	X	X	X						•
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M8/MSD (Forms 1's)																									
	$\overline{M,A}$ Total Solids Log (if applicable)																								
Injection Log																									
	in of Cust		Y																						
Case Narrative																									

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 JCDPWAW JCDW1AW JCDW3AW

JCDW4AW JCDW5AW JCDW6AW JCDW8AW JCDW8RW JCDW9AW JCSW1AW JCSW3AW 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

AFP6384I

\* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II <u>Evaluation of Inorganic Data for the Contract Laboratory Program</u>, 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 ≥IDL and their associated action levels are tabulated below:

			ACTION LEVEL	_
BLANK ID	PARAMETER	CONCENTRATION	WATER SC	DIL
CCB2	vanadium	23	115	
ССВЗ	beryllium	1	5	
	cadmium	4	. 20	
	nickel	7	35	
	vanadium	24	120	
РВ	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	
ССВ8	zinc	4	20	

Associated samples with positive values reported <u>below</u> the action level are tabulated below:

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

#### Action:

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

AFP6384I

#### Negative Blanks

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

BLANK ID CCB2	<u>Parameter</u> zinc	CONCENTRATION -12
CCB3	zinc	-11
CCB4	zinc	<b>-</b> 7
CCB6	zinc	<b>-</b> 9
ССВ8	vanadium	-10

Associated samples with results reported <10IDL:

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

#### Action:

- o associated sample results ≥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:

SAMPLE	ELEMENT	§ RECOVERY
JCDW4AW	antimony	69

### Action:

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

### Comments:

The above actions are applied to <u>all</u> 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:

ELEMENT	<b>RECOVERY</b>
mercury	123

### Action:

o for recoveries >120%, results ≥IDL are flagged as estimated (J)

#### Comments:

The above actions are applied to <u>all</u> 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:

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

### Action:

o sample results are flagged as estimated (J)

### Post-digestion spike

Samples with post-digestion spike recoveries ≥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:

SAMPLE	ELEMENT	RECOVERY
JCSW7AW	lead	79
JCDW8RW	lead	83
JCDW4AW	lead	82
<b>JCDPWAW</b>	lead	84
<b>JCDPWAW</b>	selenium	77
<b>JCSW1AW</b>	lead	84
JCDW8AW	lead	76
JCDW9AW	lead	82
JCBG2BW	thallium	80
JCDW1AW	thallium	67
JCDW9AW	thallium	79
<b>JCSW1AW</b>	thallium	58
<b>JCSW3AW</b>	thallium	80
<b>JCSW5AW</b>	thallium	67
JCSW6AW	thallium	81
JCSW8AW	thallium	132
JCSW9AW	thallium	83

### Action:

- o for spike recoveries >10%, but not within 85-115%, sample results >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	<b>J</b> 6
Barium		Nickel	A1
Beryllium	A1	Potassium	
Cadmium		Selenium	<b>J</b> 7
Calcium		Silver	
Chromium		Sodium	
Cobalt		Thallium	<b>J</b> 7
Copper	A1	Vanadium	A1,J3
Iron	Al	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 reproduceability.
- R1 Reject detection limit values (UR) due to negative blank drift.

ECHEM INC. DATA VALIDATION LOG

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S		DIOX													
lant		SAS													
(+)		<u> </u>			-	_	_	_							
Force	IITS	INOR	9/31	0/10											
SITE: Ave Force Plant S9	IDATION UN	PEST/PCB	0/81	0//1											
SITE: AL FORCE T	VAL	SVOA	9/81	0/11											
		\$300.	34%												
		DATE REC'D	2-11-92	1-24-92											
ae Natil		SDG NO.	5-6384	2											
CLIENT: Argonne Nat'l	0	CASE NO.												•	

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

## ECHEM INC. INORGANICS COMPLETENESS LOG

site: If	20		<u>S</u>	φ¢	b	we	uh	١.	(	<u> 3</u>	I.		CL:	El S#	TT:	<u>A</u>	να 3\	8 4 51)	ne	ì	d	<u>† 1</u>	l	ak
8 A M P L E	JCE ABW	JCDP WAW	JEDWIAN	TCDWSAW	JCDWPRW	Termsam	JCDU26AW	JEDWRAW	Jermaren	TCSWIRW	JCSWZAW	Jasmyfil	7			TCSW8AW		(W)						
1	K	K	X	IX	XI	X	X	Х	M	K	K	X	M	N	K	Ŋ	X	X						$\Box$
<u>2A</u>	$\cong$	X	V	$\swarrow$	X	Ķ	X	$\times$	划	$\times$	X	X	义	X	X	X	۲J	X						$\Box$
2B	凶	×	×	×	X	X	汄	X	X	X	X	X	Х	XĮ	X	Ķ	ΧĮ	X						$\Box$
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14	$\times$	X	メ	X	X	$\times$	X	X	Z	X	X	X	X	X	X	Y	X.	X X					$\Box$	二

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	
NATotal Solids Log (if applicable)	
Metals Digestion Log	
Mercury Digestion Log	
Cyanide Distillation Log	
Chain of Custody	
Case Narrative	

SAMPLE PREPARATION AND ANALYSIS SUMMARY FOR NYSDEC ECHEM INC.

CLIENT: Argenne Not! Lab

1,000

SITE: IRP Supplemental S. E.

et.		RECEIPT	d	(0	†	ત	૪	7	$\dot{ au}$		8	$\tau$	γ,	2	$\phi$	t	2	9	2	9			
ANALYTICAL FRACTION: Cyanide		COLLECT	٨.	7	.5	3	2	5	h	1	3	>	3	2	5	$\dot{\eta}$	3	7	۲.	Ų			
ANALYTICAL FR	DATE	ANALYZED	1-10-92	1-16-92	1-10-92	1-10-92	1-10-92	1-10-92	1-10-92	1-10-92	1-10-92	1-10-92	1-10-92	1-10-92	1-10-92	1-10-92	1-10-92	1-16-92	1-10-93	1-16-92			
	O. T. T.	RECEIVED	1-8-93	1-10-92	1-6-92	1-8-92	1-8-92	1-6-92	1-6-92	(-10-92	1-8-92	1-6-92	1-8-92	Eb-8-1	1-6-93	1-6-92	1-8-92	1-10-92	1-8-92	1-10-96			
SDG NO. 5-6384	CATE	COLLECTED	1-7-92	1-9-92	1-5-92	1-7-9a	1-8-92	1-5-92	26-9-1	1-9-92	1-7-98	1-5-9a	1-7-92	66-8-1	1-5-92	1-6-92	1-8-92	1-9-9a	1-7-92	1-9-92			
SDG NO. C	VIOTAL	<b>Υ</b> ΙΙ.Υω	WATER.																	<b>*</b>	•		
	LAB.	D ID	100-5179	6446-co4	6384-001	10415-002	6415-006	6384-003	6384-005	16446-002	1-00-S149	10384-002	6415-003	10415-009	400 - 48E01	6384- COG	010-51140	644b -003	6415-005	600-9hh7			
115/104410	EPA	NO.											•										
RICEASE NO. 4384/6415/6446	CLIENT	D	JCBG13W	JCDPWAW	JCDWIAW	JCDW3AW	TC. DIN 4AW	JC. DWS. P.W.	JCDW6AW)	JCDW 8AW	JC. DILY Au	Trswipw	JESWZAW	ICSWYAW	Tesussaw	Jesus Au	JCSW7AW	JCSWAAW	Irswand	JCDW8RW			

# COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

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

RECEIPT 30 HOLD TIME SITE: TRP Supplement | COLLECT 13-92 त प -93 3-9a 3-9B -15-92 - 13-92 13-93 3-92 13-93 -13-92 ANALYZED DATE -6-92 -8-92 -8-92 -10-92 -10-92 -6-93 -8-92 -6-93 RECEIVED 76-8-1 -10-92 -6-92 -8-92 DATE COLLECTED -9-92 76-67 -7-92 ′-92 -9-92 19-92 -8-92 -6-92 7-92 5-92 -7-92 1-7-92 DATE SDG NO. 5-6384 7 MATRIX WATER 200-5140 6384 - DOS 6446 - COD 6384 - COJ 200-S149 6415 - MA 6384-003 100-9449 100 - SIA SAMPLE 100-1850 100 - 9hho 6415- M 78 ₽ 7777 SAMPLE EPA <u>8</u> CLIENT: HINDING THEY CASE NO. 13384/ TCSWIRW TCDWIS RW TCSW3RW JC BGABW JCDWSAW TLDPWAW CDW3AW JCDW 4AW JCDW6 AW JCDWB AW JC DWIGHW CLIENT JCDW (AW) SAMPLE ₽

- 13-92

-8-92

76-8-

6415-00A 700 - p880

-6-9a

43

13-92

- 10-92

1-8-92

-7-92

-8-43

-9.92

6446- 003

Soos

5169

010 - 5179

6384-006

Icswahaw

JCSWIAM

ITSW 8AW JCSW9AW

JCSWSAW

TCSWYAW

-6-92

3-92 -13-92 -13-93

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

7

Appendix A-1:

Report 17

### 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 Director, Chemistry Division Gradient Corporation 44 Brattle Street Cambridge, MA 02138

Re: Laboratory: Air Force Plant 59 Galson Laboratories

Case No: SDG No:

NONE 6-6703

Volatiles: JCDPWBW

(USEPA 524.2) JCDW6BW JCDW8BW JCDW9BW

JCDW4BW JCDW3BW JCDW3RW JCSW1BW JCSW6BW JCSW7BW

JCDW5BW

JCSW3BW JCSW4BW JCSW5BW JCSW6BW
JCSW8BW JCSW9BW JCQC4WW JCQC5XW
TRIP BLANK16 TRIP BLANK17 TRIP BLANK16 TRIP BLANK18 HOLD BLANK16 HOLD BLANK18 HOLD BLANK17

JCDW1BW

### 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

AFP6703V

- 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 <u>CLP Organics Data Review and Preliminary Review</u>, 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:

COMPOUND	RECOVERY
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:

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

AFP6703V ECHEM INC.

BLANK ID.COMPOUNDCONCENTRATIONACTION LEVELVBLK5methylene chloride0.66

VBLK6 methylene chloride 0.4 4

\* Method blank levels below the NYSDEC ASP minimum requirement.

Associated samples with positive values reported <u>below</u> the action level are:

METHOD BLANK ID.

VBLK5

JCSW5BW

JCSW1BW

JCDW3BW

JCDW3RW

VBLK6 JCSW3BW

TRIP BLANK ID. ASSOCIATED SAMPLES

TRIP BLANK17 JCSW3BW JCDW9BW

FIELD BLANK ID. ASSOCIATED SAMPLES

HOLD BLANK17 ' JCSW3BW

### Action:

o associated sample results <MDL (flagged J); changed to MDL (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:

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INSTR.	CAL DATE	COMPOUND	<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:

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

### Action:

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

INSTR.	CAL DATE/TIME	COMPOUND	<u>RRF</u> %D
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

AFP6703V

INSTR. C(#3)	<u>CAL DATE/TIME</u> 02-07-92/06:28	COMPOUND 2-butanone vinyl acetate 1,1,2,2-tetrachloroethane	RRF .038 .032 .250	<u> </u>
	02-10-92/15:04		.042	
		vinyl acetate	.030	
		1,1,2,2-tetrachloroethane	.277	

### Associated samples:

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

### Action:

o for RRF ≤0.10, results ≥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

AFP6703V

### 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 noncompliant matrix spike recoveries
- J4 estimate positive values (J) for ( ) due to calibration
  not meeting minimum RF criteria

AFP6703V

- 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 noncompliant 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)

ECHEM INC. DATA VALIDATION LOG

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5.3	xoid														
2 tapt	SAS														
ance 7	INORG	17/0	6/												
SITE: Air Force Plant 59	DATION UNI PEST/PCB	11/0	1/0												
6	SVOA	9/4	%												
	VOA	9/50	1/0											,	
<u>labs</u>	DATE REC'D	03-05-92	63-05-92												
12 No.11			76779												
CLIENT: Arganne No 1'1	CASE NO.					-				-					

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 dast = 14 days

PEV. SYST

### ECHEM INC. ORGANICS COMPLETENESS LOG

SITE: AFP 59 CLIENT: Argenne Nat'l Labs 8DG# 6-65703 CASE # TRIPBIK 17 TCSW3BW 8 Trswe Bu Scswswa JCBC4 WW BW Tramakw Krowsau JCDW5BW JC DWG BW TCSW4BW Tesw75W JCSW8BW JCSW9RW Scacsxw A TODUIBL PWAT. P L E 12 1E 2A **2B** 3A 3B VOA 4A <u>52</u> N N N 6A **7**A XXXXXXXX **8 A** 1B 1C 1P 2C 2D 3C 3D **4B** SVOA 5B 6B 6C 7B 7C 8B 8C 1D 2E 2F 3 E PEST 3F 4C 80 8 E 10 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 ZCase Narrative

REV. 391

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

CLIENT: Argunde Not'l (it

CASE NO.			SDG NO.	SDG NO. 6 - 6.70 3		ANALYTICAL FR	<b>ANALYTICAL FRACTION: Volatiles</b>	es
CLIENT	EPA							
SAMPLE	SAMPLE	SAMPLE	MATRIX	DATE	DATE	DATE	НОГО	TIME
Q	NO.	( <b>D</b>		COLLECTED	RECEIVED	ANALYZED	COLLECT	RECEIPT
TCDPWRW		1070 - 1010	WATER	B -03-80	00-03-92	02-10-92	7	7
JCDW1BW		200-6749		02-01-92 08-01-93 03-06-92	08-01-93	CB-90-EO	4	کم
JCDW 3 BW		6761-001		02 -02 -92 02 -03 -92 02 -06 -92	02-03-92	DA-06-92	t	3
JCDWYBW		6703-001		61-29-92	01-30-92	01-30-92 02-04-92	و	2
JCDWSBW		6749-001		01-31-92	02-01-92	02-00-ED	9	2
JCDWG BW		6749-003		02-01-92 03 01-92 02-06-92	20192	D2 06-92	٨	h
JCDW 8 BW		6703-006		69-20-60189-05-10 -9-06-10	01-30-92	69-20- BO	7	•
JCDWI98W		6761-004		08-03-92	Da -63-92	102 -63 -92 -01 - 92	4	4
JCDW3RW		6761-002		62-00-60-63-62-60-60-62	02-03-92	02-00-G	<b>,</b>	3
ICSWIRW		6749-COC		02-01-92	69-10-60	02-01-92 cde-92	5	7
JCSW3 BW		6761-003			02-03-92	62-10-50	5	h
JCSW4BU		6703-004		29.PG-10	69-0E-10	02-01-92	9	5
JCSWSBW		6749-002		01.31.92 62.01.92 02-06-92	02-01-92	02-06-92	7	S
JCSWBW		4749.00Y		02-01-92	6P10-60	75-90-20	5	7
JC 5W 7BW		6703-005			O1-30-92	01-30-9202-05-92	9	و
Tcsw8 BW		6703-007		01-30-92 01-30-92 02-05-92	01-30-92	02-20-ED	9	9
JCSW9BW		6761-005		02-03-92	02-03-92 02-10-92	Da-10-92	7	7
JCQC4WW		6703-008		20-02-10	01-30-92	02-03-92	4	4
Tracsxu		6703-009		01-06-10 8P-06-10	_	02.03-92	4	7
TEIP BLANK 16		6703-010		01-00-92 01-30-92	01-30-92	66-50-60	e	9
TRIP BLANK 17		200 - 6719		69-10-80	CA-10-60	GP-70-60 GP-10-60	e	6
TRIP BLANK 18		100-1010			DB-03-92	03-10-92	7	7
HULD BLANKIL		103-601			01-30-99	01-30-92-02-92		
HOLD BY ANK 17		6749-008			C2-01-92	CB-10-60		
HOLD BLANKIR		900-1919	*		69.80-EO	CB-10-92		

# COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

REV. X

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 Director, Chemistry Division Gradient Corporation 44 Brattle Street Cambridge, MA 02138

Re:

Air Force Plant 59

Laboratory:

Galson Laboratories

Case No:

NONE 6-6703

Semivolatiles: JCDPWBW

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 <u>CLP Organics Data Review and Preliminary Review</u>, 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
- sample preparation and analysis summaries.

### SURROGATE RECOVERY:

Samples with two or more surrogate recoveries from <u>either</u> 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:

			PERCENT	RECOVERIES		
	BASE-NEU	TRAL	FRACTION	ACID	FRAC	rion
SAMPLE	<u>NBZ</u>	<b>FBP</b>	<u>TPH</u>	<u>PHL</u>	2FP	TBP
JCDW4BW	0	7				
JCDW3BW				3	2	2

### Action:

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

#### 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.

### RECOVERY (%)

<u>SAMPLE</u>	<u>PHE</u>	<u>CLPH</u>	<u>DCB</u>	<u>DNP</u>	<u>TCB</u>	<u>CRE</u>	<u>ACE</u>	<u>NPH</u>	DNT	<u>PCP</u>	<u>PYR</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

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

Deviations from the above calibration criteria are tabulated below.

### CONTINUING CALIBRATION

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

INSTR.	DATE/TIME	COMPOUND	<u> </u>	RRF
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:

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

### 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

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 noncompliant 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 noncompliant 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)

AFP6703S 6 ECHEM INC.

SAMPLE PREPARATION AND ANALYSIS SUMMARY FOR NYSDEC

CLIENT: Argunde Not! Labs

806 NO 10-670 3

ANALYTICAL FRACTION: Sen

	_																							
volatiles	TIME	TO EXTRACTION	RECEIPT	1	7	ام	,	1	,	5	8	5	5	5	5	5	5	5	/	/				
IACTION: Semiv	HOLD TIME	TO EXTR	COLLECT	1	h	7	ત	ત	2	٥	د	9	9	5	5	5	5	5	1					
<b>ANALYTICAL FRACTION: Semivolatiles</b>		DATE	EXTRACTED	02-64-92	08-00-92	69-00-60	03-04-92	B3-64-92	02-04-92	10-04-92	02-64-92	08-00-92	02-06-92	CB -06-92	02-06-92	02-04-92	29-40-6C	02-01-92	02-04-92	62-64-92				
	•	DATE	RECEIVED	69-60-60	02-01-92	69-00-60 69-10-60	Da-03-92 02-04-92	59-40-60 59-60-60	59-60-60	01-30-9a	61-30-92	02-01-92	69-01-60 CP-10-60	eb-90-80/eb-10-80	02-01-92	46-40-60 86-08-10	69-40-60 69-08-K	61-70-60 69-05-10	A2 -03 92	69-60-60 60-60-60				
2-6703		DATE	COLLECTED	68-63-92	02-01-92	02-01-92	_			01-29-92	,								02-03-92 NB-03-92 00-04-92	29-63-92				
SDG NO. 6-6703		MATRIX		WATER.																<b>,</b>				
		SAMPLE	ID	6761-006	6749-005	6749-006	10761-CO1	6761-COS	6761-003	6703-001	10.703 - CON	6749-001	6749-003	E00 -6619	6749-004	500-5019	903-8019	6703-007	6761- COU	1076-1005	•			
	EPA	SAMPLE	NO.																					
CASE NO.	CLIENT	SAMPLE	ID .	SCDPWBW	്യൂ ക്യ	ദേശാകന	P. DW 3BW	CDW3RW	JC S to 3R tu	CAUTBU	reswy Bw	TCDW 58W	JC.SLUS BW	TC.DIW BW	TaswaBw	1CSW 7 BW	TCDUSBUD	CSUN8 BW	TCD119BW	Tesugan				
Ċ				٢.		4	H	'n	Ϋ́	٦	17	H	Š	1	1	7	1	1	7	1				

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

AEV. 361

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 Director, Chemistry Division Gradient Corporation 44 Brattle Street Cambridge, MA 02138

Re:

Air Force Plant 59

Laboratory:

Galson Laboratories

Case No:

NONE 6-6703

Pesticides/PCB's:

JCDPWBW JCDW1BW JCDW3BW **JCDW3RW** JCDW4BW JCDW5BW JCDW6BW JCDW8BW JCDW9BW JCSW1BW JCSW3BW JCSW4BW JCSW7BW JCSW5BW JCSW6BW 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

<sup>\*</sup> All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II <u>CLP Organics Data Review and Preliminary Review</u>, 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.

			RECO	VERY (	(%)	
SAMPLE	LIN	<b>HEP</b>	ALD	DIEL	END	DDT
JCDW4BW					133/133	
MB					140	

### Action:

o none, sample results reported as CRQL U

Sincerely, ECHEM INC.

Dma Z. Wallin, PhD

Vice President

enclosures

### Air Force Plant 59 SDG. No. 6-6703

### Table I. Validation Action Summary

JCDPWBW JCDW3BW JCDW3BW JCDW5BW JCDW5BW JCDW6BW JCDW9BW JCDW9BW JCSW1BW JCSW4BW JCSW4BW JCSW5BW JCSW5BW JCSW5BW JCSW6BW JCSW6BW JCSW7BW JCSW8BW JCSW9BW	Pesticide/PCB
If the fie	eld 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 <b>-</b>	estimate positive values (J) for ( ) due to non-compliant matrix spike recoveries
J5 <b>-</b>	estimate positive values ( $J$ ) for ( ) due to calibration not meeting minimum RF criteria
J6 <b>-</b>	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%

AFP6703P 4 ECHEM INC.

ECHEM INC. SAMPLE PREPARATION AND ANALYSIS SUMMARY FOR NYSDEC

CLIENT: Argund North Labs

SUC 7-9 ON SUS

CASE NO. JUDINE			SDG NO.	SDG NO. 6-6,703		<b>ANALYTICAL FRACTION: Pesticide/PCBs</b>	ACTION: Pestic	ide/PCBs
CLIENT	EPA	LAB.					HOLD TIME	TIME
SAMPLE	SAMPLE	SAMPLE	MATRIX	DATE	DATE	DATE	TO EXTRACTION	ACTION
. OI	NO.	ID		COLLECTED	RECEIVED	EXTRACTED	COLLECT	RECEIPT
JCDAWBW		900-1919	WATER	C6-60-80	62-63-92 C2-64-92	49-40-60	/	,
JCDW 1BW		6749-005		26-10-10	02-01-92	DB-00-92	5	4
JCDW3RW		6761-001		69-60-60	49-60-60	62-10-E0		_
JCDW3RW		6761-003		02 -02 -92	02-03-92	02-03-92 02-04-92	8	
JCDWY BW		100-8020		01-29-92	O1-30-92	16-40-60 6P-08-10	4	کم
JCDWSBW		6749-001		01-31 ga	02-01-9a	02-01-92 02-06-92	7	S
JCDW6BW		6149-003		£6-10- 80	02-61-72	02-61-92 02-06-92	5-	5
JCDW 8 BW		6703-006		01-30-92	01-30-92	01-30-92 02-04-92	کم	7
TCDW9BW		6761-004		09-03-92	02-03-92	B6-40-60	1	/
JC5W18W		10749-006		29-10-00	GP-10- 60   GP-10- 60	CB-10-60	ک	7
JeswaBw				69-60-60	02-03-92	69-60-60-60-60	द	,
JCSWYBW		6703 -004		26-88-10	DI-30-92	DICAD-92 02-04-92	6	8
JCS1253W		6749-003		01-31-92	at 01-93	65-00-co	6)	8
JUSULBIN		6749-004		EP-00-60 -62-12-60 29-10-60	B-61-92	00-00-92		5
JCSWIBW		6703-005		01-30-92	01-30-9a	01-30-92 ca-04-92	5	5
JCS W& BW		6703-007		26-08-10	C6-08-10	20-30-92 03-04-92	5	7
JCSW 9BW		6761-005	•	02-03-92	02-03-92	02-03-92 02-04-92	7	-

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

AEV. X

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 Director, Chemistry Division 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 JCDW9BW JCSW1BW JCSW3BW JCSW4BW JCSW5BW JCSW6BW JCSW7BW JCSW8BW 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

AFP6703I

\* All criteria were met for this parameter.

Table I summarizes the validation actions, which were in accordance with USEPA Region II <u>Evaluation of Inorganic Data for the Contract Laboratory Program</u>, 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 ≥IDL and their associated action levels are tabulated below:

BLANK ID CCB5	PARAMETER calcium iron nickel zinc	CONCENTRATION 119 36 7 5	ACTION LEVEL WATER SOIL 595 180 35 25
CCB6	calcium	75	375
	iron	9	45
CCB7	calcium	111	555
	iron	17	85
	zinc	3	15
PB	cobalt	5	25
	nickel	7	35
	vanadium	5	25
	zinc	12	60

Associated samples with positive values reported <u>below</u> the action level are tabulated below:

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

PREP	BLANK ID	PARAMETER	SAMP	LE NO.
PB		nickel	JCSW3BW	JCSW6BW
			JCDPWBW	<b>JCDW3RW</b>
	•		JCDW4BW	<b>JCDW6BW</b>
			JCDW9BW	<b>JCSW1BW</b>
			JCSW9BW	JCSW8BW
		vanadium	JCDW1BW	JCDPWBW
		·	JCSW7BW	JCDW3BW
			JCDW3RW	JCSW8BW
			JCDW4BW	JCDW5BW
			JCSW9BW	JCDW6BW
			JCDW9BW	JCSW1BW
			JCSW3BW	JCSW4BW
			JCSW5BW	
		cobalt	JCDW3BW	JCDW3RW
		002420	JCSW4BW	JCSW6BW
			JCSW8BW	
			TOCKIADN	TOCKII PW
		zinc	JCSW3BW	JCSW1BW
			JCSW7BW	JCSW5BW
			JCDW5BW	JCSW3BW
			JCDW6BW	JCDW8BW
			JCDW4BW	

#### Action:

o 'associated sample results ≥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:

SAMPLE	ELEMENT	RECOVERY
JCDW4BWMS	thallium	63

## Action:

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

AFP6703I ECHEM INC.

#### Comments:

The above actions are applied to <u>all</u> 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:

SAMPLE	ELEMENT	RPD %	CRDL	<u>s - D</u>
JCDW3DW	zinc		20	56
	aluminum	·68		•
	iron	67		
	manganes <b>e</b>	37		

#### Action:

o results ≥IDL are flagged as estimated (J)

#### Comments:

The above actions are applied to <u>all</u> 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:

ELEMENT	<b>%RECOVERY</b>
celenium	70

# Action:

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

#### Comments:

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

AFP6703I ECHEM INC.

## FURNACE ATOMIC ABSORPTION RESULTS:

#### Post-digestion spike

Samples with post-digestion spike recoveries ≥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:

SAMPLE	ELEMENT	<pre>% RECOVERY</pre>
JCDW1BW	lead	83
JCDPWBW	lead	<b>78</b>
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	<b>.</b> 83
JCSW5BW	thallium	49
JCDW6BW	thallium	82
JCSW6BW	thallium	61
JCDW1BW	thallium	66
JCSW1BW	thallium	49
<b>JCDW3BW</b>	thallium	77
<b>JCDW3RW</b>	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 >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	<b>J</b> 5
Arsenic		Mercury	
Barium		Nickel	A1
Beryllium		Potassium	
Cadmium		Selenium	J6,J7
Calcium		Silver	
Chromium		Sodium	
Cobalt	A1	Thallium	J4,J7
Copper	٦	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.

- 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.

# ECHEM INC. INORGANICS COMPLETENESS LOG

SITE: AF	P 9	50	Ì							c	LI	EN	T:	P	Ira	01	n n	e	V	la-	<del>+</del> '	1 (	إسا
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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	

SAMPLE PREPARATION AND ANALYSIS SUMMARY FOR NYSDEC ECHEM INC.

CLIENT: Fromme Nay'I Labs

CASE NO.			SDG NO.	SDG NO. 6-6-70-3		ANALYTICAL FR	ANALYTICAL FRACTION: Mercury	<u>-</u>
CLIENT	SAMPLE	LAB. SAMPLE	MATRIX	DATE	DATE	DATE	HOLD TIME	TIME
O	NO.	O .		COLLECTED	RECEIVED	ANALYZED	COLLECT	RECEIPT
JCDPWBW)		900-1929	UIA TER	62-63-92	09-63-60	C2-11-92	8	٥
JCDW 1 BW		10749-005	_	100-01-92	62-01-92	£ 6-11-60	10	10
JCDW3BW		100-1929		02-02-0A	12-03-92		9	S
JCDW3RW		67101-003		02-02-92	C9-60-60		9	Ø
Trandro		6703-001		01-29-92	41-30-92		13	<del>ر</del> ۲
Trams 8 W		100-6740		D1-31.93	69-10-60		19.	0
J CDW 6 BW		6749-003		02-01-9a	cb-10-60		0	10
JCDW88W		900-8019			01-30-92		اع	4
TC DWG BW		400-1919		03-03-92 04-03-93	04-03-93		৬	80
Jesmian		700-6417	·	CD-101-62	26-10-60		01	9)
JCSW3BW		6761-003		62 -03 -92 02 -03-93	69-63-69		P	Ø
1 CSW4BW		400- 2019		01-29-92	61-30-92		13	اع
JCSWS BW		6749-00A		01-31-9a	02-01-BO		11	0
Jeswasu		P00-6719			09-01-60		10	01
JCSWJBy		6703-005		01-30-92 01-30-92	01-30-92		<u>ر</u>	4
JCSW&BW		100 - 201 9		01.30-92 01-30-92	01-30-9a		14	ત
JCSW9BW		6-101-005	<b>&gt;</b>	02 -03-92	A3-03-92	•	<b>~</b>	8
								•

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

ECHEM INC.
SAMPLE PREPARATION AND ANALYSIS SUMMARY
FOR NYSDEC

CLIENT: Argunde May 1 Labs

676 6-6763

SITE: HFP ST ANALYTICAL FRACTION: CVANI

<b>de</b>		TIME	RECEIPT	t	و	4	б	γ	و	٠	کم	4	e	6	V	ر	و	M	γ	6				
ANALYTICAL FRACTION: Cyanide		HOLD TIME	COLLECT	Н	7	10	. 0	2	7	6	5	9	,	10	٦	7	b	γ	5	9				
ANALYTICAL FF		DATE	ANALYZED	08-67-92	02-07-92	02-12-92	Da -12 -92	08-04-92	62-07-92	62-07-92	G1-30-92 62-62-08-10	62-12-92	03-07-92	02-12-92	02-04-92	02-07-92	02 -07-92	02-04.92	62-00-60	02-12-92				
		DATE	RECEIVED	AP-60-60	26-10-50	100-03-92 02-12-92	0a -03 -92	41-30-99 00 -04-92	22-10-20 BB-10-20	CP-10- 20 CP-10-80	26-08-10	29-63-62 69-60-60	CO-01-92	02-03-92 02-12-92	C1-30-92	02-01-92	29-10-E0	101-30-92 Da-04-92	B1-30-92	02-03-92				
SDG NO. 6 -6 703		DATE	COLLECTED	D2-03-92 08-03-92	02.01-92 02-01-92 02-07-93	62 -02 -92		01.29-92	01-31-92		46 - 95-10	02-03-92	02-01-92 D3-01-92 D3-07-92	02-08-92	01-29-92 01-30-92 02 -04-92	01-31-92 62-01-92 02-07-92	02-01-92 02-01-92 02	61-30-42	01-30-92	02-63-92				
SDG NO. (		MATRIX		WATER	_															<b>&gt;</b>				
	· LAB.	SAMPLE		100-1919	b749-005	101-101	6761-002	6703-001	6749-001	6749-603	10103-006	6761-004	6749-006	6761-003	6703-004	6749-602	6749-004	10703-00S	6703-007	6761-005				
	EPA	SAMPLE	NO.																					
CASE NO. U	CLIENT	SAMPLE	Ol	JCDPWBLJ	JCDW 1 BW	JCDW3 BW	JCD103 KW	JCDWARW	TCDWS BW	JCDINGBW	JCDW8.BW	TCDWGBW	Jcsw18W	Jaswagw	JCSW4BW	JCSUSBU	JCSW6 BW	JCSW7BW	Trswiew	TCSWABW				

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT - DATE RECEIVED MINUS DATE ANALYZED

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 Director, Chemistry Division 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/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.

**AFP6779V** 

Table I summarizes the validation actions, which were in accordance with USEPA Region II <u>CLP Organics Data Review and Preliminary Review</u>, 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.

Sime of Wallin, PhD

Vice President

enclosures

#### Air Force Plant 59 SDG No. 7-6779

# Table I. Validation Action Summary

# Sample No. VOA JC2L1AS

If the field is blank, no qualifiers were necessary.

- A1 change positive values for ( ) to revised detection limit due to blank contamination

- 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 noncompliant 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 noncompliant 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

AFP6779V ECHEM INC.

- 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)

AFP6779V

# ORGANICS COMPLETENESS LOG

SITE: AFP 59 CLIENT: Franne Nat 1 CASE # 8DG# 7-1-779 8 A M LA P L ß E 2 17 X X 2A 2B 3A VOA 3B X <u>4A</u> ハ <u>5A</u> ベ 6A **7**A 8A 1B X 1C ス 1F 2C 2D X 3C 3D >X SVOA 4B 5B X 6B 6C × 7B X X 7C X 8B X 8C <u>1D</u> 2 E <u>2F</u> 3E Pest 3**F** 4C 8D X 8E X X 9 10 ✓ 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

FOR NYSDEC	SDG NO. 7-6779	DATE DATE	ID COLLECTED I	11-31-92											
77.1.1.70	Carring		: !	00 - 5119 - 00											
CHENIT. A. C. C.	CASE NO.	CLIENT SAMPI E	01 C	JC2LIAS											

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE ANALYZED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE ANALYZED

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 Director, Chemistry Division Gradient Corporation 44 Brattle Street Cambridge, MA 02138

Re:

Air Force Plant 59

Laboratory:

Galson Laboratories

Case No: SDG No: NONE 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
- \* 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 <u>CLP Organics Data Review and Preliminary Review</u>, 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.

				RECO	VERY	(%)			
 	<u>CLPH</u> 68	 <u>DNP</u> 65	TCB 74	<u>CRE</u> 70	ACE	NPH	DNT	PCP	<u>PYR</u> 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

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

Deviations from the above calibration criteria are tabulated below.

## CONTINUING CALIBRATION

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

# Associated samples:

INSTRUMENT	DATE/TIME	SAMPLE NO.
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

Sample No.	SVOA
JC2L1AS	R8

If the field is blank, no qualifiers were necessary.

- A1 change positive values for ( ) to revised detection limit due to blank contamination

- J4 estimate positive values (J) for pyrene due to noncompliant 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 noncompliant internal standard stability
- 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)

AFP6779S 5 ECHEM INC.

SAMPLE PREPARATION AND ANALYSIS SUMMARY FOR NYSDEC ECHEM INC.

CLIENT: Argunne Mat 1 Lahs

NO 7-1. 779

SITE: AFP

CASE NO.	CLIENT	SAMPLE	O	JC3LIAS												
			NO.													
	LAB.	SAMPLE	OI	100-6219												
SDG NO. 1-(07/19		MATRIX		2016												
-6779		DATE	COLLECTED	01-31-92												
		DATE	RECEIVED	62-01-92 02.06-92												
ANALYTICAL FF		DATE	EXTRACTED	0 a . ol92.												
<b>ANALYTICAL FRACTION: Semivolatiles</b>			COLLECT RECE													
volatiles	TIME	ACTION	RECEIPT	(0	•					I						

COMMENTS:

HOLD TIME COLLECT - DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

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

**AFP6779P** 

1

ECHEM INC.

# Also attached are the:

- data validation log,
- 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

# Sample No. Pesticide/PCB 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 noncompliant matrix spike recoveries
- 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 noncompliant 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%

AFP6779P 4 ECHEM INC.

ECHEM INC. SAMPLE PREPARATION AND ANALYSIS SUMMARY

**FOR NYSDEC** 

CLIENT: Arganne Nay 11 Labs

SDG NO. 9-1,779

SITE: AFP 59

side/PCBs	TIME	IACTION	RECEIPT	67)	}												
IACTION: Pestic	ПОН	TO EXTR	COLLECT	_													
ANALYTICAL FF	AMIT CHOH	DATE	EXTRACTED	26-17-60													
		DATE	RECEIVED	$\neg \neg$													
1-10-14		DATE	COLLECTED	01.31.92 02.01-93													
SDG NO.		MATRIX		Sou							٠						
	.841	SAMPLE	OI .	100-5660													
	EPA	SAMPLE	NO.														
CASE NO.	CLIENT	SAMPLE	O	IC2 LIAS													

COMMENTS:

HOLD TIME COLLECT = DATE COLLECTED MINUS DATE EXTRACTED

HOLD TIME RECEIPT = DATE RECEIVED MINUS DATE EXTRACTED

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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.

Location/Analysis*	Report Page Number
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	1 1
Outfalls	
MET	12
P/P	13
SVOC	13
VOC	13

<sup>\*</sup> MET=inorganics P/P=PCB's and pesticides

# 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, 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 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 recoverywas 44%. Therefore, the lead data are considered usable but estimated (j) values and may be biased 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

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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 I): Aldrin at 7.6 ppb in JCDW1AS, 4,4'-DDE 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.

	JCDW1AS	JCDW1BS
phenanthrene	160J	1100U
anthracene	17Ј	1100U
di-n-butyl phthalate	220Ј	260J
fluoranthene	140Ј	65J
pyrene	110Ј	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.

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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 JC5W9B5.

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 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 R lists the metals validated data for the Groundwater Samples. These comprised SDG #5 (samples: JCDPWAW, JCDW1AW, JCDW3AW, JCDW4AW, JCDW5AW, JCDW6AW, JCDW8AW, JCDW8RW, JCDW9AW, JCSW1AW, JCSW3AW, JCSW4AW, JCSW5AW, JCSW6AW, JCSW7AW, JCSW8AW, JCSW9AW, and background sample JCBG2BW) and SDG #6 (samples: JCDPWBW, JCDW1BW, JCDW3BW, JCDW3BW, JCDW4BW, JCDW5BW, JCDW6BW, JCDW6BW, JCDW6BW, JCSW7BW, JCSW8BW, JCSW9BW, JCSW7BW, JCSW8BW, JCSW9BW, JCSW7BW, JCSW8BW, JCSW9BW, JCSW7BW, JCSW8BW, JCSW9BW, JCSW9BW, 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 JCSW4AW and JCSW8AW. 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.

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 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 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 OC was very good. All groundwater pesticide data are usable.

## 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).

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 JC2L1AS) 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 JC2L1AS 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 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.

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 JC2L1AS contained 130 ppb of Aroclor 1260 and JCIH1AS 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 PAHs 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 PAHs 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 JC2L1AS 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 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 (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. 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.

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.

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, 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, 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 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.

#### 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 5 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

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Appendix B: Well Data and Lithologic Logs

Appendix B-1: Lithological Logs

Appendix B-2: Well Completion Record

Appendix B-1:

Lithological Logs

TE	ST BOF	RING	LOG		ARGONNE NATIO	NAL LABORATO	RY	PAGE 1
BORIN	G NO.:		DW1		PROJECT: AFP#59	IRP SI		DATE: 11/22/9
	OJECT NO: LOCATION: ISPECTOR:	91230 Johnson Joseph I	•-		DRILLER: RIG TYPE: METHOO:	MARCOR Canterra CT 350 HSA & Driven Steel Casing	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	831.83'
WE	VELL TYPE: ELL DEPTH: SCREEN: SLOT SIZE:	4" PVC 61.5' 4" Cont. \	Wound PVC		SCREEN LENGTH: GROUT LENGTH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:	•	PROTOP WIDTH/TYPE PAD ELEVATION: TOG ELEVATION STICK UP/DOWN:	831.93' 834.57'
			IPLE TION DATA					
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (In.)		DESCRIPTION		DEPTH
4'		0			Asphalt (Begin 11-21-91	at 0600 hour)		
_ 		0	8/8/32	6*	Brown and gray gravel, so	me fine to coarse sand, tr	ace silt and clay	-
- - - 4		0	10/4/5/7	24*	Brown fine sand and silt, t	race clay		_
-  - 6	. 1	0 .	11/7/8/9	24"	SAB			5 
-  - 8		0	3/4/6/7	24'	SAB			, <u>-</u>
- - 10	2/CHEM	0	5/9/10/10	18*	8 - 9' SAB (3' split spoon		y	<u> </u>
-  - 12		0	2/5/5/7	6*	10'-11.5' SAB	oarse sand and gravel tra	ce 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	i, trace gravel		-
- - - 20	СНЕМ	o	12/15/19/17	12*	SAB, some gravel (3" split	spoon)		20
- - - 22	SA-1	o	4/10/11/17	6•	Brown fine to coarse sand	i and gravel		-
-  24		0	4/8/16/21	12*	SAB			<u>-</u> -
<u> </u>								25 
 - - - - 28			<b>:</b> *.					<u>-</u>
-		0	9/13/15/36	12"	SAB			- - - 30

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY PAG	E 2
BORIN	G NO.:		DW1		PROJECT: AFP#59 IRP SI DATE	:11/22/91
			IPLE TION DATA			
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6°	REC (In.)	DESCRIPTION	DEPTH
<u> </u>						_
33						F .
E		0	4/5/23/28	6*	SAB	
35		<del> </del>				35
_				ď		-
38					38' No sample, heaving sands in casing. Brown coarse sand and fine gravel	E
_					cuttings.	_
<u></u>						40
Ŀ						
43	4			0.	43' Heaving sands in casing. SAB cuttings.	-
	-				Tourning can be in caving. City of the cavings.	E
E						45
<u>-</u>						
F.,				0*	48' Heaving sands, SAB cuttings. (End 1700 hour)	
<b>48</b>				-	46 Meaving saids, SAB culturgs. (End 1766 field)	E
E						50
<u></u>			ĺ			
E			ĺ			_
53	5			0.	53' Heaving sands in casing. Brown, medium to coarse sand and fine gravel cuttings. (Begin 0600 hour, 11/22/91)	_
			)			55
_						_
<u> 58</u>					58' Heaving sands in casing. Brown medium to coarse sand and fine gravel cuttings	-
60						60
-			7		62.5' Heaving sands in casing. SAB cuttings.	_
62.5					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'.	_
 65					(Water at 19.84 bgs) (End 1030 hour)	65
	TIONS US	ED: TRA	CE = 0-10	%, LITT	LE = 10-20%, SOME 20-35%, AND = 35-50%	

115	ST BOI	TING	LOG		ARGONNE NATIONAL LABORATORY PAGE	<u> </u>
BORIN	G NO.:		DW3		PROJECT: AFP#59 IRP SI DAT	E: 11/8/91
PROJECT NO: 91230  LOCATION: Johnson City, NY  INSPECTOR: Joseph Hau			•		DRILLER: MARCOR DRILLING BIT: 14 1/4  PIG TYPE: Canterra CT 350 GROUND ELEVATION: 829.4:  METHOD: HSA & Driven Steel Casing SAMPLING METHOD: 24° S/4	z
WE	VELL TYPE: ELL DEPTH: 9CREEN: SLOT SIZE:	4" PVC 88.0" 4" Cont. " 0.010	Wound PVC		SCREEN LENGTH: 20' PROTOP WIDTH/TYPE 10" FI GROUT LENGTH/TYPE: 59.5' / 10:90 Bent:Cernt Mbx PAD ELEVATION: 829.4  SEAL LENGTH/TYPE: 5' / Bentonite TOC ELEVATION: 829.0  FILTER LENGTH/TYPE: 23.5' / No. 2 Sand STICK UP/DOWN: -0.38	1' <b>4'</b>
			APLE TION DATA			
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	DESCRIPTION	DEPTH
		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	_
-  6	1	NSNO	9/4/3/10	12"	SAB  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	E
- - - 20		NSNO	50/Ref.	o	SAB wet spoon (First water at 18')	20 
- - 22	cutting	NSNO	80/100/ref.	o	SAB, wet (3" split spoon)	_
24	cutting	NSNO	30/65/47/33	o	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)	
<u>-</u>	cutting	0	18/12/14/43	6"	SAB (Begin 11-06-91 at 0600 hour)	

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY	PAGE 2
BORIN	G NO.:		DW3		PROJECT: AFP#58 IRPSI	DATE: 11/8
			MPLE TION DATA			
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	DESCRIPTION	DEPT
- - -	cutting					
33					·	E
-	_				33' - 34.5' SAB	_
35	3 4	0	3/5/7/13	24"	34.5' - 35' Wet, gray, fine sand, little silt, trace clay	35
<u>-</u>						=
 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)	=
		_			(End 1436 hour)	40
<u>-</u>						E
43					(Begin 11/7/91 at 0600 hour. Drive and wash 6° casing.)	
45	5	0	4/5/9/13	24*	SAB, trace clay	45
-						
48		_				-
 50	6	0	27/17/16/16	12*	Wet, gray coarse sand, little gravel	50
-		_				
-						<u> </u>
					53'-54.75' Gray, fine sand and silt, little clay.	_
55	7		16/14/19/36	12*	54.75'-55' Gray, fine to coarse sand, some silt, trace gravel.	55
-						=
58	_					E
- 60		0	15/28/26/30	12*	Gray, fine sand and silt, little clay	 60
_			zi.			60
-						_
63						
_65			15/14/20/24	24'	SAB .E = 10-20%, SOME 20-35%, AND = 35-50%	65

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY	PAGE 3
BORIN	IG NO.:		DW3		PROJECT: AFP#59 IRP SI	DATE: 11/8/91
			APLE TION DATA			
DEPTH	SAMPLE NUMBER	HNU (PPIG)	STP TEST BLOWS / 6"	REC (Inl.)	DESCRIPTION	DEPTH
					-	_
<u>-</u>						<u></u>
68						_
-  70		o	16/20/25/27	12*	Gray coarse sand and gravel trace silt (gravel are shale fragments) (Note; Hard to rollerbit)	70
_						70
- -						-
73						_
 75	8	0	60/ref	6°	SAB (End 17:00)	<u> </u>
-	·					75
-						E
78						<u> </u>
 80	. 9	NSNO	64/ref	6•	Gray, angular gravel (Begin 11-08-91 at 0600)	
						8o 
-						E
83						-
  85		NSNO	ret/	0.	SAB	
86						85 
- 		NSNO		0.	CAR	
88		NSNO	ref/	0	SAB	-
_					Boring terminated at 88' (Water level in well after completion is 19.07' bgs) (End 1200 hour)	
<del>-</del>						90 
_						
<del></del>						_
<del>-</del>						95 
			<b>*</b>			
_						
_						_
20000	BTIONS US	ED. TO	05 - 0 100		LE = 10-20%, SOME 20-35%, AND = 35-50%	100

	ST BO	HING	LUG		ARGONNE NATIO	PAGE 1		
BORIN	IG NO.:		DW4		PROJECT: AFP#59		DATE: 11/25/9	
	IOJECT NO: LOCATION: NSPECTOR:	91230 Johnson City, NY Joseph Hau			DRILLER: MARCOR DRILLING BIT: PIG TYPE: Canterra CT 350 GROUND ELEVATION: METHOD: HSA & Driven Steel Casing SAMPLING METHOD:			829.05'
WE	WELL TYPE: LL LENGTH: SCREEN: SLOT SIZE:	4" PVC 85.0' 4" Cont. ' 0.010	Wound PVC		SCREEN LENGTH; GROUT LENGTH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:	57' / 10:90 Bent:Cemt Mix 5' / Bentonite	PROTOP WIDTH/TYPE PAD ELEVATION: TOC ELEVATION STICK UP/DOWN:	10° Flush Manhok 829.10' 828.78' -0.27
			APLE TION DATA					
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)		DESCRIPTION		DEPT
4"			12/9/9	8"	Asphalt (Begin 11-23-91			
2'		0	3/3/4/5	6*	Yellowish-brown, sandy g	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	<b>.</b>		_ 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' - 16' Brown fine sand	and silt little clay		15
- 18	3	60	4/3/5/10	18*	SAB, trace clay			_
			3/3/4/8	24"	SAB			
23	_	_						<u> </u>
25	4	0	1/2/2/4	18"	Gray fine sand and silt, tra	ce clay		25
- - 28			·					-
		0	1/1/2/3	18*	SAB, little clay			
30	TIONOLIO	CD. TD4	OE - 0 100	/ 1177	LE = 10-20%, SOME 20-3	250/ AND - 25 500/		30

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY PA	GE 2
BORIN	G NO.:		DW4	X-15	PROJECT: AFP#59 IRP SI	TE: 11/25/9
			TION DATA			
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	DESCRIPTION	DEPT
						-
-						<u> </u>
- 33						<u> </u>
	- <del>-</del>					-
- 35		0	1/3/3/6	18"	SAB (8" casing set at 35') (End 1130 hour)	- 35
_						
_						<b>-</b> -
38						<b>-</b> -
_	<b>.</b>		15/16/04 100	100	(Begin 11-24-91 at 0600) (Water at 21.3)	_
40	5	0	15/16/31/28	12"	Brown fine to coarse sand, little gravel, trace silt, 1-2 mm clay layers, up to 1" silt layers. (4" spoon)	<u></u> 40
<del>-</del>						
43		1				<u> </u>
_	6	0	10/12/22/32	8•	SAB (4" spoon.)	
45	•	•	10/12/202	•	(4 specific	45
<u> </u>						
· 				0		_
48					48' Five feet of heaving sand and gravel. No recovery, large gravel felt by driller under rollerbit	_
<u>-</u>						50
<del></del>						_
						F
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 
<u>-</u>						
 58				0	59' Twoke fact of having sand and armalia ansi No	
				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
						60
			<b>*</b> .			_
- 63				0	63' Twelve feet of heaving sand and gravel in casing. No recovery	-
					63' Twelve feet of heaving sand and gravel in casing. No recovery.  Brown coarse sand and fine gravel cuttings, large gravel felt by bit.	_
_						<del></del>

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY PAGE			
BORIN	G NO.:		DW4		PROJECT: AFP#59 IRP SI DATE:	11/25/9		
10		4	IPLE TION DATA					
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	DESCRIPTION	DEPTH		
_						F		
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.	Ε		
_						_		
_		}		}		70		
_				}		<u> </u>		
_						<u> </u>		
73	8			0	73' Nine feet of heaving sand in casing. Gray, slightly finer sands in cuttings.	_		
,	]		İ		No large gravel felt. (End 1700 hour)	<del>_</del>		
_					·	75 75		
					, ,	<u> </u>		
					(Begin 11-25-91 at 0600) (Water at 14.3')	_		
78				0	78' Eight feet of heaving sand in casing. Gray coarse sand and fine gravel in cuttings. No large gravel felt.	F		
_					cutungs. No large graver lett.	F		
						80		
_						F		
						<u> </u>		
83	9				83' Seven feet of heaving sands in casing. Gray coarse sand and fine gravel cuttings. No large gravel felt.	E		
-					Culturings. 140 large graver role			
-		Ì				85		
-								
_						E		
88					88' Eight feet of heaving sands in casing. Gray coarse sand and fine gravel cuttings Large gravel felt at 87.5'	<u>-</u>		
-					Failing Alexander and and	_		
<u>-</u>						90		
-						_		
- <sub>92.5</sub>				Ref	92.5' SAB, large gravel and likely shale bedrock (refusal of rollerbit)	<u> </u>		
					Boring terminated at 92.5'	_		
_					(End 1200 hour) (water level at 19.5 bgs)	 _ gs		
_						F-33		
_			<b>4.</b> .			_		
<u>-</u>						<u> </u>		
_						_		
_						10		
-	DEIGNA	OED: TO	ACE = 0 11	194 117	TLE = 10-20%, SOME 20-35%, AND = 35-50%			

TEST BORING LOG			LOG		ARGONNE NATIONAL LABORATORY	PAGE 1	
ORIN	G NO.:		DW5		PROJECT: AFP#59 IRP SI	DATE: 11/19/	
PROJECT NO: 91230  LOCATION: Johnson City, NY INSPECTOR: Joseph Hau			•		DRILLER: MARCOR DRILLING BIT: PIGETYPE: Canterna CT 350 GROUND ELEVATION: METHOD: HSA & Driven Steel Casing SAMPLING METHOD:	836.24'	
WELL TYPE: 4° PVC WELL LENGTH: 83' SCREEN: 4° Cont. Wound PVC SLOT SIZE: 0.010 SAMPLE					SCREEN LENGTH: 10' PROTOF WIDTH/TYPE 105' / 10:90 Bent:Cernt Mix PAD ELEVATION: 8 SEAL LENGTH/TYPE: 5' / Bentonite TOC ELEVATION 8 FILTER LENGTH/TYPE: 13' / No. 2 Sand STICK UP/DOWN:		
			IPLE TION DATA				
EPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	DESCRIPTION	DEPI	
4'		0			Asphalt (Begin 11-17-91 at 1225 hour)		
2		0	7/6/5	8•	Brown fine to coarse sand, some gravel fill	_	
						F	
4						-	
-						5	
- 6	, 1	0	3/2/2/1	16°	Brown fine to medium sand, some silt, trace clay and gravel		
0						· 📙	
					<del></del>	— <u> </u>	
88							
	SA 1	0	10/6/6/10	0	Brown fine to coarse sand and gravel, trace slit, moist.		
10					(Used four—3" spoons for 4 qt. recovery)	10	
						_	
12						<u> </u>	
			10/00/00/05	18*	CAR	10  - - - - - -	
14	2	0	12/20/20/25	18*	SAB	_	
	1					15	
16						F	
						F	
18		0	3/5/3/2	12*	SAB	-	
						-	
-						20	
		_	9/10/7/9	4.	SAR wat at tip		
		0	3/10///3		SAB, wet at tip	_	
22							
24		-					
-	3		3/2/1/4		Wet, brown grading to gray, fine sand and silt, some clay	25	
26	1				a Stannis to Stall time amine and and and and	_	
_			<b>7</b> .				
28						_	
		0	3/1/2/3	18*	SAB	⊢ 30	

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY	PAGE 2
BORIN	G NO.:		DW5		PROJECT: AFP#59 IRP SI	DATE: 11/19/9
			APLE TION DATA			
OEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (In.)	DESCRIPTION	DEPTI
-						
_						
_						_
-		}				<u> </u>
						<u> </u>
35						35
- 	5		2/1/2/4	24"	SAB (Set 8' casing at 35') (end 1535 hour)	_
37		-	2.724		SAB (Set 8" casing at 35") (end 1535 hour) (Begin 11-18-91 at 0700 hour) (Drive 6" casing)	_
38						
<del>-</del>	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		<del> </del>			39.5 - 40' Wet, gray fine sand and silt, little clay.	40
_						
_						_
43						
	7	0	4/5/7/9	24"	SAB, some brown streaks	45
45 -						- "
<del>-</del>						E
— - 48						=
-						-
 - 50			13/11/15/15	0	No recovery	50
-						<u> </u>
-						<u></u>
53					SOL SO SI Was access grow and trace sitt and clay	-
-			10/12/16/18		53' - 53.5' Wet, coarse gray sand, trace sitt and clay  53.5' - 55' Wet, gray fine sand and sitt, trace clay.	
55	8	, °	10/12/10/18		30.0 - 30 fred gray into each and and end comy.	55
<u>-</u>						=
_						
58					-	_
_	9	0	16/19/17/17	18*	Wet, fine to coarse gray sand, little silt, trace clay.	- 60
60		+				
<u> </u>						
			;'			
<u> 63</u>	10					_
 65	10	•	11/13/15/20	24*	Wet, brownish gray fine sand, some silt, little clay.	65
PROPO	BTIONS US	SED: TRA	ACE = 0-109	6, LITT	LE = 10-20%, SOME 20-35%, AND = 35-50%	

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY PAGE	GE 3
BORIN	G NO.:		DW5		PROJECT: AFP#59 IRP SI DAT	E:11/19/91
			TION DATA			
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	DESCRIPTION	DEPTH
_						L
-						_
68	_	<u> </u>				
<u>-</u>			12/16/20/25	24*	SAB (End 1730 hours)	上
70					(2.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	70
_						E
 - 73						_
-					(Begin 11-19-91 at 0600 hours)	-
75	12	0	6/20/31/33	18*	SAB Gray, fine to coarse sand, some gravel, trace silt and clay (shale fragments)	75
<u>-</u>						_
- 						_
<u>78</u> -						
 - 80	SA 2	0	35/39/43/39	18*	Gray, fine to coarse sand and angular gravel, trace silt and clay.	
<del>-</del>						
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
-	l		: <b>-</b>			_
<del></del>						-
						E
					LE = 10-20%, SOME 20-35%, AND = 35-50%	100

	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY				1
BORIN	IG NO.:		DW6		PROJECT: AFP#59	IRP SI		DATE:1	11/16/9
	IOJECT NO: LOCATION: NSPECTOR:	91230 Johnson Joseph I	City, NY Hau		PIG TYPE:	MARCOR Canterna CT 350 HSA & Driven Steel Casing	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:		6 1/4"
WE	WELL TYPE: LL LENGTH: SCREEN: SLOT SIZE:	4" PVC 66.5' 4" Cont. 0.010	Wound PVC		SCREEN LENGTH: 10' PROTOP WIDT GROUT LENGTH/TYPE: 48.5' / 10:90 Bent:Cemt Mix PAD ELF SEAL LENGTH/TYPE: 5' / Bentonite TOC ELE FILTER LENGTH/TYPE: 13 / No. 2 Sand STICK UP			N: 828.97' ON 828.51'	
			APLE TION DATA						
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)		DESCRIPTION			DEPTH
4'					Asphalt (Begin 11-13-9)	1 at 0600 hours)			
_ - <sub>2</sub>	1	0	13/11/10	6'	4*-1.5' gravel fill 1.5'-2' Brown, fine to coa	rse sand and silt, trace cla	<u></u>		_
- - - 4			6/7/5/6	o	Brown, fine to coarse sand	d and gravel, trace silt (not	ed from cuttings)		
- - - 6		0	5/8/26/28	6*	SAB			,	5 
- - - 8	2	0	5/12/15/19	12"	SAB			-	<u>-</u> -
- - - 10		0	5/7/7/30	12"	SAB, moist	4			
- - - 12		0	13/15/19/16	12"	SAB, thin, wet layer at 13'				_
		0	9/5/5/5	12*	SAB			-	<u>-</u>
		0	15/45/21/22	0	SAB				15 
- - - 18		0	9/9/8/7	6'	SAB				_
- -  - 20		0	5/9/12/14	12*	SAB				_ 
- - - -									- - -
23   25	3	0	7/4/13/12	6.	Wet, brown, fine to coarse (Augers walking west, har	sand and gravel. d obstruction at 25') (End	1650 hour)		 _ _ 25
	4	0	25/14/12/8	24'	(Begin 11-14-91 at 0600 Wet, brown fine sand and				- -
	5	0	cuttings		Wet, gray very fine sand a	nd silt, little clay (cuttings)			- - - - - 30

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY	PAGE 2
BORIN	IG NO.:		DW6	î M	PROJECT: AFP#59 IRP SI	DATE: 11/16/91
	SAMPLE		APLE TION DATA STP TEST	REC	DE000	
DEPTH	NUMBER	(PPM)	BLOWS / 6º	(in.)	DESCRIPTION	DEPTH
-						F
33					·	<u> </u>
_	5	0	cuttings		SAB (8" casing set at 36") (End 1200 hours)	
35		-				35
<del></del>						_
 						E
<u>-</u>	6	0	5/6/11/14	24"	(Begin 11-15-91 at 0600 hours) (Drive 6° casing) SAB, trace clay	<u>-</u>
40					Side   Side	<del>4</del> 0
-						<u></u>
 43						
					×.	_
- -	ST 1	0		20° 36°	SAB, little clay	45
46		-				45 
 - 48						-
_		0	6/8/14/21	24"	SAB	
50		+	1	<u> </u>		50
_						_
53						
_	7	0	9/11/15/22	12"	SAB	_
- 55 -				<del>  -</del>		55
<u> </u>						
58						E
	8		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						60
-			<del>.</del> .			
63						_
-		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	DECNALIS				LE = 10-20%, SOME 20-35%, AND = 35-50%	65

ITE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY	PAGE 3	3
ORIN	G NO.:		DW6		PROJECT: AFP#59 IRP SI	DATE: 11	/16/9
			TION DATA				55
EPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	DESCRIPTION	į.	DEPT
						-	_
-							_
68							-
- 70		0	2/2/7/12	24'	SAB, smail brown streaks	-	- 70
70			_			_	_70
•							-
						F	_
73						F	
		o	9/14/25/29	24"	SAB		- 75
75				_		<u> </u>	_, `
-						-	_ _ _75 _
						F	-
78'							-
-	9	0	12/16/26/27	24°	Gray, fine sand and silt, little clay	F	-
80		-					_80
-	1					F	-
-						_	-
83						_	-
-		0	12/16/22/32	24"	SAB (End 1700 hours)		- 
85		<del> </del>			(Begin 11-16-91 at 0600 hour) (Water level at 17.5')		_85
86.5					Refusal of rollerbit		
-					Boring terminated at 86.5', (Water level in well post completion is ~ 21')		_
_					(End 0645 hours)		-
-							_
-						_	_90
-						E	_
-						E	_
-						E	_
-						E	
_						F	_95
_						_	_
_			· ·			F	_
_						_	_
_						F	_
							_10

TE	ST BOI	RING	LOG		ARGONNE NATIO	NAL LABORATO	DRY	PAGE 1	
BORIN	G NO.:		DW8_		PROJECT: AFP#59	IRP SI		DATE: 11/3/9	
	OJECT NO; LOCATION: ISPECTOR;	Johnson	City, NY Iau		DRELLER: MARCOR DRELLING BIT: 14 1  FIG TYPE: Canteria CT 350 GROUND ELEVATION: 830.  METHOD: HSA & Driven Steel Casing SAMPLING METHOD: 24°			830.20	
WEL	VELL TYPE: L LENGTH: SCREEN: SLOT SIZE:	1	Wound PVC		SCREEN LENGTH: GROUT LENGTH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:	65' 5.5' / Bentonite	PROTOP WIDTH/TYPE PAD ELEVATION: TOC ELEVATION STICK UP/DOWN:	830.20' 829.70'	
			APLE TION DATA		_				
DEPTH .	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)		DESCRIPTION		DEPTH	
2	1	0	8/16/20	6*	Asphalt (Begin 10-31-91 Brownish black gravel and	•	* cobbles)		
4	1	0	17/20/25/15	12*	2' - 3' Brown gravel and : 3.5' - 4' Brown sand and	•	_	=	
6	. 2	0	11/8/3/9	24"	Gray, fine sand, some silt,			5	
8	3	0	6/3/4/5	24*	Gray, fine sand, some silt,	some clay, trace gravel			
_ 	4	0	0/1/2/2	24*	8' - 9.5' Gray, fine sand, 9.5' - 10' Moist, brown, fi	••		10	
12	4	0	0/1/2/4	24°	Moist, mottled, brown/gray		•	=	
14	5	0	2/2/3/6	18*	12'-13' SAB 13'-14' Wet, brown, coar	se sand and gravel			
16	5	0	3/5/3/2	24"	SAB			15	
18	6	0	1/2/3/4	24°	SAB			-	
20	6	0	7/7/6/5	6•	SAB				
22	6	o	3/4/6/8	6*	Wet, gray sand and gravel			-	
_	7	0	8/2/4/6	24*	Wet, gray, fine sand and s	ilt, trace clay		-	
	7	0	2/3/3/5	24*	SAB			25 	
 	7	0	0/2/3/6	24*	SAB			_	
  - 30	7	0	0/3/4/7	24*	SAB				

TE	ST BOI	RING	LOG		ARGONNE NATIONAL LABORATORY	PAGE 2
ORIN	IG NO.:		DW8		PROJECT: AFP#59 IRP SI	DATE: 11/3
		COLLEC	IPLE TION DATA	· .		
РТН	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (In.)	DESCRIPTION	DEP1
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	o	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 fall due to gravel fall	
47	SA -1	0	0.05	24*	SAB	
49						50 
	ST 1	0		0	Shelby tube - no recovery, cohesionless	
<u>55</u> <u>57</u>	SA 1a	0		24'	SAB	
- - -	SA 1a					6
64	SA 1b	o	12/18/18/18	24'	SAB	- 6:
- - 64	1 b				SAB	

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY PA	GE 3
BORIN	IG NO.:		DW8		PROJECT: AFP#59 IRP SI DA	TE: 11/3/9
			MPLE TION DATA			
XEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6°	REC (in.)	DESCRIPTION	DEPTI
_						-
67						_
 69	SA 10	o	16/17/25/22	18"	SAB (End 1700 hour)	E
_	1					
72						_
_	8	0	19/19/19/18	F	(Begin 11-3-91 at 0600) (Water at 14.4') SAB	Ε
7 <u>4</u>	-	-	19/19/19/16	r	948	<u> </u>
-					·	75
_						-  -
77			_			
- 79	9	0	13/14/12/12	F	Wet, gray, fine to coarse sand, some silt, trace clay	
,,,					· · ·	- 80
_						80
82						
_	SA- 2a	0	11/11/15/15	F	SAB	_
84	10		11/11/13/13	r	348	_
_						85
-	10					
87	_					
- 89	10	0	12/13/18/51	F	SAB	
90					90' Coarse gravel felt by driller under rollerbit, no recovery	- 90
_						- - - 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 
_			:			_
-						_
-						_
				=	LE = 10-20%, SOME 20-35%, AND = 35-50%	100

ST BO	RING	LOG		ARGONNE NATIO	ONAL LABORATO	DRY	PAGE 1		
G NO.:		DW9		PROJECT: AFP#59	IRP SI		DATE: 12/9/		
OJECT NO: LOCATION: ISPECTOR:	Johnson	•		PIG TYPE:	Canterra CT 350	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	828.80'		
VELL TYPE: L LENGTH: SCREEN: SLOT SIZE:	0.010			GROUT LENGTH/TYPE: SEAL LENGTH/TYPE:	59.5' / 10:90 Bent:Cemt Mix 5' / Bentonite	PROTOP WIDTH/TYPE PAD ELEVATION: TOC ELEVATION STICK UP/DOWN:	828.80' 831.31'		
SAMPLE NUMBER	HNU	STP TEST	REC (in.)		DESCRIPTION				
	(A) (A) (A)			Turf (Begin 12-6-91 at 14	400 hour)		09/38/35		
1	0	4/12/11/19	16"	Brown, fine sand and silt, s	some clay, trace gravel				
2	0	9/9/7/7	12"	2'-3' Yellow, coarse sand 3'-4' Dark brown, coarse	sand and silt, trace grave	i,some clay			
3	0	5/5/5/5	6'	Dark brown, fine to coarse	sand, some gravel, little s	ilt and clay	5		
	0	3/3/4/4	6'	SAB			E		
	0	6/8/11/8	8•	SAB (3° spoon)	*.				
4	0	2/6/15/17	61	Brown, fine to coarse sand	d and gravel, trace silt and	clay, moist			
SA 1	0	12/14/22/26	18*	SAB, moist					
SA 1	0	32/36/42/42	18*	SAB, wet (First water at	~ 15')		<u>_</u> 1"		
5	0	3/9/5/5	16'	Brown, fine to coarse sand	d, little gravel, trace organi	c matter			
	0	4/4/9/13	12*	SAB			20		
	0	3/6/8/13	12'	SAB, trace gravel			2!		
		y .					-		
	0			SAB. No recovery, heaving	g sands (End 1700 hour)		- 30		
	G NO.:  DJECT NO:  OCATION:  SPECTOR:  SELL TYPE:  L LENGTH:  SCREEN:  SLOT SIZE:  3  4  SA  1  SA  1  SA  1	GINO.:  DJECT NO:   91230  OCATION:   Johnson   Joseph   PELL TYPE:   88.0'   4" Cont.   0.010  SAMPLE   HNU   (PPM)   1	DJECT NO: OCATION: Johnson City, NY SPECTOR: Joseph Hau SELL TYPE: 4° PVC SLOT SIZE: 0.010  SAMPLE COLLECTION DATA  SAMPLE HNU STP TEST BLOWS / 6°  1 0 4/12/11/19  2 0 9/9/7/7  3 0 5/5/5/5  0 3/3/4/4  0 6/8/11/8  4 0 2/6/15/17  SA 1 0 12/14/22/26  SA 1 0 32/36/42/42  5 0 3/9/5/5  0 4/4/9/13	G NO.: DW9  DJECT NO: 91230 Johnson City, NY Joseph Hau  FELL TYPE: 4* PVC L LENGTH: 88.0*  SCREEN: 4* Cont. Wound PVC SLOT SIZE: 0.010  SAMPLE COLLECTION DATA  1 0 4/12/11/19 16*  2 0 9/9/7/7 12**  3 0 5/5/5/5 6*  0 3/3/4/4 6*  0 6/8/11/8 8*  4 0 2/6/15/17 6*  SA 1 0 12/14/22/26 18*  SA 1 0 32/36/42/42 18*  5 0 3/9/5/5 16*  0 4/4/9/13 12*  0 3/6/8/13 12*	DW9 PROJECT: AFP #59  Diect No:    91230   DRILLER   High Type   Method:   Screen Length:	DW9	DW9		

TE	ST BOI	RING	LOG		ARGONNE NATIONAL LABORATORY PAG	E 2
BORIN	IG NO. <u>:</u>	84	DW9		PROJECT: AFP#59 IRP SI DAT	E: 12/9/9
			TION DATA			
ÆPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (In.)	DESCRIPTION	DEPTI
_						
_						
33						E
_					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
_						-
_		1				E
38					(8° casing set at 38')	-
_	7	0	2/4/6/13	4•	Gray, fine sand and silt, little clay	<u> </u>
40		<u> </u>	24/0/10	_	Cruy, and said and and and and and and and and and an	40
_	8	0	1/4/5/7	8•	40' - 41' SAB 41' - 42' Gray, fine to medium sand, little silt and clay	+
42	_					_
43					(Begin 12-8-91 at 0630 hour)	
 45	9	0	7/17/14/16	18*	43' - 44' Gray, fine sand and silt, some clay, trace gravel 44' - 45' Gray, fine sand and silt, little clay	45
-,0						_45
						_
48						
_	10		10/10/10/10		0.0	E
50	10	•	13/13/19/19	18"	SAB	50
_	ST			27"		_
_	1	0		27° 36°	SAB	
53						
 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						-
	12		20/02/02/02	101	58' - 59.5' Gray, fine to coarse sand and gravel, trace silt and clay	
60	13	0	32/28/22/22	18*	59.5 - 60' Gray, fine sand and silt, little clay	60
_						_
_			<b>7</b> .			
63						
		o	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	OTIONS US	ED: TR	VCE - 0 100		LE = 10-20%, SOME 20-35%, AND = 35-50%	65

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY PA	AGE 3
BORIN	IG NO.:		DW9		PROJECT: AFP#59 IRP SI	ATE: 12/9/91
1 1 44 1,44			MPLE TION DATA_			
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	DESCRIPTION	DEPTH
-						_
-						-
_ 						<u> </u>
-						-
70	14	0	14/18/27/47	20"	Gray, fine to coarse sand and shale gravel, little silt and clay	70
						F
 - 72						E
73	15		CORE	5°	Refusal at 72' cored 5" shale boulder	_
	1.0		20100100140	4.00	Constitution to accompany and and about arrayal trace site and alay	
75	16	0	20/30/38/40	18*	Gray, fine to coarse sand and shale gravel, trace silt and clay (End 1636 hour)	75
<b>_</b> 		}				F
<u> </u>						<u> </u>
78		<del> </del>			(Begin 12-9-91 at 0600 hour)	_
					No recovery — 3' of heaving sands in casing	- 80
80		-				80
						F
83						E
- 55						
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)	_
E						_
_			1			_
_						
						95
F			<b>.</b> .			
						_
						-
-						100
PROPO	RTIONS US	SED: TR	ACE = 0-109	6, UTT	LE = 10-20%, SOME 20-35%, AND = 35-50%	

TEST BO	RING	LOG		ARGONNE NATIONAL LABORAT	ORY	PAGE 1
BORING NO.:		IW9		PROJECT: AFP#59 IRP SI		DATE: 12/10/91
PROJECT NO: LOCATION: INSPECTOR:	Johnson	City, NY Hau		DRILLER: MARCOR RIG TYPE: Canteria CT 350 METHOD: HSA & Driven Steel Casing	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	8 1/4° 826.62
WELL TYPE WELL LENGTH: SCREEN; SLOT SIZE:	51' 2" Cont.	Wound PVC		SCREEN LENGTH: 5' GROUT LENGTH/TYPE: 38' / 10:90 Bent:Cernt Mix SEAL LENGTH/TYPE: 5' / Bentonite FILTER LENGTH/TYPE: 8' / No. 2 Sand	PROTOP WIDTH/TYPE PAD ELEVATION; TOG ELEVATION STICK UP/DOWN:	628.83 831.52
		APLE TION DATA				
DEPTH SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	DESCRIPTION		DEPTH
			<u> </u>	Turi (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 grav	vel,some clay	-
5				Dark brown, fine to coarse sand, some gravel, little	silt and clay	<u> </u>
<u>-</u>				SAB		_
10				(3° spoon)		10
				Brown, fine to coarse sand and gravel, trace silt an	d clay, moist	<u> </u>
_ - - -				SAB, moist		
- -				SAB, wet (First water at ~ 15')		15 
- -				Brown, fine to coarse sand, little gravel trace organ	ic matter	
20 				SAB		<u> </u>
- - -						
25 				SAB, trace gravel		25 25
-		.·				-
				SAB		30

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY	PAGE 2
ORIN	G NO.:		IW9		PROJECT: AFP#59 IRP SI	DATE: 12/10/5
			TION DATA			
РҮН	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	HEC (in.)	DESCRIPTION	DEPT
						F
					33'-34' Brown, coarse sand and trace gravel	F
35					34'35' Brown, fine sand and silt, some clay	35
						E
					<del></del>	— <u> </u>
					Gray, fine sand and siit, little clay	E
40					40'-41' SAB	<u>_</u> 40
					41'-42' Gray, fine to medium sand, little silt and clay	E
					43'-44' Gray, fine sand and silt, some clay, trace gravel	— <u></u>
					43 -44 Gray, line sand and six, some day, trace graves	
45					44'-45' Gray, fine sand and silt, little clay	45
						<u> </u>
						E
50					SAB	50
					SAB (End 1500 hour)	
.					Boring terminated at 51.0' (Water at 14.9')	
55						55
						-
60						60
,50						
			₹.			
					·	_
65	710110110	ED: TO:	05 - 0 - 115	, ,,	LE = 10-20%, SOME 20-35%, AND = 35-50%	65

TE	ST BO	RING	LOG		ARGONNE NATIO	ONAL LABOR	ATORY	PAGE	1
BORIN	IG NO.:		IW7		PROJECT: AFP#59	IRP SI		DATE	12/5/91
	IOJECT NO: LOGATION; NSPECTOR;	91230 Johnson Joseph I	ı City, NY Hau			MARCOR Canterra CT 350 Hollow Stem Auger	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	828,88	Spoon
WE	WELL TYPE: LL LENGTH: SCREEN: SLOT SIZE:	None			SCREEN LENGTH: GROUT LENGTH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:		PROTOP WIDTH/TYPE PAD ELEVATION: TOC ELEVATION STICK UP/DOWN:		
			MPLE TION DATA						
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)		DESCRIPTION			DEPTH
					Grass and clayey topsoil v	w/ organics (Begin 1:	2-5-91 at 0800 hour)		_
<u> </u>		0	3/3/4/6	6*	Brown, fine sand and silt,	little clay, trace grave	ol with organices		
- - - 6					C. TOAD				5 
- - - 8		0	9/8/6/12	6•	6' - 7' SAB 7'-8' Brown, fine to coars	se sand and gravel, t	race silt		
- - - 10						٠.			  10
- - 12	1	0	3/4/6/10	6•	SAB				<u>-</u>
- - 14									
- - - 16	2	0	4/5/11/12	12*	14' - 15' SAB (3' spoon) 15'-16' Brown, coarse sa		vel, moist (First water at 15.8'	bgs)	15 
- - 18	3_	0	7/8/15/18	8•	16'-17' Brown, coarse gr 17'-18' Brown, coarse gr	ravel and coarse sand ravel and coarse sand	d, wet d, wet (3° spoon)		
	SA 1	0	16/17/27/29	10*	SAB (3' spoon)				 20
-  - 22									<u>-</u>
- - - 24	SA 1	0	23/14/10/10	18*	SAB (3' spoon)				
 									25 
-  28	4		11/11/11/14	2 <b>0'</b>	26'-26.5' SAB 26.5'-28' Brown, fine sar	nd and silt, little clay	(3° spoon)		
-  30									  30
PROPO	RTIONS US	ED: TRA	CE = 0-10%	, LITT	LE = 10-20%, SOME 20-3	35%, AND = 35-50%	6		

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY PAGE	Ε 2
BORIN	G NO.:		IW7		PROJECT: AFP#59 IRP SI	E: 12/5/9
			MPLE TION DATA			
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (In.)	DESCRIPTION	DEPTH
31	ST-1 (Cont.)			0°	28'-31' Attempt Shelby tube (No recovery)	_
32			-			
 34	5	0	33/38/43/45	84	Brown, fine to coarse sand, little silt	_
35						35
<u>36</u>						_
38		0	1/6/13/13	24"	SAB, trace gravel	_
-  - 40						- 40
-	6	0	7/11/18/22	24"	SAB, trace gravel	_
42						=
44					(End 1200 hours)	F
45 _					Boring terminated at 44'  IW7 not installed. Atempted to install SW7 - running sands interfered with bentonit	45
					plug. Boring backfilled with grout 0'-26', bentonite/formation sand mix 26'-28', sand 28'-32', formation collapse 32'-44'	
						_
 50						50
-						
<u>-</u>						Ξ
- 						- - - 55
55 						
-  -						_
60 						60
			;			
<u>-</u> -						<u> </u>
65					LE = 10-20%, SOME 20-35%, AND = 35-50%	65

TE	ST BOI	RING	LOG		ARGONNE NATIO	NAL LABORATO	RY	PAGE 1
BORIN	G NO.:		SW4		PROJECT: AFP#59	IRP SI		DATE: 12/2/91
	OJECT NO: LOCATION: ISPECTOR:	91230 Johnson Joseph i	City, NY			MARCOR Canterra CT 350 Hollow Stern Auger	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	829.05
WEL	VELL TYPE: L LENGTH: SCREEN: SLOT SIZE:	2" PVC 29' 2" Cont. 0.010	Wound PVC		GROUT LENGTH/TYPE:	2' / Bentonite	PROTOP WIDTH/TYPE PAD ELEVATION: TOC ELEVATION STICK UP/DOWN:	829.28 828.85
			IPLE TION DATA					
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)		DESCRIPTION		DEPTH
4* 					Asphalt (Begin 0730 hour) Yellowish, brown sand and			-
		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			<del>-</del>
_  10		0	8/12/22/24	6*	SAB	4.		<u> </u>
-  12		0	16/10/6/7	6•	SAB, moist			<u>-</u> -
_  14		0	5/7/7/14	6*	SAB, wet at 13'			<del>-</del>
_  16	CHEM	0	10/19/14/15	12"	14'-15' SAB (3" spoon) 	and silt. little clay		15
- - - 18	CHEM	0	17/23/27/31	F	SAB, trace clay (3" spoon)	-		Ē
- - - - - -					SAB, wet			20 20
			· .		Gray, fine sand and silt, tra	ice clay (End 1200 hour)		
30					Boring terminated at 29' (V	Water at 18.38' bos.)		30

	EST BO	HING	LOG		ARGONNE NATIO	ONAL LABORATO	DRY	PAGE 1		
BORIN	IG NO.:		SW5		PROJECT: AFP#59	IRP SI		DATE: 11/20/		
	HOJECT NO: LOCATION: NSPECTOR:	91230 Johnson Joseph	n City, NY Hau		DRILLER: PIG TYPE: METHOD:	Canterra CT 350	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	836.24'		
	WELL TYPE: ELL DEPTH: SCREEN: SLOT SIZE:	2" PVC 30.5 2" Cont. 0.010	Wound PVC		SCREEN LENGTH:  GROUT LENGTH/TYPE:  SEAL LENGTH/TYPE:  FILTER LENGTH/TYPE:	14.5' / 10:90 Bent:Cemt Mix 3' / Bentonite	PROTOP WIDTH/TYPE PAD ELEVATION: TOC ELEVATION STICK UP/DOWN:	836.32' 835.84'		
	×		MPLE TION DATA							
ЭЕРТН	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)		DESCRIPTION				
4*					Asphalt (Begin 0600 hour)					
_ _ _ 3					Brown fine to coarse sand	, some gravel		-		
- 5		0	1/1/1/2	18"	Brown, fine to medium sa	Brown, fine to medium sand, some silt, trace clay and gravel				
8								_		
 10		0	3/3/7/13	18*	Brown, fine to coarse sand	d and gravel, trace silt		-10		
- 12	CHEM	0	36/35/41/55	12"	SAB (two, 3" spoons)					
13 - 15		0	13/26/28/26	18"	SAB			15		
-								-		
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 gra	y, fine sand and silt, some	clay (3" spoon)	_ 25		
- 27	СНЕМ	0.5-0.8	10/11/11/20		Gray SAB, some brown, s 0.5-0.8 ppp at 25.5 and 2	treaks wet, (Note: 3" spoo 6 ft below grade)	on, ovm hotspots,			
<b>-</b>	sws			25° 36°	SAB Shelby Tube Sample	•		-		
30	1				Boring Terminated at 30.5 LE = 10-20%, SOME 20-3		30 hour)			

TE	ST BO	RING	LOG		ARGONNE NATIO	ONAL LABORAT	ORY	PAGE 1	
BORIN	G NO.:	W 1989	SW6		PROJECT: AFP#59	IRP SI		DATE: 11/17/	
	OJECT NO: LOCATION: ISPECTOR:	91230 Johnson Joseph i	City, NY			MARCOR Canterra CT 350 Hollow Stem Auger	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	828.95'	
WEI	VELL TYPE: LL LENGTH: SCREEN: SLOT SIZE:	2" PVC 29' 2" Cont. 0.010	Wound PVC		SCREEN LENGTH: GROUT LENGTH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:	13' / 10:90 Bent:Cemt Mix 3' / Bentonite	PROTOP WIDTH/TYPE PAD ELEVATION: TOG ELEVATION: STICK UP/DOWN:	828.99° 828.49°	
			APLE TION DATA						
ЕРТН	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6°	REC (In.)	DESCRIPTION				
4*					Asphalt (Begin 11-16-91 4'-1.5' Gravel fill	at 1406 hours)			
_ _ 3					1.5'-2' Brown, fine to coa	arse sand and gravel tra	ce silt	— <u>F</u>	
- 5		0	2/3/6/10	18"	Brown coarse sand and g	gravel, trace silt		_ _ _ 5	
_								E E	
8 - 10		. 0	3/4/8/20	12"	Brown fine to coarse sand	l and gravel, trace silt (Tv	vo, 3° spoons)	- - - - - 10	
_								<u> </u>	
13  15		0	9/8/8/10	6•	SAB			_ _ _ _ _ 15	
16									
		0	5/8/7/16	6"	SAB (Two, 3° spoons)			-	
_ 		0	32/31/19/22	18*	SAB (3" spoon)				
-								-	
<del>-</del> -					SAB (End 1600 hours)			_	
25								25	
<del>-</del>			·		(Begin 11-17-91 at 060X Brown fine sand and silt, t	•			
29					Boring terminated at 29" (	End 0635 hour)		_	
_30					(Water level in well after c LE = 10-20%, SOME 20-	ompletion is at 21.7')		30	

TE	ST BO	RING	LOG		ARGONNE NATIO	ONAL LABORA	TORY	PAGE 1	
PA	G NO.: OJECT NO: LOCATION:	91230 Johnson	SW7		PROJECT: AFP#59	MARCOR	DRILLING BIT:	1 '	
110	SPECTOR:	Joseph	•		METHOD:	i	SAMPLING METHOD:	I	
WEI	VELL TYPE: L LENGTH: SCREEN: SLOT SIZE:	0.010	Wound PVC		SCREEN LENGTH: GROUT LENGTH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:	6.5 / 10:90 Bent:Cernt Mix 3' / Bentonite	PROTOP WIDTH/TYPE PAD ELEVATION: TOC ELEVATION STICK UP/DOWN:	829.12° 831.89°	
			MPLE TION DATA						
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)			DEPTH		
- 2					Grass and clayey topsoil v	Grass and clayey topsoil w/ organics			
- - - - - 7					Brown, fine sand and silt, i				
9	CHEM	0	10/11/10/11	5*	Brown, fine to coarse sand	and gravel, trace silt	(3° spoon)	— <u>-</u> E	
-  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 sa	nd, trace gravel, moist	(3" spoon)	15	
18	СНЕМ	0	8/11/16/19	8"	16'-17' SAB 17'-18' Brown, coarse gr	avel and coarse sand, v	wet (3" spoon)		
- -									
- - -					SAB				
			<b>;</b>		(End 0840 hours)			25 	
					Boring terminated at 26.5	' (Water at ~ 15.8')		- -	
					E = 10-20%, SOME 20-3			30	

TES	ST BOI	RING	LOG		ARGONNE NATIO	NAL LABORAT	ORY	PAGE 1
BORING	3 NO.:		SW8		PROJECT: AFP#59	IRP SI		DATE: 11/4/9
Ľ	DECT NO: OCATION: SPECTOR:	91230 Johnson Joseph I	ı City, NY Hau		DRILLER: RIG-TYPE: METHOD:	MARCOR Canterra CT 350 Hollow Stern Auger	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	830.20'
WELL	ELL TYPE: L LENGTH: SCREEN: LOT SIZE:	2" PVC 23' 2" Cont. 0.010	Wound PVC		SCREEN LENGTH: 10° PROTOP WIDTH/TYPE 8° F GROUT LENGTH/TYPE: 7.5° / 10:90 Bent:Cemt Mix PAD ELEVATION: 829 SEAL LENGTH/TYPE: 3° / Bentonite TOC ELEVATION 829 FILTER LENGTH/TYPE: 12.5° / No. 2 Sand STICK UP/DOWN: -0			
			MPLE TION DATA					
DEPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)		DESCRIPTION		DEFT
4*					Asphalt (Begin 1629 hour			
_					1'-2' Brownish, black gra	wei fili		
4		0	28/35/14/10	12"	2'-3' Brown gravel and s 3'-4' Brown sand, some	and fill	wei	=
•					0 1 2101111 00110 1001110	on, como oray, acco gro	1401	
-	•							
7								
								_
9		3	2/2/3/3	24*	Gray, fine sand, some silt,	trace clay and gravel		
_					<del></del>	<del></del>	<del> </del>	— <u> </u>
					Brown, fine sand and silt,	trace clay and gravel (No	ote: Cuttings from 7'-14	•
_					have strong petroleum od	or and gray, ony sneen)		
_								_
14								_
_		0	1/3/2/2	6"	Wet, gray, coarse sand an	nd gravel trace clay and	eilt (Eirst water at 14 4')	15
16		_	1/0/2/2	ļ .	Tret, gray, coarse saile ar	id graver, trace city and t	sit (First water at 14.4)	
_		}						_
_		}						_
·								_
_					SAB (End 1800 hours)			20
_								
22					Marin 44 OF 04 -+ 0000	N Avenue et 40 77		_
23					(Begin 11-05-91 at 0600	n) (water at 16.//)		-
.					Boring terminated at 23'	(End 0900 hour) (water is	evel in well after completion	on
					is 13.06')			25
								_
								_
.						•		-
			1	1				

TE	ST BO	RING	LOG		ARGONNE NATIONAL LABORATORY	PAGE 1
ORIN	G NO.:		SW9		PROJECT: AFP#59 IRP SI	DATE: 12/1
	OJECT NO: LOCATION: ISPECTOR:	Johnson	ı City, NY Hau		DRILLER: MARCOR DRILLING BIT:	8 1/4° 828.80°
WEL	VELLTYPE: LLENGTH: SCREEN: SLOT SIZE:	25'	Wound PVC		SCREEN LENGTH: 15' PROTOP WIDTH/TYPE  GROUT LENGTH/TYPE: 6' / 10:90 Bent:Cernt Mix PAD ELEVATION:  SEAL LENGTH/TYPE: 2' / Bentonite TOC ELEVATION  FILTER LENGTH/TYPE: 17' / No. 2 Sand STICK UP/DOWN:	828.80' 831.38'
			MPLE TION DATA			
тн	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6°	REC (in.)	DESCRIPTION	0E
					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	
	CHEM	0	12/15/17/20	10°	Dark brown, fine to coarse sand, some gravel, little silt and clay	-
0	СНЕМ	0	31/31/30/27	10"	SAB	
4	СНЕМ	0	44/49/47/64	12"	Brown, fine to coarse sand and some gravel, trace silt and clay, moist	- - - - - -
6	CHEM	0	50/50/46/52	12	SAB	- - - - - -
					SAB	
25				_	(End 1000 hours)	- 2
			<i>.</i>		Boring terminated at 25' (Water at 15.0')	<u>-</u>   
30						F

PROJECT NO. LOCATION: Joseph Nav.  NINSPECTOR: Joseph Nav.  MELL TYPE WILL LENGTH; SCREEN ISSUED STANDING METHOD: 24* Spik Spot MELL TYPE WILL LENGTH; SCREEN ISSUED STANDING METHOD: 24* Spik Spot MELL TYPE SCALE HONTON TO: SECRETH STANDING METHOD: 24* Spik Spot MELL TYPE SCALE HONTON TYPE SC	TE	ST BO	RING	LOG		ARGONNE NATIO	NAL LABORA	TORY	PAGE 1
LOCATION: Joseph Hau   METHOD:   M	BORIN	G NO.:		1H1		PROJECT: AFP#59	IRP SI	4	DATE: 12/4/91
SCHEPCH SCHEPCHICAL SCHEPCHICA		OCATION:	Johnson	•		RIGTYPE	Canterra CT 350	GROUND ELEVATION:	828.67"
DESCRIPTION   DESCRIPTION	WEL	L LENGTH: SCREEN:				GROUT LENGTH/TYPE: SEAL LENGTH/TYPE:	 	PAD ELEVATION: TOC ELEVATION	
SAMPLE   HNU   STP TEST   REC   Rec   BLOWS / 6"   Rec   BLOWS / 6"   Rec   BLOWS / 6"   Rec									
Brown, fine to coarse sand and gravel fill  (1) 2.1 3/2/1/5 2* (1) Gray, coarse sand in spoon tip- (2) 8* of gray, fine to coarse sand and gravel (Bruker = low ppm hydrocarbon detect, 3* spoon)  L CHEM 3.4 13/19/20/10 6* Gray, oily coarse sand and gravel — much stain and odor (3* spoon)  L CHEM 30 6/6/8/7 18* SAB, heavy oil stain and odor (Bruker = low ppm, 3* spoon)  Boring terminated at 14* (Bruker determined existance of alaphitic alkenes and napthalene)  End 1000 HOUR)	DEPTH		HNU	STP TEST			DESCRIPTION		DEPTH
Brown, fine to coarse sand and gravel fill  (1) 2.1 (2) 0.0 (2	6"					Gravel - Crusher run (Begin 084	0 hour)		
10 (1) 2.1 3/2/1/5 2* (1) Gray, coarse sand in spoon tip. (2) 8* of gray, fine to coarse sand and gravel (Bruker = low ppm hydrocarbon detect, 3* spoon) (2) 8* of gray, fine to coarse sand and gravel (Bruker = low ppm hydrocarbon detect, 3* spoon) (3* spoon) (4) CHEM 3.4 13/19/20/10 6* Gray, oily coarse sand and gravel — much stain and odor (3* spoon) (5) CHEM 30 6/6/8/7 18* SAB, heavy oil stain and odor (Bruker = low ppm, 3* spoon) (5) CHEM (Bruker determined at 14* (Bruker determined existance of alaphitic alkenes and napthalene) (End 1000 HOUR)	3								- - -
(1) 2.1 3/2/1/5 2" (1) Gray, coarse sand in spoon tip. (2) 8" of gray, fine to coarse sand and gravel (Bruker = low ppm hydrocarbon detect, 3" spoon)  L CHEM 3.4 13/19/20/10 6" Gray, oily coarse sand and gravel — much stain and odor (3" spoon)  L CHEM 30 6/6/8/7 18" SAB, heavy oil stain and odor (Bruker = low ppm, 3" spoon)  Boring terminated at 14" (Bruker determined existance of alaphitic alkenes and napthalene) (End 1000 HOUR)	 5		0.0	11/12/15/14	12"	Brown, fine to coarse sand	d and gravel fill		<u> </u>
(1) 2.1 3/2/1/5 2" (1) Gray, coarse sand in spoon tip. (2) 8" of gray, fine to coarse sand and gravel (Bruker = low ppm hydrocarbon detect, 3" spoon)  L CHEM 3.4 13/19/20/10 6" Gray, oily coarse sand and gravel — much stain and odor (3" spoon)  L CHEM 30 6/6/8/7 18" SAB, heavy oil stain and odor (Bruker = low ppm, 3" spoon)  Boring terminated at 14" (Bruker determined existance of alaphitic alkenes and napthalene) (End 1000 HOUR)	-								
(1) 2.1 3/2/1/5 2" (1) Gray, coarse sand in spoon tip. (2) 8" of gray, fine to coarse sand and gravel (Bruker = low ppm hydrocarbon detect, 3" spoon)  L CHEM 3.4 13/19/20/10 6" Gray, oily coarse sand and gravel — much stain and odor (3" spoon)  L CHEM 30 6/6/8/7 18" SAB, heavy oil stain and odor (Bruker = low ppm, 3" spoon)  Boring terminated at 14" (Bruker determined existance of alaphitic alkenes and napthalene) (End 1000 HOUR)	<del>-</del>								
L CHEM 30 6/6/8/7 18* SAB, heavy oil stain and odor (Bruker = low ppm, 3* spoon)  Boring terminated at 14' (Bruker determined existance of alaphitic alkenes and napthalene)  (End 1000 HOUR)	_		(1) 2.1 (2) 0.0	3/2/1/5	2*	(2) 8" of gray, fine to coar	se sand and gravel (Br	uker = low ppm	
Boring terminated at 14' (Bruker determined existance of alaphitic alkenes and napthalene) (End 1000 HOUR)	 12	L CHEM	3.4	13/19/20/10	6•	Gray, oily coarse sand an	d gravel – much stain a	and odor (3° spoon)	=
(Bruker determined existance of alaphitic alkenes and napthalene) (End 1000 HOUR)	14	L CHEM	30	6/6/8/7	18"	SAB, heavy oil stain and o	odor (Bruker = low ppr	n, 3" spoon)	_
						Bruker determined exista	nce of alaphitic alkenes	s and napthalene)	15 
	_								=
	_								<u></u> 20
	_								-
<u>-                                    </u>									_ 25
_ , , , , , , , , , , , , , , , , , , ,	· <u> </u>								
_	_								-
	<del></del>								

115	ST BO	RING	LOG		ARGONNE NATIO	DNAL LABORAT	ORY	PAGE 1	
ORIN	G NO.:		3H1		PROJECT: AFP#59	IRP SI		DATE: 12/	
	OJECT NO: LOCATION: ISPECTOR:	91230 Johnson Joseph i	City, NY Hau		DRILLER: RIG TYPE: METHOD:	Canterra CT 350	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	8 1/4° 828.58'	
WE	VELL TYPE: LENGTH: SCREEN: SLOT SIZE:	None			SCREEN LENGTH: GROUT LENGTH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:	  	PROTOP WIDTH/TYPE PAD ELEVATION: TOC ELEVATION STICK UP/DOWN:		
			APLE TION DATA						
EPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)	n.J.:				
6" - 2		0	15/13/18/17	8*	6° Turf (Begin 1145 hour) Brown, sand and gravel fil	I, trace silt (All 3" spoons	)		
<del>-</del> 4		0	3/3/4/4	20*	Brown, fine sand and silt,	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  9.7'-10' Gray, oily, fine to coarse sand and gravel				
. 12		76.5	10/13/14/17	6•	9.7'-10' Gray, oily, fine to coarse sand and gravel Oily SAB				
. 14		63.8	11/12/7/17	6*	Oily SAB Oily, gray coarse sand			<u>-</u>	
-			<i>*</i> .		Boring terminated at 14' (End 1245 hours)	Bruker detect alaphitic al	kenes and napthalene)	1*	

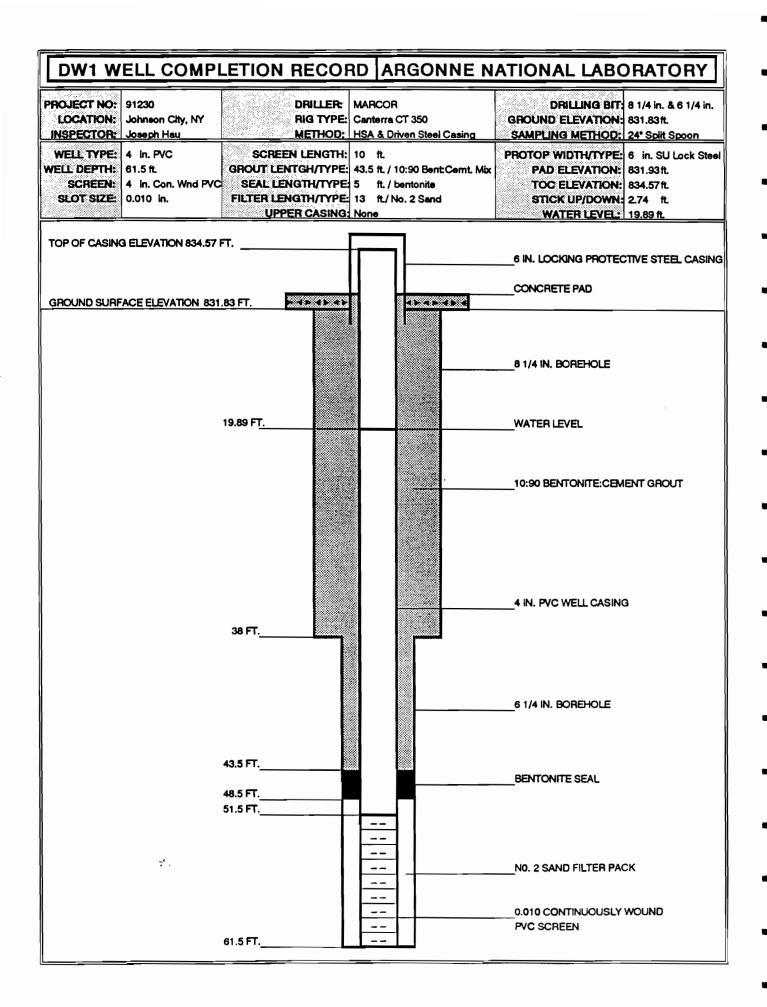
	ST BOI	5 55500		5.5		NAL LABORAT		PAGE		
PA	G NO.: OJECT NO: LOCATION: NSPECTOR:	91230 Johnson Joseph I	•	- 10 (3.8%) - 12 (3.8%)	PROJECT: AFP#59  DRILLER: RIG TYPE: METHOD:		DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	829.19		
WEI	WELL TYPE: LL LENGTH; SCREEN; SLOT SIZE	None			SCREEN LENGTH: PROTOP WIDTH/TYPE GROUT LENGTH/TYPE: PAD ELEVATION: SEAL LENGTH/TYPE: TOG ELEVATION FILTER LENGTH/TYPE: STICK UP/DOWN:					
			IPLE TON DATA							
ЕРТН	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6"	REC (in.)		DESCRIPTION			DEPTI	
6 <b>"</b>					6" Asphalt (Begin 0845 hour) Sand and gravel fill		-			
- 3							<del></del>			
5	FCHEM	0	7/7/8/9	6*	Brown, fine to coarse sand	d and gravel, trace clay a	and silt (Bruker = ND)		_ _ _ 5	
-									5 5	
8									_	
10	F CHEM	0	7/7/14/15	6"	SAB (Bruker = Low ppm	hydrocarbon detect)			_ 10	
•										
13									_	
15	F CHEM	0	13/12/14/14	8"	SAB (Bruker = ND, 3* spo	oon)			_ 15	
17	L CHEM	0	11/12/14/15	14*	SAB (Bruker = ND, 3* spo	oon)			_	
18										
					Boring terminated at 18' Boring installed at 30° from (End 1210 hours)	n verticle			- - 20	
					(End 1210 hodis)					
									_	
									25	
			• .						_	
•										
-									-	
									30	

[TE	ST BO	RING	LOG		ARGONNE NATIO	ONAL LABORA	TORY	PAGE 1
PR(	G NO.: OJECT NO: LOCATION: ISPECTOR:	91230	4H2 City, NY	7 %	PROJECT: AFP#59  DRILLER: RIG TYPE: METHOD:	MARCOR Canterra CT 150	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	829 <i>.27</i> *
WEL	VELL TYPE: L LENGTH: SCREEN: BLOT SIZE:	None			SCREEN LENGTH: GROUT LENGTH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:		PROTOP WIDTH/TYPE PAD ELEVATION: TOC ELEVATION STICK UP/DOWN:	
PTH	SAMPLE		APLE TION DATA STP TEST	REC				
	NUMBER	(PPM)	BLOWS / 6"	(in.)		DESCRIPTION		DEF
3					Sand and gravel fill	ou nour		
5	F CHEM	0	15/15/16/15	12"	3'-4.5' Brown, fine to coa			
8	5 O I 5 1		9/9/0/4-0	100	SAD	4.		-
13	F CHEM	0	8/8/8/18	12"	SAB			10 - - - - -
15	F CHEM	0	11/11/15/17	12"	SAB			
17	L CHEM	0	15/12/12/12	8*	SAB			E
19	L CHEM	0	18/16/17/26	8•	SAB			
					Boring terminated at 19' Boring installed at 30° from (End 1700 hours)	n verticle		x - - - - - -
								25
								- 30

	ST BO	ette se	A	w , ,	1. 14 _ val e in 5 @3 h in installin	HUMBER IN THE TOTAL	ti i na spojetka kaj kaj se i kaj kaj kaj kaj kaj kaj kaj kaj kaj kaj	
PA	G NO.: OJECT NO: LOCATION: ISPECTOR:	91230 Johnson Joseph I	-		PROJECT: AFP#59  DRILLER: RIG TYPE: METHOD:	MARCOR Canterra CT 350	DRILLING BIT: GROUND ELEVATION: SAMPLING METHOD:	
WEI	WELL TYPE: LL LENGTH: SCREEN: SLOT SIZE:	None			SCREEN LENGTH: GROUT LENGTH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:	  	PROTOP WIDTH/TYPE PAD ELEVATION: TOG ELEVATION STICK UP/DOWN:	
			APLE TION DATA					
)EPTH	SAMPLE NUMBER	HNU (PPM)	STP TEST BLOWS / 6°	REC (in.)		DEPTI		
6" - 2		0	25/9/11	6"	Asphalt (Begin 1415 hour)  Brown, coarse sand and g	gravel fill with asphalt p	pieces (3° spoon)	_
		0	5/4/4/12	6"	Brown, fine sand and silt, (3" spoon)	little clay, trace gravel	and asphalt pieces	E
6	,	0	1/3/6/4	6"	SAB (2" spoon)			5 
_ 8		0	1/3/1/3	6•	SAB (2" spoon)			<del>-</del>
10		0	3/5/5/4	8-	8'-9.7' SAB (2" spoon) 9.7' - 10' Brown, fine to c	coarse sand and grave	el (3º spoon)	10
- 12		0	5/5/5/5	8*	SAB (3" spoon)	•	,	<u>-</u>
- 14		0	6/4/5/25	8*	SAB (3° spoon)			-
					Boring terminated at 14' (End 1555 Hour)			15 

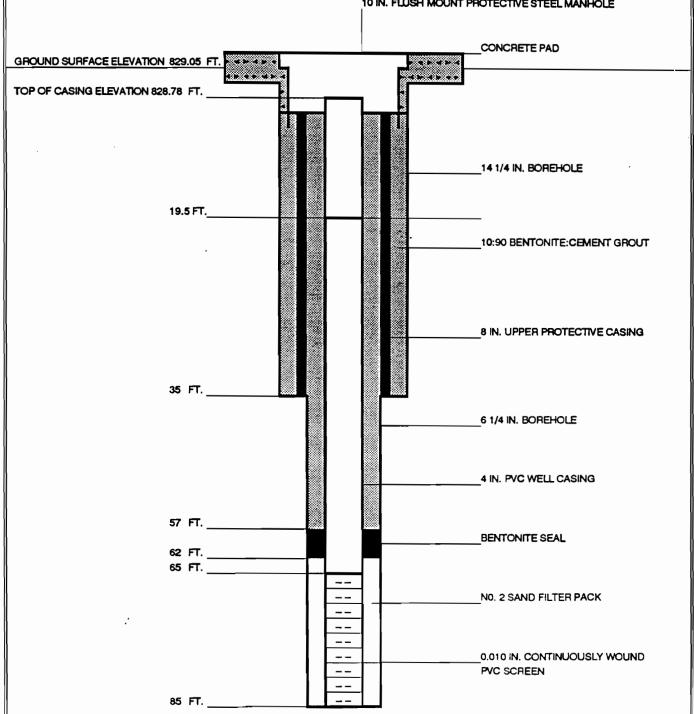
Appendix B-2:

Well Completion Record

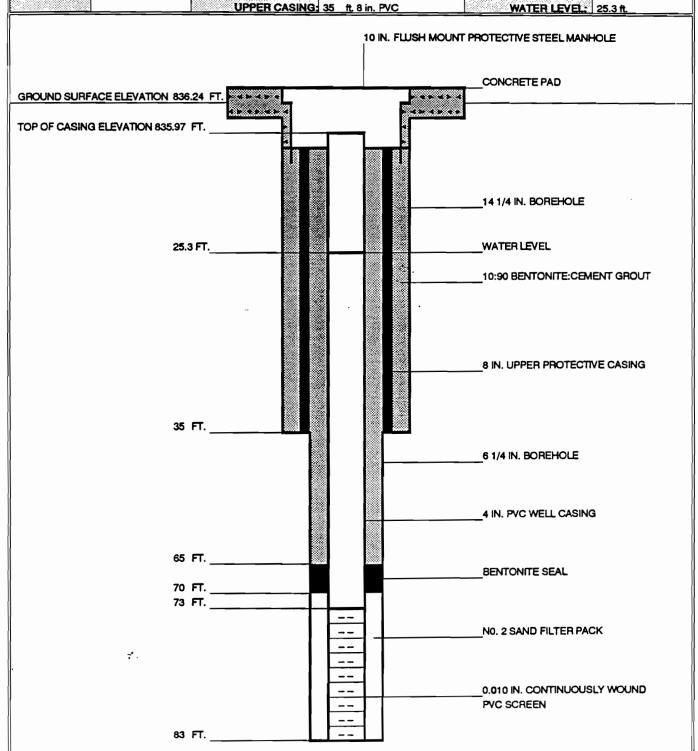


### DW3 WELL COMPLETION RECORD ARGONNE NATIONAL LABORATORY PROJECT NO: 91230 DRILLER: MARCOR DRILLING BIT: 14 1/4 in. & 6 1/4 in. LOCATION: Johnson City, NY RIG TYPE: Canterra CT 350 GROUND ELEVATION: 829.42ft. INSPECTOR: Joseph Hau METHOD: HSA & Driven Steel Casing SAMPLING METHOD: 24' Split Spoon WELL TYPE: 4 in. PVC PROTOP WIDTH/TYPE: 10 in. Flush Manhole SCREEN LENGTH: 20 ft. WELL DEPTH: 88.0 ft. GROUT LENTGH/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: 829.04ft. 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. 10 IN. FLUSH MOUNT PROTECTIVE STEEL MANHOLE CONCRETE PAD GROUND SURFACE ELEVATION 829.42 FT. \*\*\*\*\* TOP OF CASING ELEVATION 829.04 FT. 14 1/4 IN. BOREHOLE WATER LEVEL 19.1 FT. \*\* 10:90 BENTONITE: CEMENT GROUT 8 IN. UPPER PROTECTIVE CASING 40 FT. 6 1/4 IN. BOREHOLE 4 IN. PVC WELL CASING 59.5 FT. BENTONITE SEAL 64.5 FT. \_\_\_\_\_ 67.5 FT. \_\_\_\_\_ NO. 2 SAND FILTER PACK · . 0.010 IN. CONTINUOUSLY WOUND PVC SCREEN 88 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: 829.05ft INSPECTOR: Joseph Hau METHOD: HSA & Driven Steel Casing SAMPLING METHOD: 24' Split Spoon SCREEN LENGTH: 20 ft. WELL TYPE: 4 In. PVC PROTOP WIDTH/TYPE: 10 in. Flush Manhole GROUT LENTGH/TYPE: 57 ft. / 10:90 Bent; Cemt. Mix WELL DEPTH: 85 ft. PAD ELEVATION: 829,10ft. SCREEN: 4 in. Con. Wnd PVC SEAL LENGTH/TYPE 5 ft. / bentonite TOC ELEVATION: 828.78ft 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. 10 IN. FLUSH MOUNT PROTECTIVE STEEL MANHOLE CONCRETE PAD

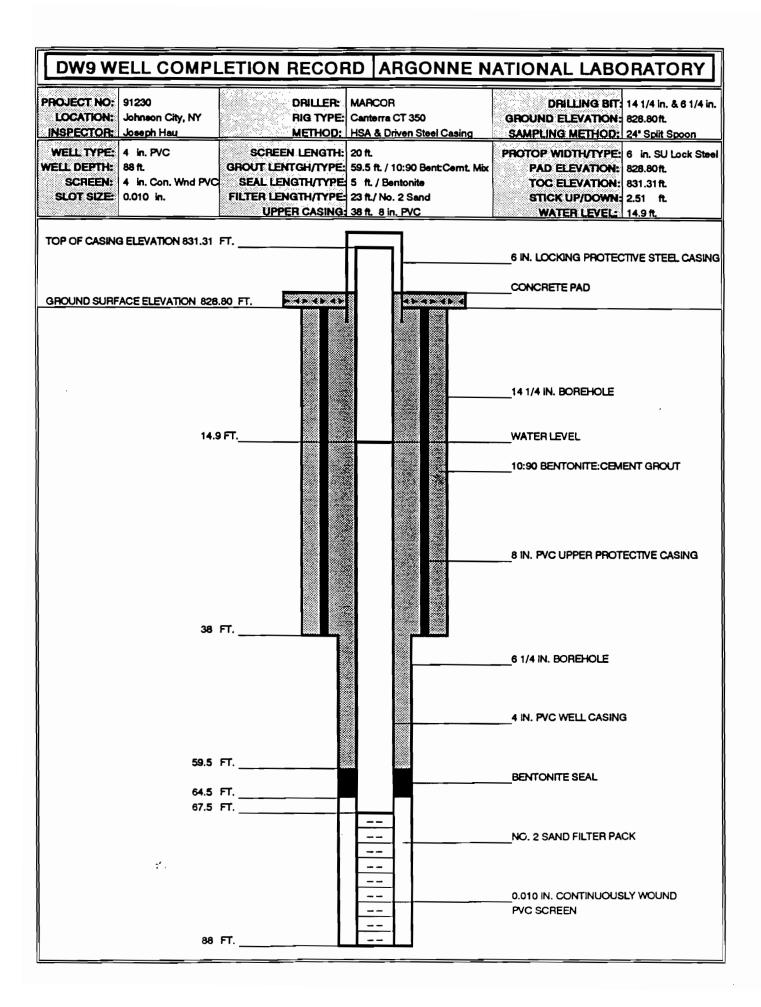


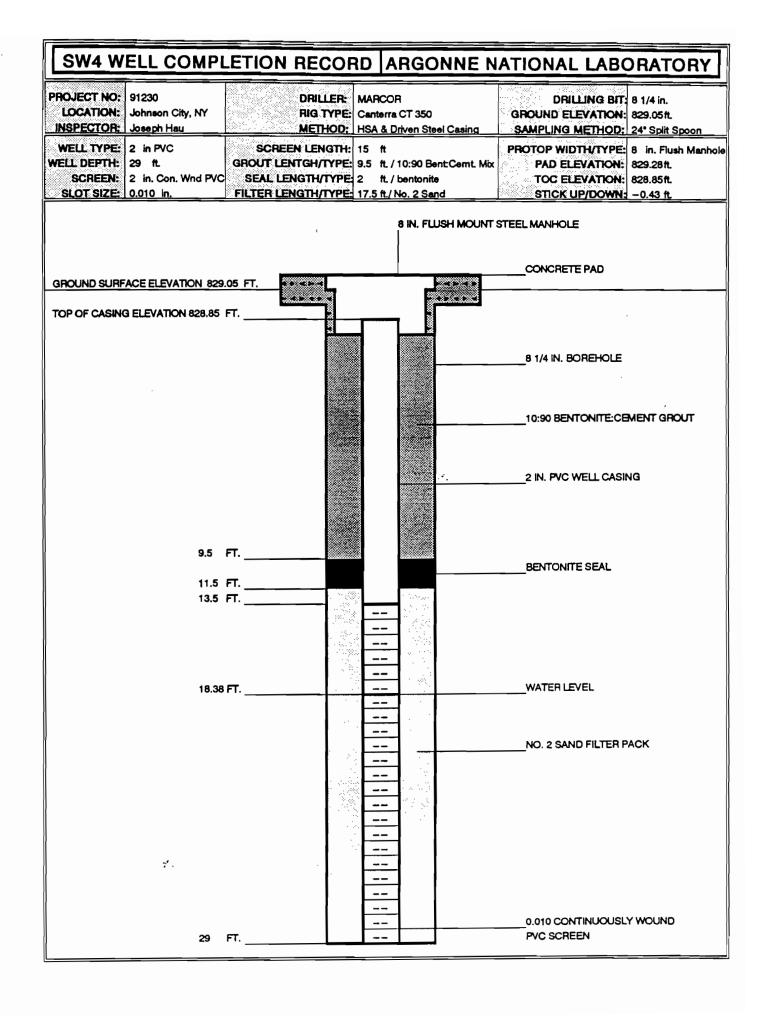
#### DW5 WELL COMPLETION RECORD ARGONNE NATIONAL LABORATORY PROJECT NO: 91230 DRILLING BIT: 14 1/4 in. & 6 1/4 in. DRILLER: MARCOR LOCATION: Johnson City, NY RIG TYPE: Canterra CT 350 GROUND ELEVATION: 836.24ft. INSPECTOR: Joseph Hau METHOD: HSA & Driven Steel Casing SAMPLING METHOD: 24' Split Spoon SCREEN LENGTH: 10 ft. WELL TYPE: 4 in. PVC PROTOP WIDTH/TYPE: 10 in, Flush Manhole GROUT LENTGH/TYPE: 65 ft. / 10:90 Bent: Cemt. Mix WELL DEPTH: 83 ft. PAD ELEVATION: 836.24ft SCREEN: 4 in. Con. Wnd PVC SEAL LENGTH/TYPE 5 ft. / bentonite TOC ELEVATION: 835.97ft. 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.



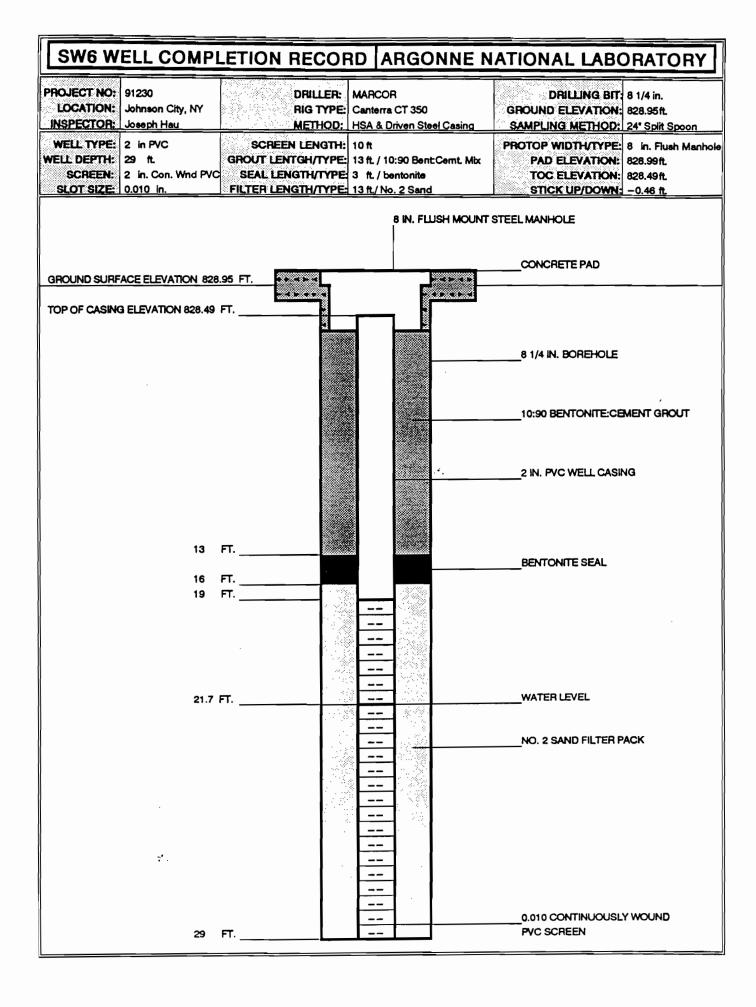
#### DW6 WELL COMPLETION RECORD ARGONNE NATIONAL LABORATORY PROJECT NO: 91230 DRILLER: MARCOR DRILLING BIT: 14 1/4 in. & 6 1/4 in. LOCATION: Johnson City, NY RIG TYPE: Canterra CT 350 GROUND ELEVATION: 828.95 ft. INSPECTOR: Joseph Hau METHOD: HSA & Driven Steel Casing SAMPLING METHOD: 24° Split Spoon WELL TYPE: 4 in. PVC SCREEN LENGTH: 10 ft. PROTOP WIDTH/TYPE: 10 in. Flush Manhole GROUT LENTGH/TYPE: 48.5 ft. / 10:90 Bent:Cernt. Mix WELL DEPTH: 68.5 ft PAD ELEVATION: 828,97ft. SEAL LENGTH/TYPE 5 ft. / bentonite SCREEN: 4 In. Con. Wnd PVC TOC ELEVATION: 828.51ft. 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. 10 IN. FLUSH MOUNT PROTECTIVE STEEL MANHOLE CONCRETE PAD GROUND SURFACE ELEVATION 828.95 FT. \*\*\*\* TOP OF CASING ELEVATION 826.51 FT. 14 1/4 IN. BOREHOLE 21 FT.\_ WATER LEVEL 10:90 BENTONITE:CEMENT GROUT 8 IN. UPPER PROTECTIVE CASING 36 FT. \_\_\_\_\_ 6 1/4 IN. BOREHOLE 4 IN. PVC WELL CASING 48.5 FT. BENTONITE SEAL 53.5 FT. \_\_\_\_\_ 56.5 FT. NO. 2 SAND FILTER PACK · . --0.010 IN, CONTINUOUSLY WOUND PVC SCREEN 66.5 FT. \_\_\_\_\_

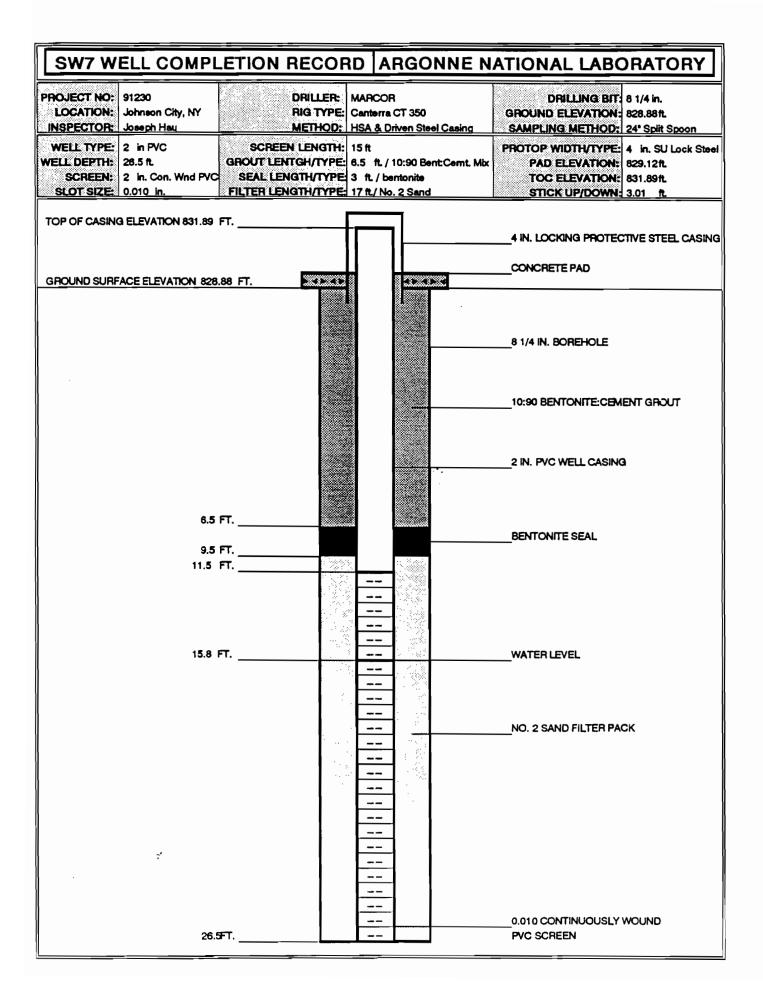
### DW8 WELL COMPLETION RECORD ARGONNE NATIONAL LABORATORY PROJECT NO: 91230 DRILLER: MARCOR DRILLING BIT: 14 1/4 in. & 6 1/4 in. LOCATION: Johnson City, NY RIG TYPE: Canterra CT 350 GROUND ELEVATION: 830.20ft. INSPECTOR: Joseph Hau METHOD: HSA & Driven Steel Casing SAMPLING METHOD: 24' Split Spoon WELL TYPE: 4 in. PVC SCREEN LENGTH: 20 ft. PROTOP WIDTH/TYPE: 10 in. Flush Manhole WELL DEPTH: 93 ft. GROUT LENTGH/TYPE: 65 ft. / 10:90 Bent: Cemt. Mix PAD ELEVATION: 830.20ft. SCREEN: 4 in. Con. Wnd PVC SEAL LENGTH/TYPE: 5.5 ft. / bentonite TOC ELEVATION: 829.70ft. 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. 10 IN. FLUSH MOUNT PROTECTIVE STEEL MANHOLE CONCRETE PAD TOP OF CASING ELEVATION 829.70 FT. 14 1/4 IN, BOREHOLE WATER LEVEL 18.4 FT. 10:90 BENTONITE:CEMENT GROUT 8 IN. UPPER PROTECTIVE CASING 40 FT. \_\_\_\_\_ 6 1/4 IN. BOREHOLE 4 IN. PVC WELL CASING 65 FT. BENTONITE SEAL 70.5 FT. \_\_\_\_\_ 72.5 FT. NO. 2 SAND FILTER PACK 0.010 IN, CONTINUOUSLY WOUND PVC SCREEN 93 FT.

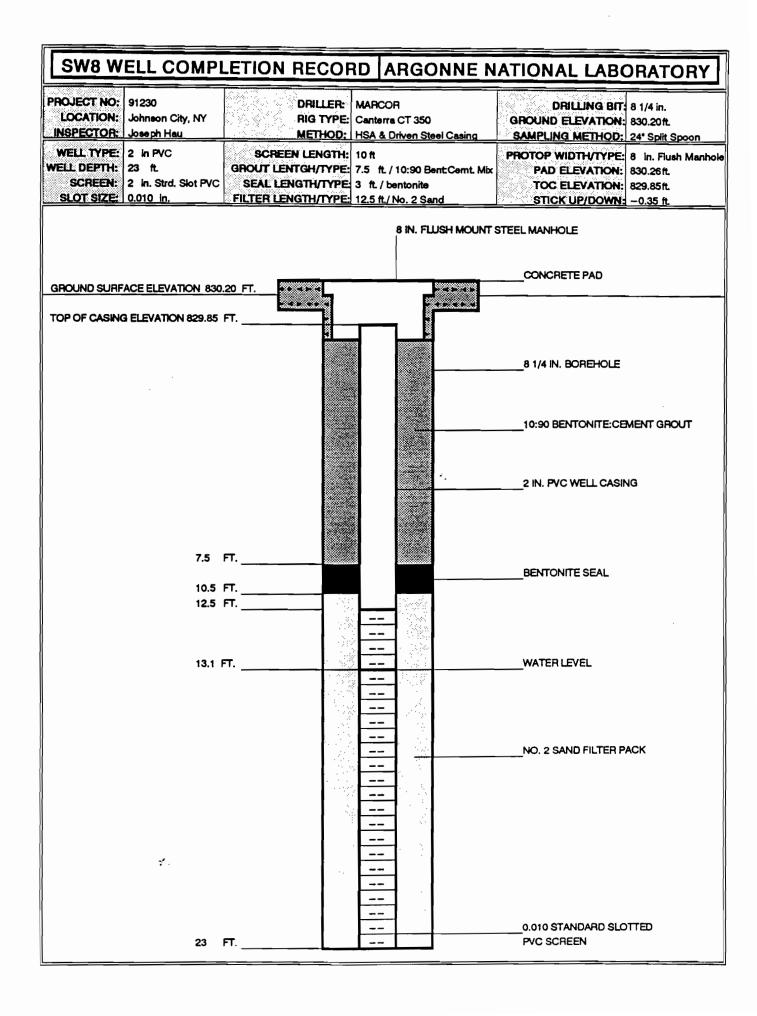


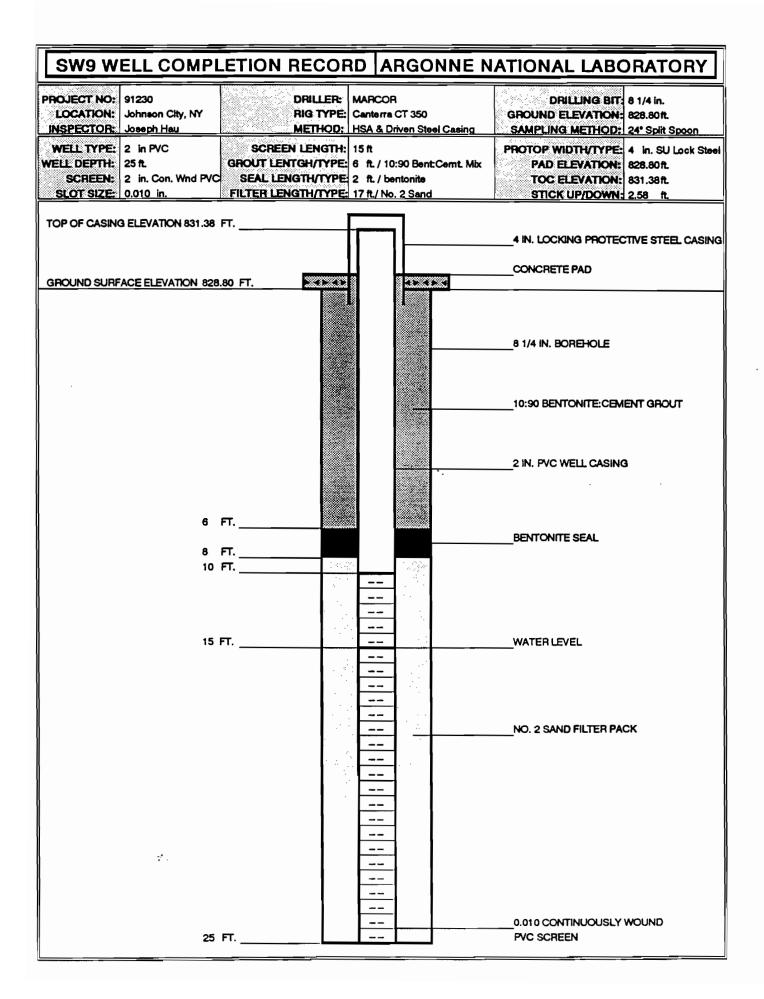


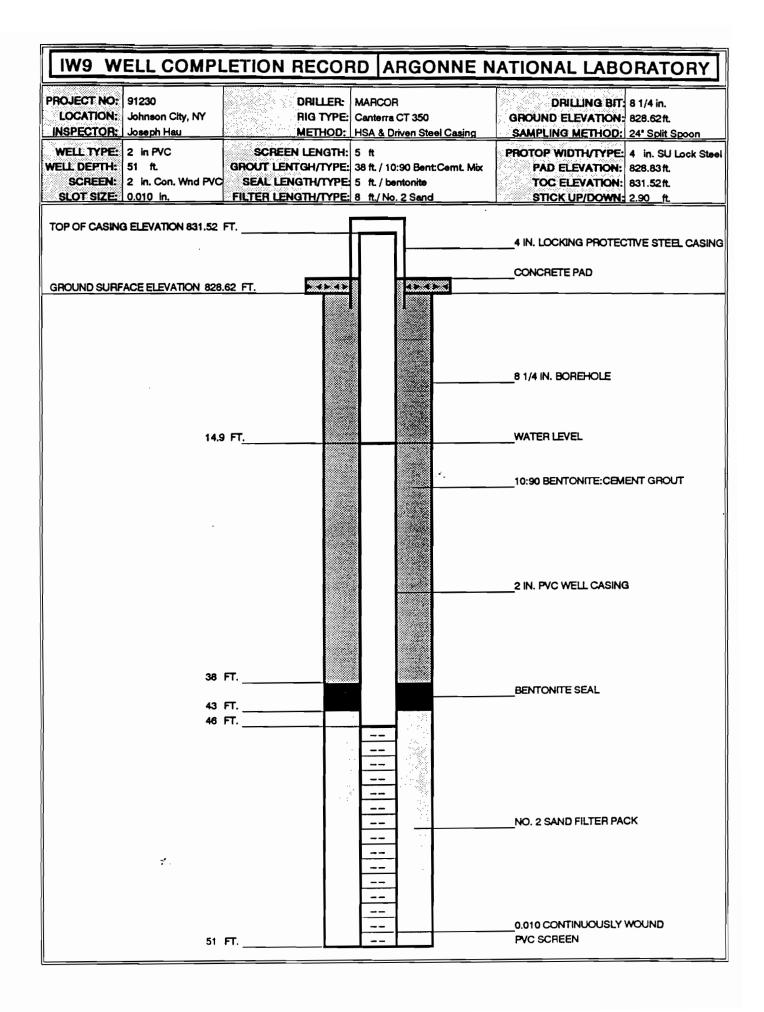
## SW5 WELL COMPLETION RECORD ARGONNE NATIONAL LABORATORY DRILLER: MARCOR PROJECT NO: 91230 DRILLING BIT: 8 1/4 in. LOCATION: Johnson City, NY RIG TYPE: Canterra CT 350 **GROUND ELEVATION: 836.24ft.** METHOD: HSA & Driven Steel Casing INSPECTOR: Joseph Hau SAMPLING METHOD: 24" Split Spoon WELL TYPE: 2 in. PVC SCREEN LENGTH: 10 ft PROTOP WIDTH/TYPE: 8 in. Flush Manhole GROUT LENTGH/TYPE: 14.5 ft. / 10:90 Bent:Cemt. Mbx WELL DEPTH: 30.5 ft. PAD ELEVATION: 836.32ft. SCREEN: 2 In. Con. Wnd PVC SEAL LENGTH/TYPE: 3 ft. / bentonite TOC ELEVATION: 835.84ft. SLOT SIZE: 0.010 in. FILTER LENGTH/TYPE: 13 ft./ No. 2 Sand STICK UP/DOWN: -0.40 ft. 8 IN. FLUSH MOUNT STEEL MANHOLE CONCRETE PAD GROUND SURFACE ELEVATION 836.24 FT. TOP OF CASING ELEVATION 835.84 FT. \_\_ 8 1/4 IN. BOREHOLE 10:90 BENTONITE: CEMENT GROUT 2 IN. PVC WELL CASING 14.5 FT. \_\_\_ BENTONITE SEAL 17.5 FT. \_\_\_\_ 20.5 FT. \_\_\_\_ 25.4 FT. \_\_\_\_\_ WATER LEVEL --NO. 2 SAND FILTER PACK --0.010 CONTINUOUSLY WOUND PVC SCREEN 30.5 FT. \_\_\_\_











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Appendix C:

Raw Field Data

# Appendix C-1:

**Well Development Records** 

DW1 W	ELL DEVELO	PMENT RECOP	D ARGONNE	ARGONNE NATIONAL LABORATORY					
PROJECT NO:	91230	DRILLER:	MARCOR	DEPTH TO WATER: 20.66 R.					
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 R.	PROTOP WIDTH/TYPE: 8 in. SU Lock Stee					
WELL DEPTH:	61.5 ft.	GROUT LENTGH/TYPE:	43.5 ft. / 10:90 Bent:Cemt. Mix	GROUND ELEVATION: 831.83 ft.					
SCREEN:	4 in. Con. Wnd PVC	SEAL LENGTH/TYPE	5 ft. / bentonite	PAD ELEVATION: 831.93 R.					
SLOT SIZE:	0.010 in.	FILTER LENGTH/TYPE:	13 R./ No. 2 Sand	TOG ELEVATION: 834.57 R. STICK UP/DOWN: 2.74 R.					

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
рН		6.87	8.33	7.61	7.48	7.26	7.26	7.24	[7.23]
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]							
рΗ									
CONDUCTIVITY (mS)	14.01	[14.03]							
TURBIDITY (NTUs)		[36.2]							

<sup>(1) ---</sup> means no reading(2) [Number] means parameter has stabilized or is acceptable

#### **DW3 WELL DEVELOPMENT RECORD** ARGONNE NATIONAL LABORATORY PROJECT NO: 91230 DRILLER: DEPTH TO WATER: 14.81 ft. MARCOR LOCATION: Johnson City, NY RIG TYPE: Canterra CT 350 HEIGHT OF WATER: 51.69 R. INSPECTOR: Joseph Hau METHOD: HSA & Driven Steel Casing VOLUME IN WELL: 34 gai. SCREEN LENGTH: 20 ft. WELL TYPE: 4 in. PVC PROTOP WIDTH/TYPE: 10 in. SU Lock Steel WELL DEPTH: 88.0 ft. GROUT LENTGH/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 R./ No. 2 Sand TOC ELEVATION: 829.04 ft. STICK UP/DOWN: -0.38 ft.

	CTART								
DATE	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	12.7					13.3			
рН	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]								

<sup>(1) ---</sup> means no reading

<sup>(2) [</sup>Number] means parameter has stabilized or is acceptable

PROJECT NO: 91230 LOCATION: Johnson INSPECTOR: Joseph H		DRILLE RIG TY METHO	PE: Cante				1000	ER: 15.34 ER: 76.67	ft.	
WELL TYPE: 4 In. PVI NELL DEPTH: 85 R. SCREEN: 4 In. Co SLOT SIZE: 0.010 in.	n. Wnd PVC	GROUT I	EEN LENG LENTGH/TY LENGTH/TY	PE 57 R	57 ft. / 10:90 Bent:Gemt. Mix 5 ft. / bentonite			ELEVATI ELEVATI ELEVATI	/PE: 10 in. 5 ION: 829.05 ON: 829.10 ON: 828.78 WN: 2.74	ft. ft.
DATE	12/12/91									
TIME	0950	0955	1000	1005	1010	1015	1020	1025	1030	1035
RATE (GPM)	5	5	5	5	6	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	30.84
VOLUME (gai)	0	15	40	75	90	120	150	175	200	225
TEMPERATURE (°C)	12.3	12.4	12.9	12.8	12.5	12.5	12.8	13.1	12.7	12.7
рН	(i)	7.22	7.38	7.36	7.35	7.33	[7. <b>35</b> ]			
CONDUCTIVITY (mS)								9.27	9.71	9.39
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	
рН										
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]		

DW5 W	ELL DEVELO	PMENT RECOF	D ARGO	ARGONNE NATIONAL LABORATORY					
PROJECT NO: 91230  LOCATION: Johnson City, NY INSPECTOR: Joseph Hau		The first made of the control of the	MARCOR Canterra CT 350 HSA & Driven Steel	DEPTH TO WATER: 22.33 ft. HEIGHT OF WATER: 60.97 ft. Casing VOLUME IN WELL: 40 gal.					
WELL TYPE: WELL DEPTH: SCREEN: SLOT SIZE:	83 ft. 4 in. Con. Wnd PVC	SCREEN LENGTH: GROUT LENTGH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:	65 ft. / 10:90 Bent: 5 ft. / bentonite	PROTOP WIDTH/TYPE: 10 in. SU Lock Stee					

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 (gai)	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
рН	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]					
рН									
CONDUCTIVITY (mS)	8.53	[8.58]							
TURBIDITY (NTUS)	141			92.5	71.2		[48.3]		

<sup>(1) ---</sup> means no reading(2) [Number] means parameter has stabilized or is acceptable

ROJECT NO: 91230 LOCATION: Johnson INSPECTOR: Joseph H	DRILLER: MARC RIG TYPE: Cante METHOD: HSA			a CT 350	Casing	DEPTH TO WATER: 14.81 ft. HEIGHT OF WATER: 51.69 ft. VOLUME IN WELL: 34 gal.						
WELL TYPE: 4 in. PVC VELL DEPTH: 66.5 ft. SCREEN: 4 in. Co. SLOT SIZE: 0.010 in.	o. Wnd PVC	Physical Committee (Committee Commit			48.5 R. / 10:90 Bent:Cemt. Mix 5 R. / bentonite			PROTOP WIDTH/TYPE: 10 in. SU Lock St				
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	PUMP	55.0	38.0	14.92	39.37	53.0	PUMP	41.3	14.8		
VOLUME (gal)		34			o	25	35	50				
TEMPERATURE (°C)	10.2				12.3	12.6	12.6	12.6				
рН					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	PUMP	PUMP	PUMP	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]			
рН .		11.0	11.22	11.29	11.14	[11.18]						
CONDUCTIVITY (mS)						6.03	5.83	5.65	[5.58]			
TURBIDITY (NTUs)									[>200]			

DW8 W	ELL DEVELO	PMENT RECOF	RD ARGONNE N	NATIONAL LABO	RATORY
PROJECT NO: LOCATION: INSPECTOR:	Johnson City, NY		MARCOR Canterra CT 350 HSA & Driven Steel Casing	DEPTH TO WATER: HEIGHT OF WATER: YOLUME IN WELL:	76.9 ft.
WELL TYPE: WELL DEPTH: SCREEN: SLOT.SIZE:	93 ft. 4 in. Con. Wnd PVC	PROBLEM NOW WANTED	65 ft. / 10:90 Bent:Cemt. Mix 5.5 ft. / bentonite	PROTOP WIDTH/TYPE:	10 in. SU Lock Stee 830.20 ft. 830.20 ft. 829.70 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
рН	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					
рН	[7.13]								
CONDUCTIVITY (mS)	15.94	15.74	15.83	15.82					
TURBIDITY (NTUS)		55.6		42.1					

<sup>(1) ---</sup> means no reading(2) [Number] means parameter has stabilized or is acceptable

DW9 W	ELL DEVELO	PMENT RECOP	D ARGONNE N	ARGONNE NATIONAL LABORATORY				
PROJECT NO: LOCATION: INSPECTOR:	Johnson City, NY		MARCOR Canterra CT 350 HSA & Driven Steel Casing	DEPTH TO WATER: 17.28 ft. HEIGHT OF WATER: 70.22 ft. VOLUME IN WELL: 46 gal.				
WELL TYPE: WELL DEPTH: SCREEN: SLOT SIZE:	88 lt. 4 in. Con. Wnd PVC	ualiga gregas autorio, brya Pereki Atta Padaki Bari a	59.5 ft. / 10:90 Bent:Cemt. Mix 5 ft. / bentonite	PROTOP WIDTH/TYPE: 6 In. SU Lock Stee GROUND ELEVATION: 828.80 ft. PAD ELEVATION: 828.80 ft. 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	
рН	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)									

<sup>(1) ---</sup> means no reading(2) [Number] means parameter has stabilized or is acceptable

SW4 W	ELL DEVELO	PMENT RECOF	מו	ARGONNE NATIONAL LABORATORY			
PROJECT NO: LOCATION: INSPECTOR:	Johnson City, NY	DRILLER: RIG TYPE: METHOD:	Cante		DEPTH TO WATER: HEIGHT OF WATER: YOLUME IN WELL:	13.91 ft.	
WELL TYPE: WELL DEPTH: SCREEN: SLOT SIZE:	29 ft. 4 in. Con. Wnd PVC	Market - Til Nike & Mark 1975 - Nation 1	9.5 f	t. / 10:90 Bent:Cemt. Mix t. / bentonite	PROTOP WIDTH/TYPE: GROUND ELEVATION: PAD ELEVATION: TOG ELEVATION: STICK UP/DOWN:	8 in. SU Lock Stee 829.05 ft. 829.28 ft. 828.85 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	PUMP	PUMP	23.35	23.95	23.37	PUMP	PUMP	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
рН				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	PUMP	PUMP	19.78						
VOLUME (GAL)	19	20							
TEMPERATURE (°C)	17.3	[17.3]							
ρН		7.28							
CONDUCTIVITY (mS)		[9.63]							
TURBIDITY (NTUs)		>200							

 <sup>(1) ---</sup> means no reading
 (2) [Number] means parameter has stabilized or is acceptable
 (3) Well was slow yieding - unable to remove fies to < 200 NTUs</li>
 Well was developed to less than 50 NTUs during purging prior to sampling

SW5 W	SW5 WELL DEVELOPMENT RECORD   ARGONNE NATIONAL LABORATORY										
PROJECT NO: LOCATION: INSPECTOR:	Johnson City, NY	13 - 4 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0	MARCOR Canterra CT 350 HSA & Driven Steel Casing	DEPTH TO WATER: HEIGHT OF WATER: VOLUME IN WELL:	4.78 R.						
WELL TYPE: WELL DEPTH: SCREEN: SLOT SIZE:	30.5 ft. 4 in. Con. Wnd PVC	17000.00 \$1000 000.0000 638 when it	14.5 ft. / 10:90 Bent:Cemt. Mix 3 ft. / bentonite	PROTOP WIDTH/TYPE:	8 in, SU Lock Steel 836.24 ft. 836.32 ft. 835.84 ft.						

	- DAILERI			niume.	755		 	
DATE	BAILED 11/24/91		END	PUMPED 12/11/91	(3)			
	,,							
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]					
рН	7.85	7.41 •	[7.48]					
CONDUCTIVITY (mS)	12.23	11.50	[11.14]					
TURBIDITY (NTUs)			>200					
DATE								
TIME								
TIME RATE (GPM)						_		
RATE (GPM)  DEPTH TO WATER								
RATE (GPM)								
RATE (GPM)  DEPTH TO WATER (FT)								
RATE (GPM)  DEPTH TO WATER (FT)  VOLUME (GAL)  TEMPERATURE								
RATE (GPM)  DEPTH TO WATER (FT)  VOLUME (GAL)  TEMPERATURE (°C)								
RATE (GPM)  DEPTH TO WATER (FT)  VOLUME (GAL)  TEMPERATURE (°C)  pH  CONDUCTIVITY								

 <sup>(1) ---</sup> 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</li>

## SW6 WELL DEVELOPMENT RECORD ARGONNE NATIONAL LABORATORY PROJECT NO: 91230 DRILLER: MARCOR DEPTH TO WATER: 20.6 R. LOCATION: Johnson City, NY RIG TYPE: Canterra CT 350 HEIGHT OF WATER: 8.4 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 LENTGH/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. FILTER LENGTH/TYPE 13 R./ No. 2 Sand SLOT SIZE: 0.010 in. TOC ELEVATION: 828.49 ft. STICK UP/DOWN: -0.46 ft. BAILED DATE

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

<sup>(1) ---</sup> means no reading

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

<sup>(3)</sup> 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 W	SW7 WELL DEVELOPMENT RECORD   ARGONNE NATIONAL LABORATORY												
PROJECT NO: LOCATION: INSPECTOR:	Johnson City, NY		MARCOR  Canterra CT 350  HSA & Driven Steel Casing	DEPTH TO WATER: HEIGHT OF WATER: VOLUME IN WELL:	10.82 R.								
WELL TYPE: WELL DEPTH: SCREEN: SLOT SIZE:	26.5 ft. 2 in. Con. Wnd PVC	Approximate attended to the contract of the co	6.5 ft. / 10:90 Bent:Cemt. Mix 3 ft. / bentonite	PROTOP WIDTH/TYPE: GROUND ELEVATION: PAD ELEVATION: TOC ELEVATION: STICK UP/DOWN	828.88 ft. 829.12 ft. 831.89 ft.								

DATE	BAILING			END			
DATE	12/13/91			END			
TIME	1545	1553	1605	1625		i	
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]			
рН		6.37	6.51	[6.94]			
CONDUCTIVITY (mS)		12.11	11.80	[11.76]			
TURBIDITY (NTUs)				>200			
DATE							
TIME					 "		
RATE (GPM)					-		
DEPTH TO WATER (FT)							
VOLUME (GAL)							
TEMPERATURE (°C)							
<b>"</b> рН							
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</li>

SW8 W	ELL DEVELO	PMENT RECOF	ID.	ARGONNE NATIONAL LABORATORY			
PROJECT NO: LOCATION: INSPECTOR:	Johnson City, NY	DRILLER: RIG TYPE: METHOD:	Cante		DEPTH TO WATER: HEIGHT OF WATER: YOLUME IN WELL:	10.48 ft.	
WELL TYPE: WELL DEPTH: SCREEN: SLOT SIZE:	23 ft. 2 in. Con. Wnd PVC	SCREEN LENGTH: GROUT LENTGH/TYPE: SEAL LENGTH/TYPE: FILTER LENGTH/TYPE:	7.5 f	t. / 10:90 Bent:Cemt. Mix	PROTOP WIDTH/TYPE:	8 in. SU Lock Steel 830.20 ft. 830.26 ft. 829.85 ft.	

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

 <sup>(1) ---</sup> 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</li>

SW9 WELL DEVELOPMENT RECORD   ARGONNE NATIONAL LABORATORY									
PROJECT NO: 91230 LOCATION: Johnson City, NY		DRILLER: RIG TYPE:	MARCOR Canterra CT 350	DEPTH TO WATER: HEIGHT OF WATER:					
INSPECTOR:	Joseph Hau	METHOD:	HSA & Driven Steel Casing	VOLUME IN WELL:	1.8 gai.				
WELL TYPE:	2 in. PVC	SCREEN LENGTH:		PROTOP WIDTH/TYPE:					
WELL DEPTH:	25 ft.	GROUT LENTGH/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	TOG ELEVATION: STICK UP/DOWN:					

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)				>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</li>

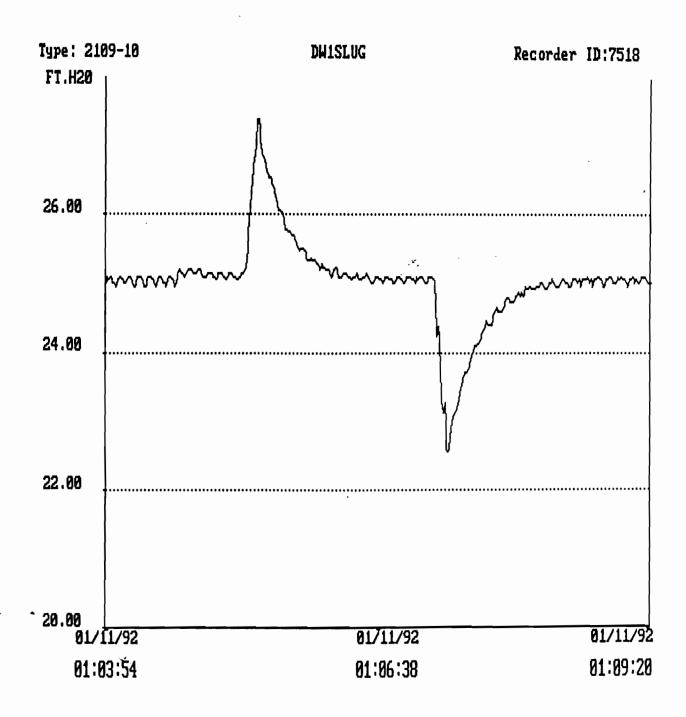
IW9 WELL DEVELOPMENT RECORD   ARGONNE NATIONAL LABORATORY									
LOCATION: Johnson City, NY RIG TYP		NXXX	MARCOR Canterra CT 350 HSA & Driven Steel Casing	DEPTH TO WATER: HEIGHT OF WATER: VOLUME IN WELL:	34.28 R.				
WELL TYPE:	2 in. PVC	SCREEN LENGTH:		PROTOP WIDTH/TYPE:					
WELL DEPTH: SCREEN:	51 ft. 2 in. Con. Wnd PVC	GROUT LENTGH/TYPE: SEAL LENGTH/TYPE			828.62 ft.				
SLOT SIZE:	0.010 in.	FILTER:LENGTH/TYPE:	8 ft./ No. 2 Sand	TOC ELEVATION: STICK UP/DOWN:	831.52 ft.				

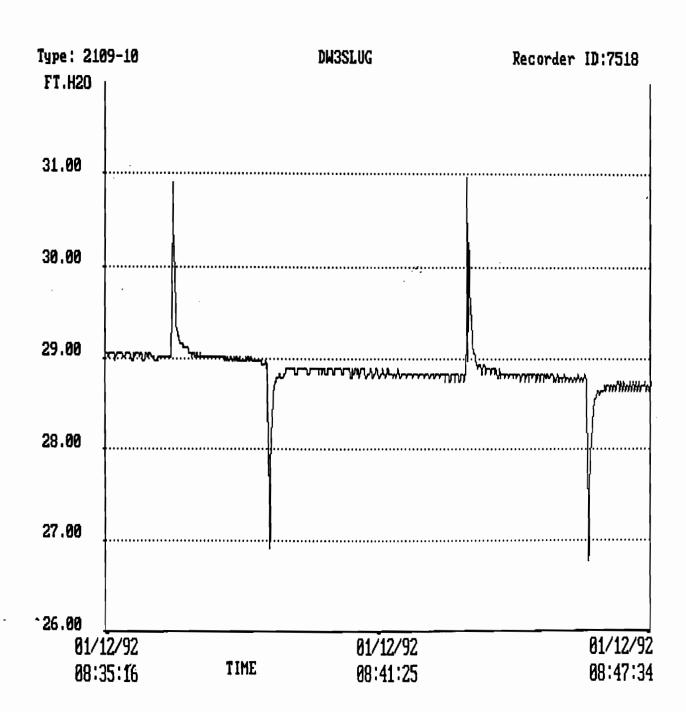
DATE	12/13/91					END	
TIME	1405	1419	1440	1510	1520	1530	
RATE (GPM)							
DEPTH TO WATER (FT)	16.72	30.6	30.78	31.04	31.3	31.7	
VOLUME (gal)	0	5	10	12	14	17 .	
TEMPERATURE (°C)		14.6	14.3	13.1	13.0	[13.0]	
рН		6.67	6.41	6.44	6.42	[6.43]	
CONDUCTIVITY (mS)		11.76	5.28	5.50	5.41	[5.33]	
TURBIDITY (NTUs)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

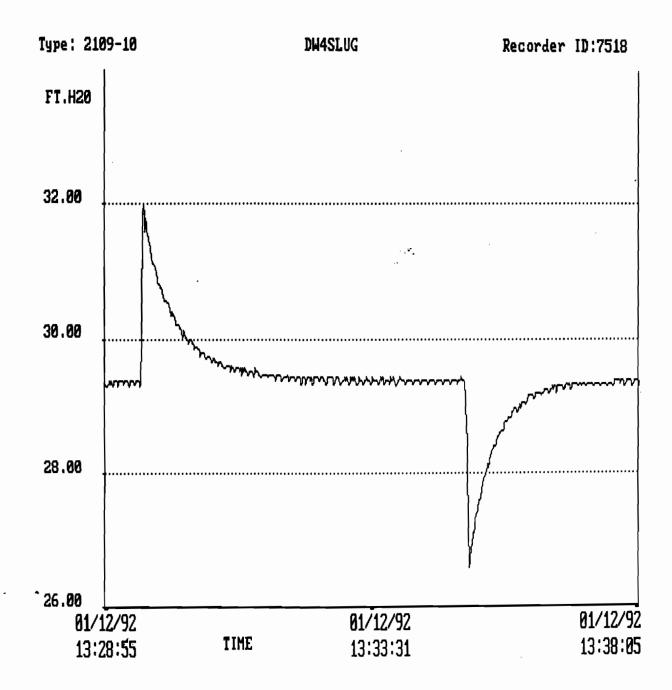
 <sup>(1) ---</sup> means no reading
 (2) [Number] means parameter has stabilized or is acceptable
 (3) Unable to install pump at time of well development - well was developed by bailing - unable to remove fines to <200 NTUs</li>

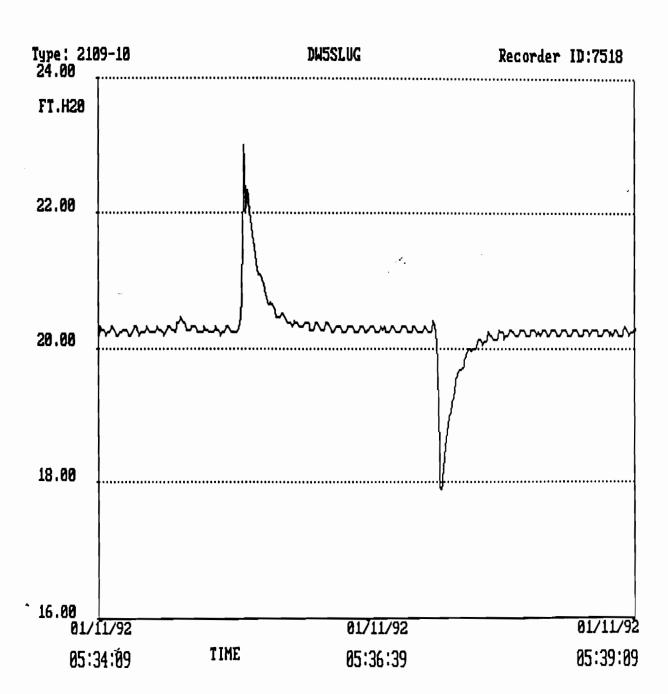
## Appendix C-2:

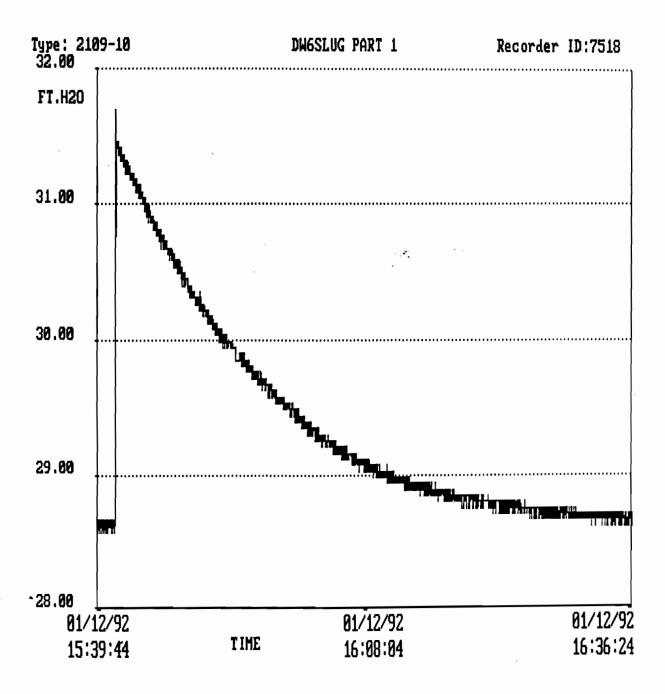
**Aquifer Slug Test Recovery Curves** 

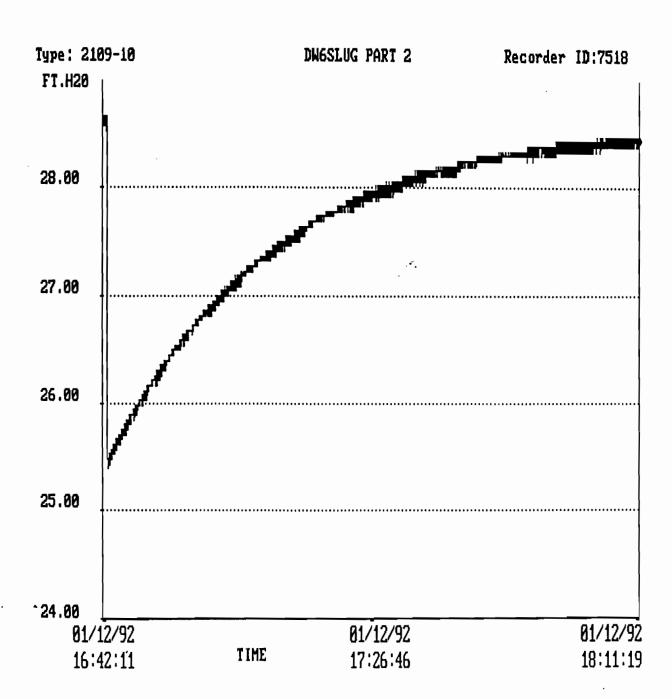


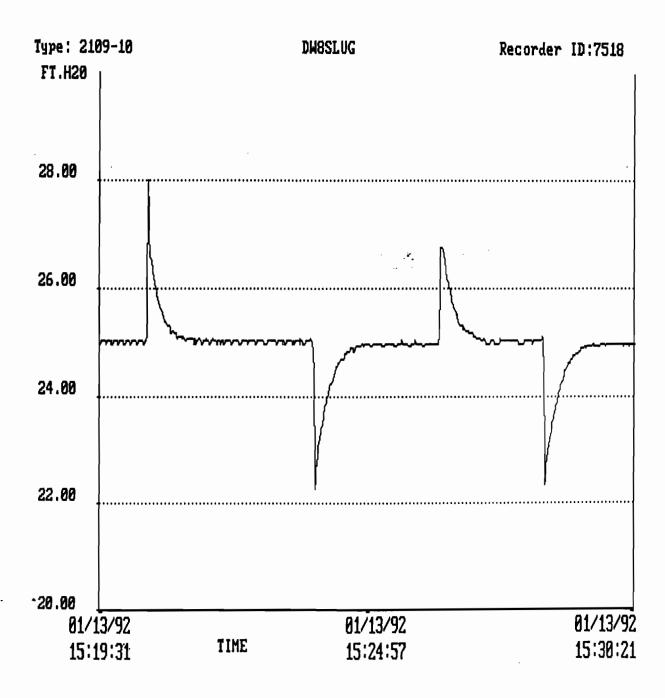


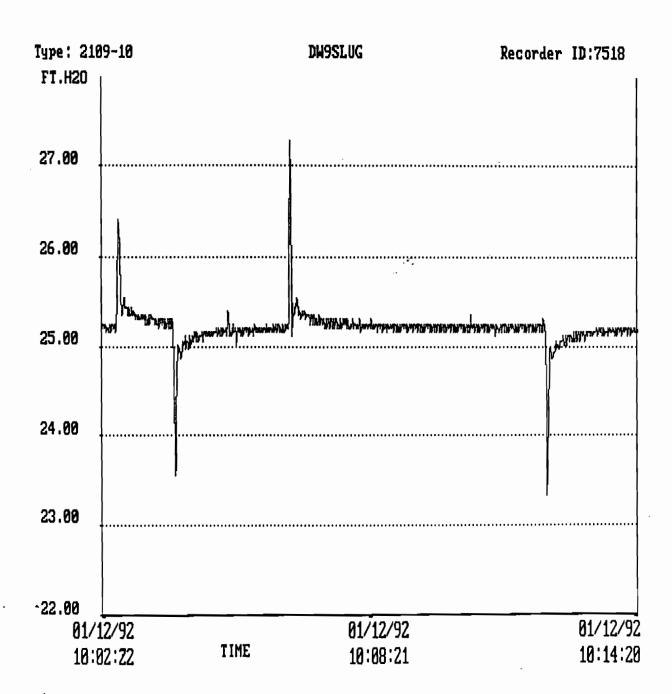


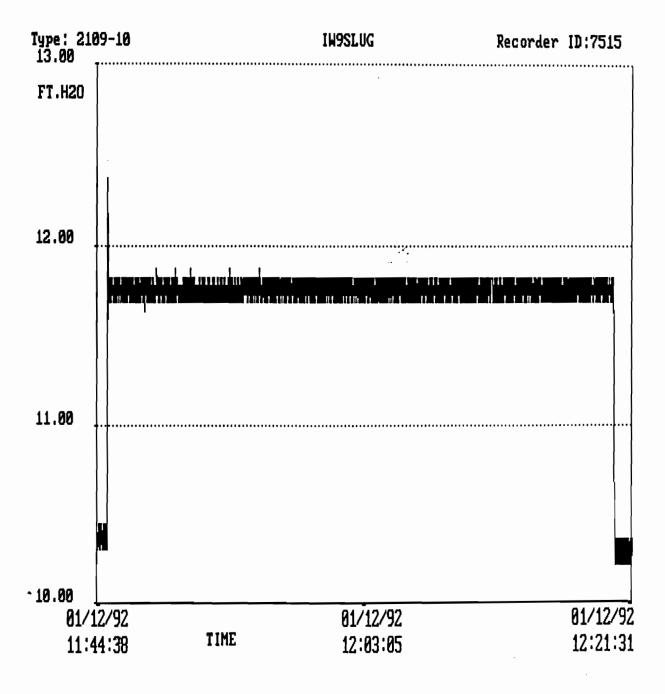


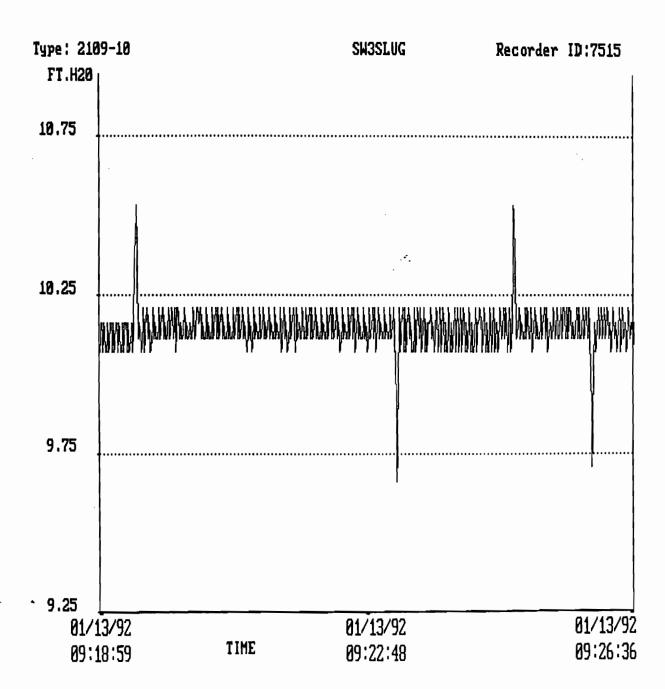


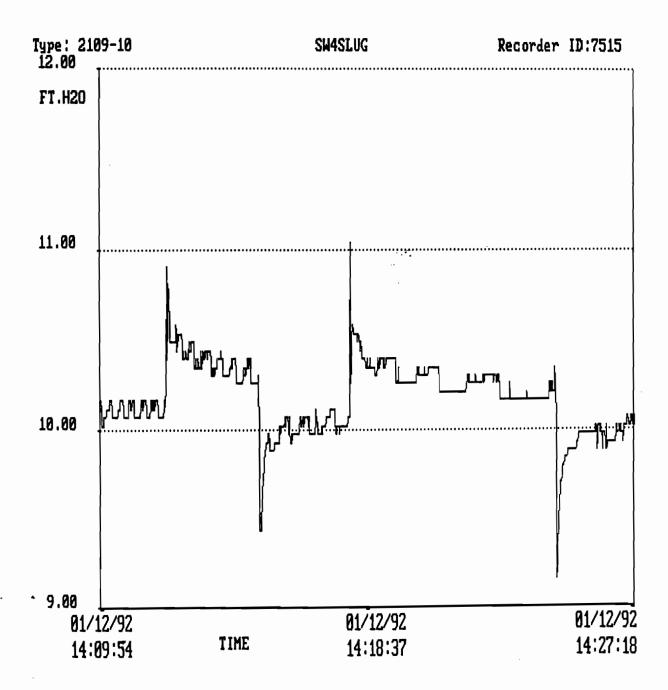


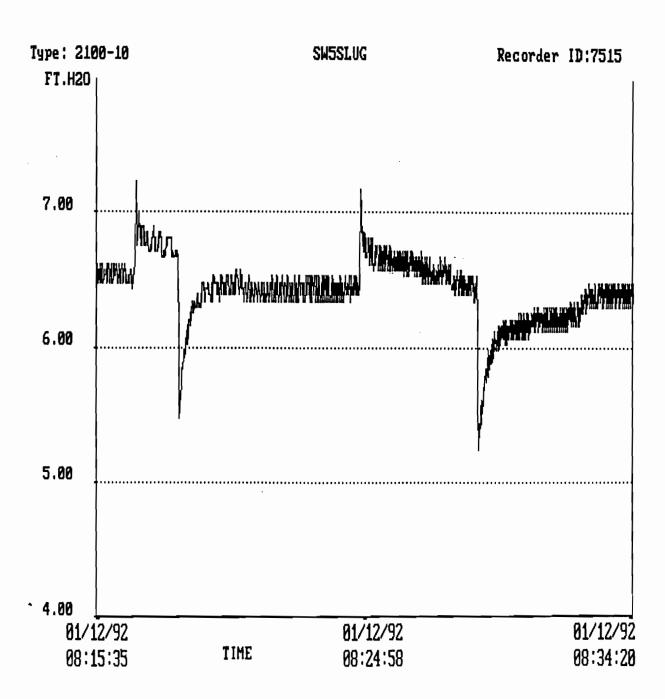


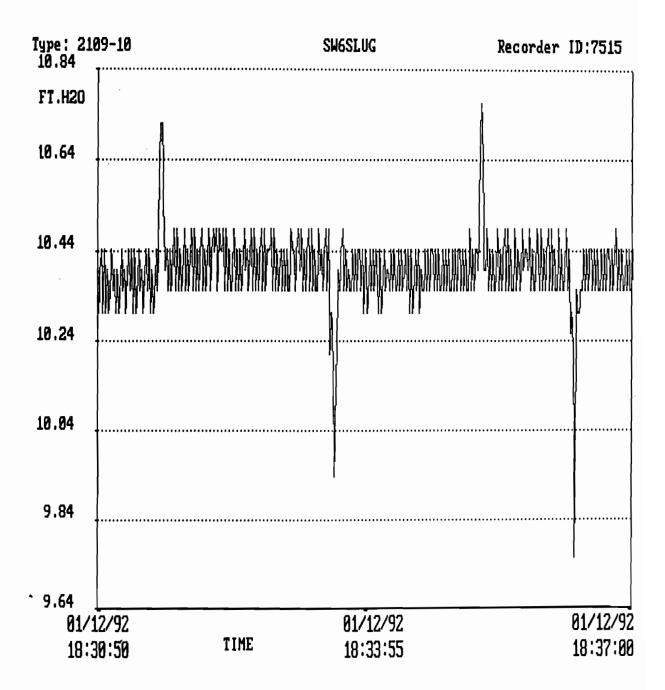


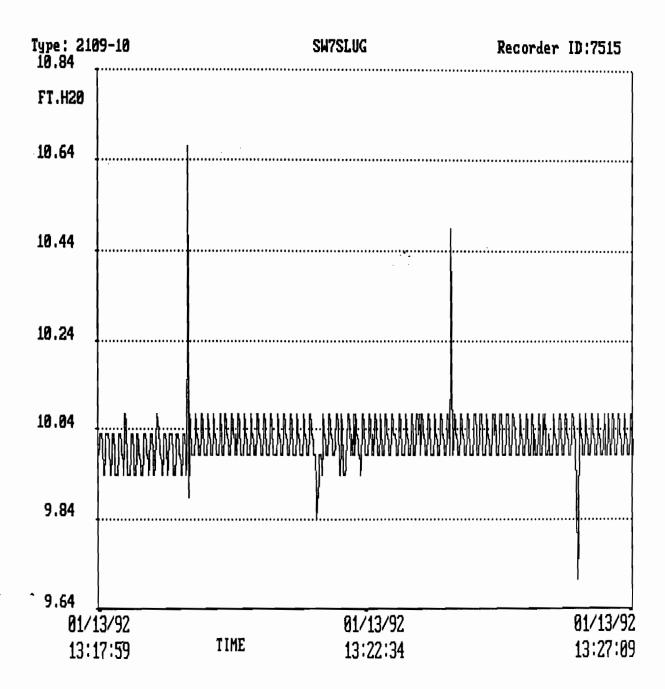


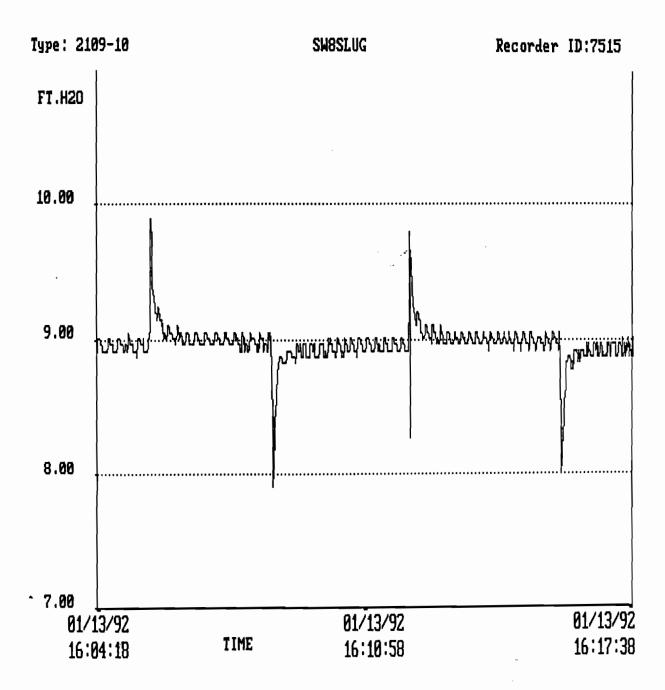


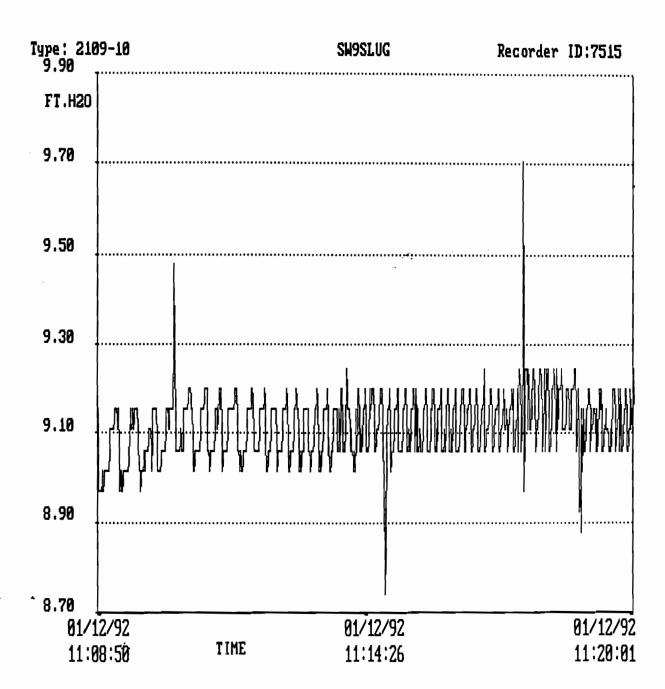






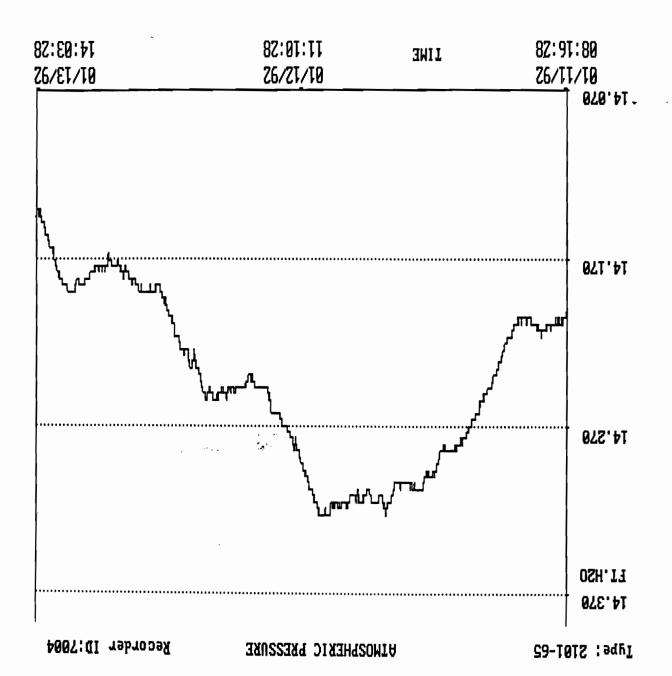


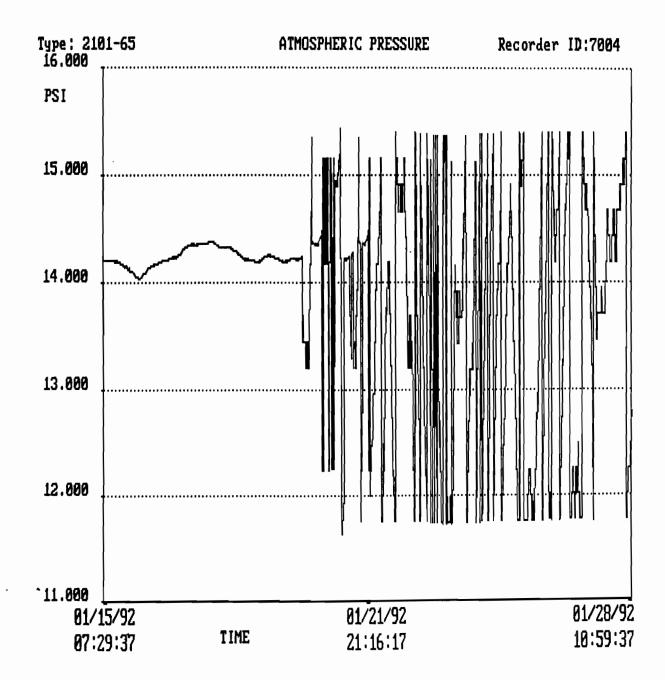


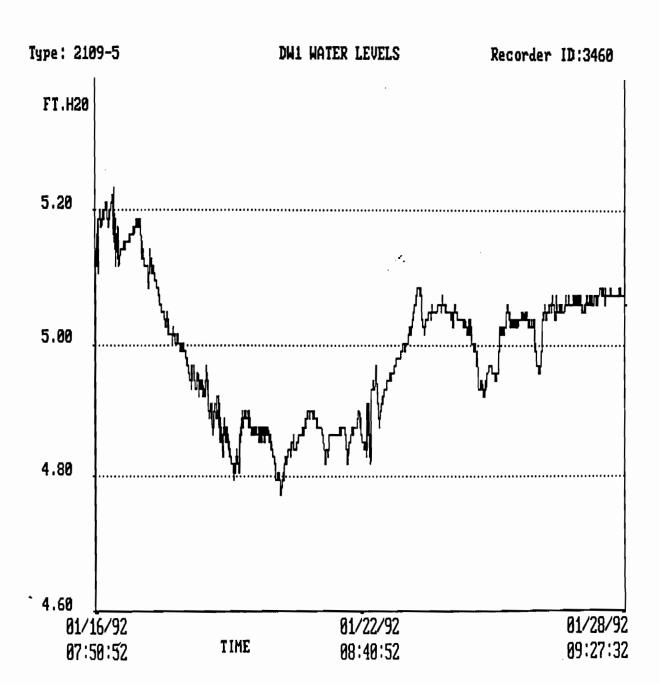


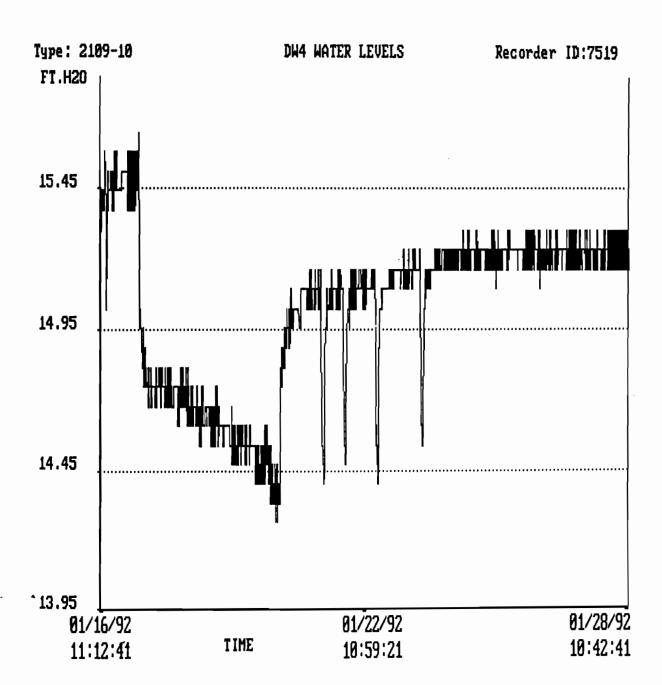
Appendix C-3:

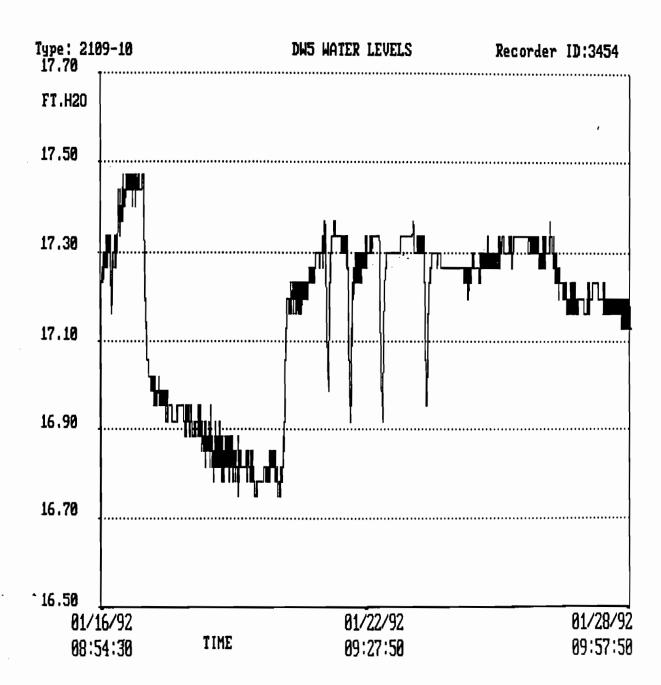
Water Level Data

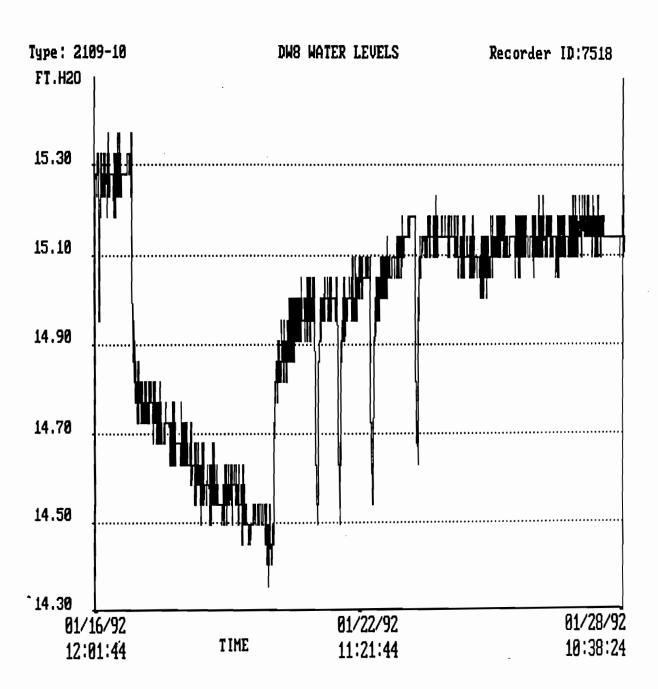


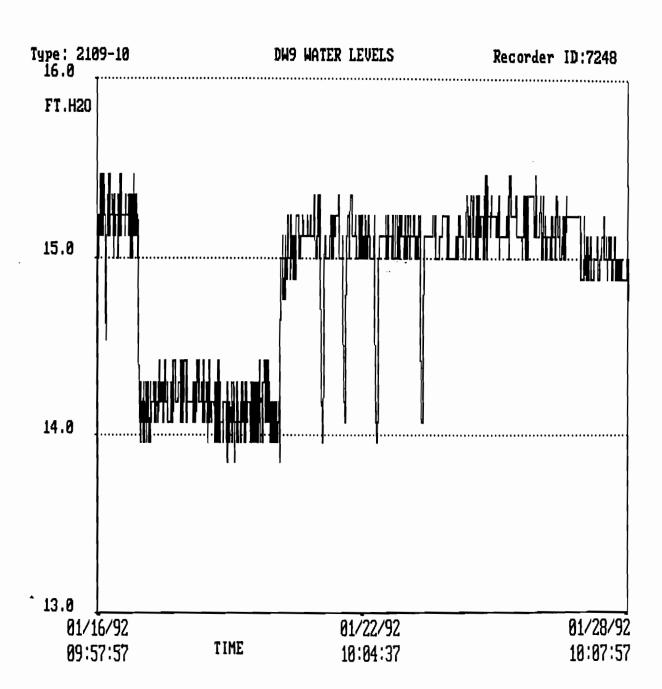


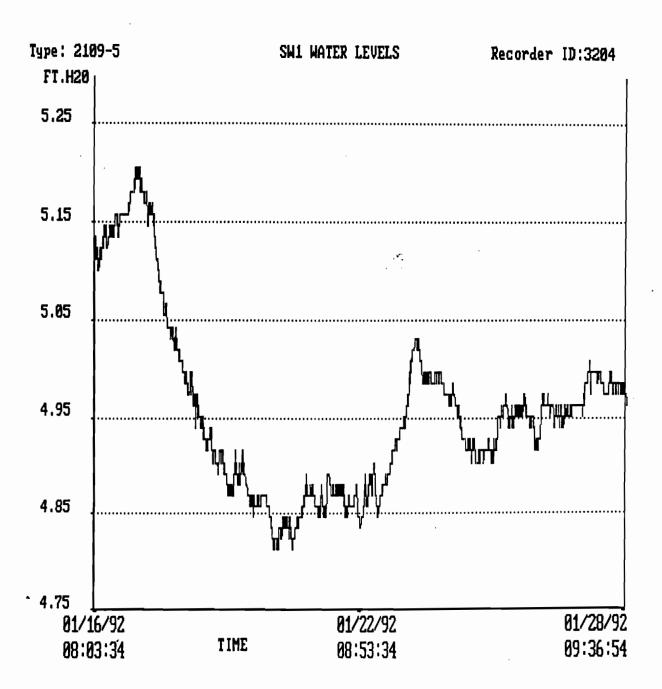


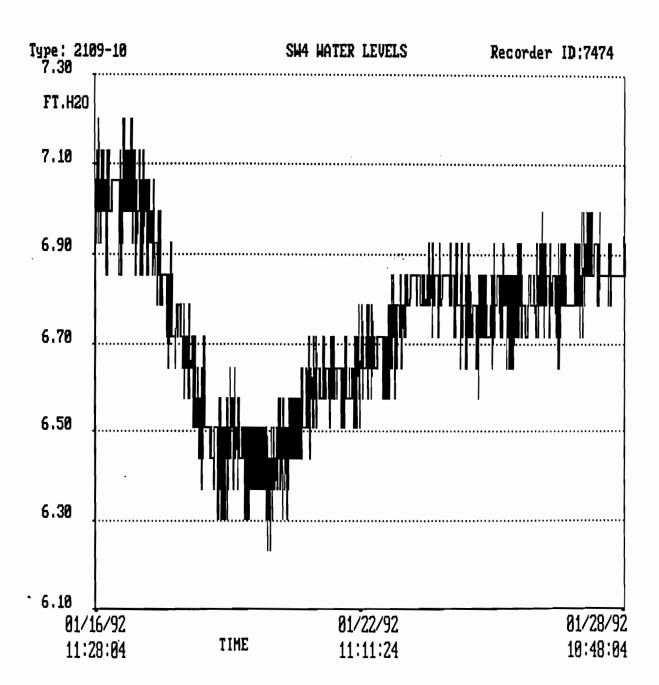


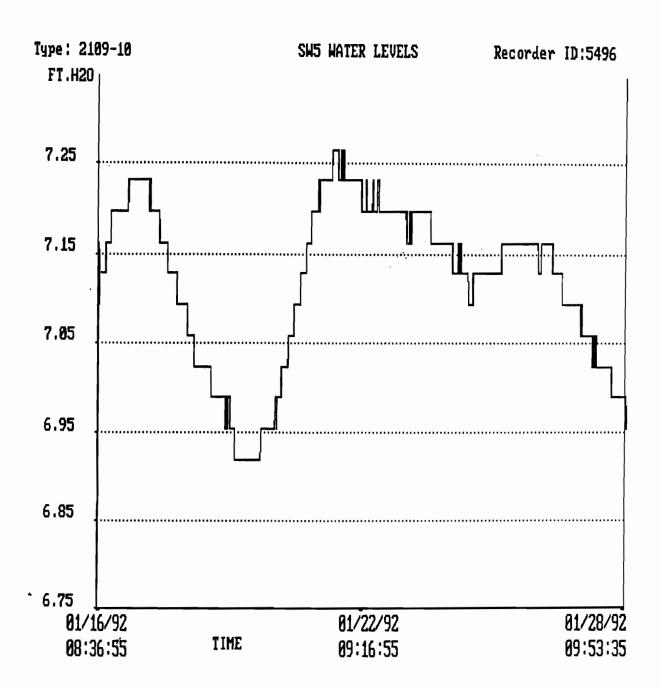


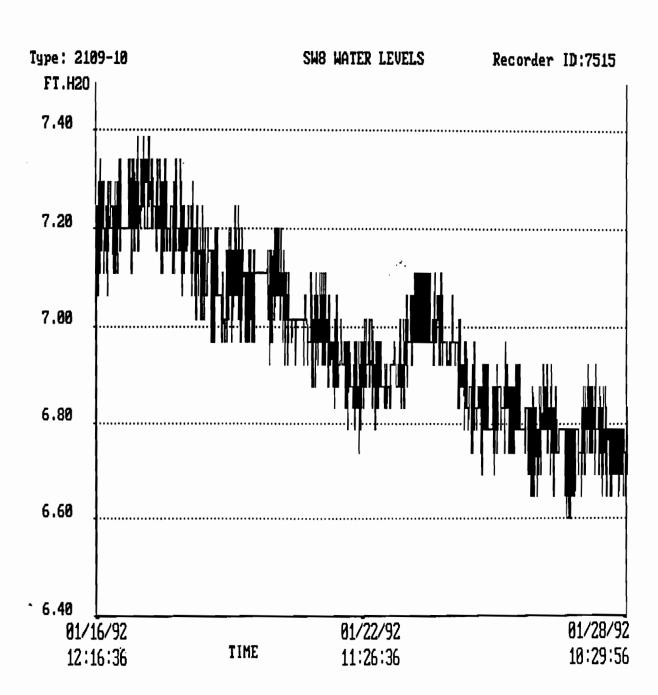


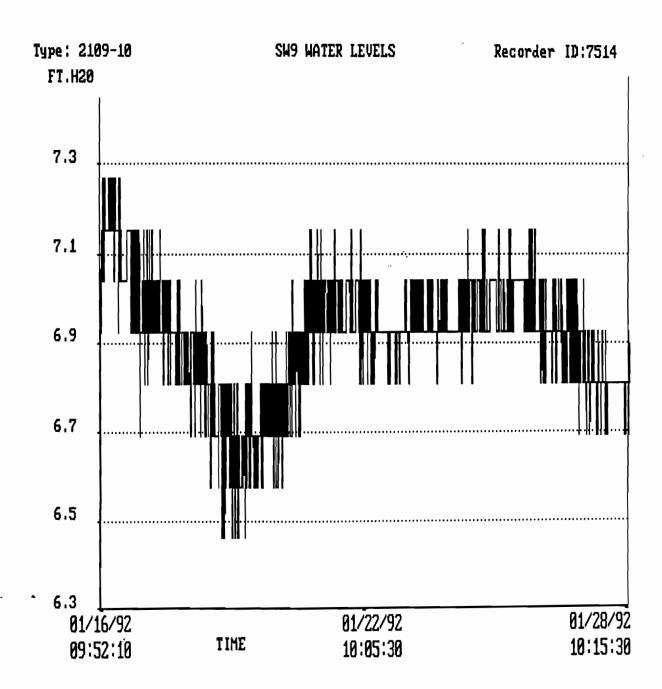












Appendix C-4:

Geotechnical Analysis



120 Elmgrove Park Rochester, NY 14624 (716) 247-6955

### FACSIMILE TRANSMITTAL COVER SHEET

#### PLEASE DELIVER THE FORTHCOMING PAGES TO:

DATE: 1-12-91  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.	FROM:	NAME:	Joe Han
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Comments and/or Special Instructions:	Comments and/or Special Instructions:		
Loil analytical results	Loil analytical results	Commer	nts and/or Special Instructions:
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		Ear vote	r information, we may receive transmissions on our FAX machine at (716) 247-

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# SECTECHNICAL 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 shelby 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) shelby tube samples were each tested for permeability and gradation. A hydrometer analysis was included for 2 of the shelby tube samples because of the high percentage of silts. Atterberg limits testing was not performed on any of the shelby 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.

# VAN DER HORST

Marcor of New York Soils Testing page 2

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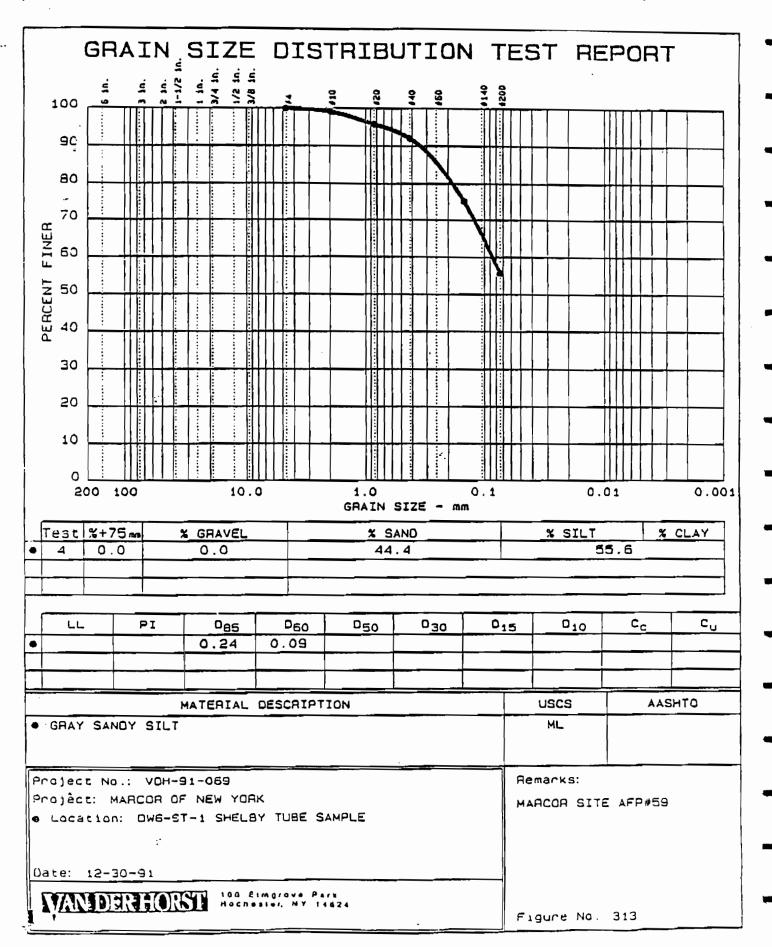
SUMMARY OF TESTING FROM SHELBY TUBE SAMPLES

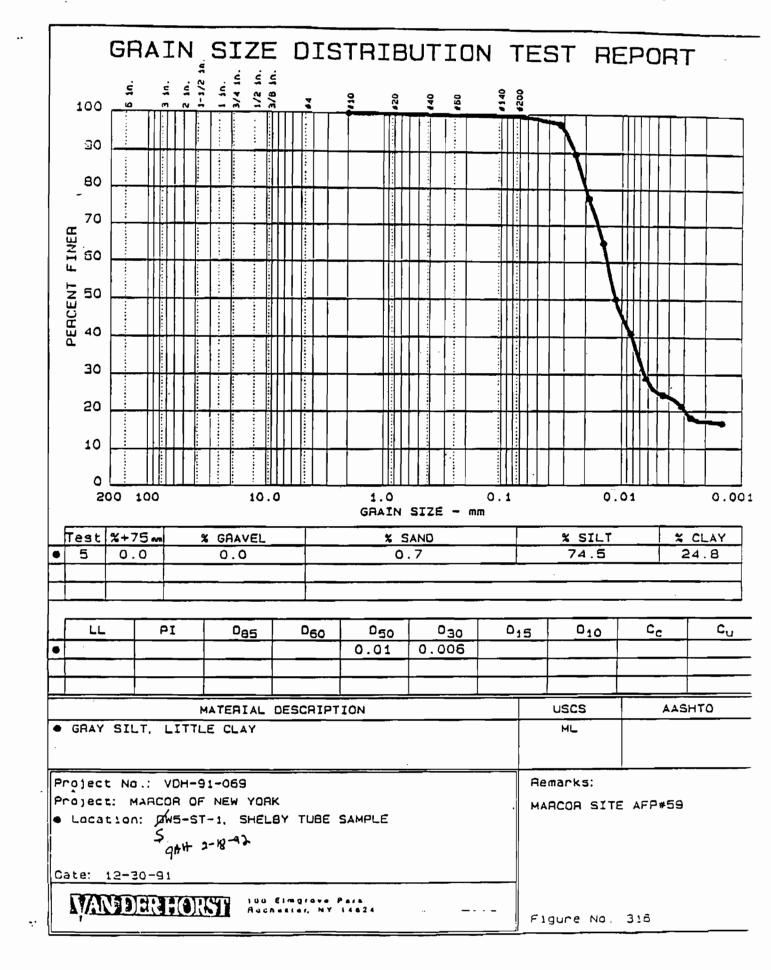
SAMPLE I.D.	PERMEABILITY (K=cm/sec)	% GRAVEL	% SAND	% SILT	% CLAY
DW6-ST-1 (LAB 313)	2.3 x 10 <sup>-4</sup>	0.0	44.4	55.6	see note 1
S 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1.6 x 10 <sup>-5</sup>	0.0	0.0	74.5	24.8
DW9-SP-1 (LAB_330)	8.1 x 10 <sup>-4</sup>	0.4	64.4	19.3	15.9

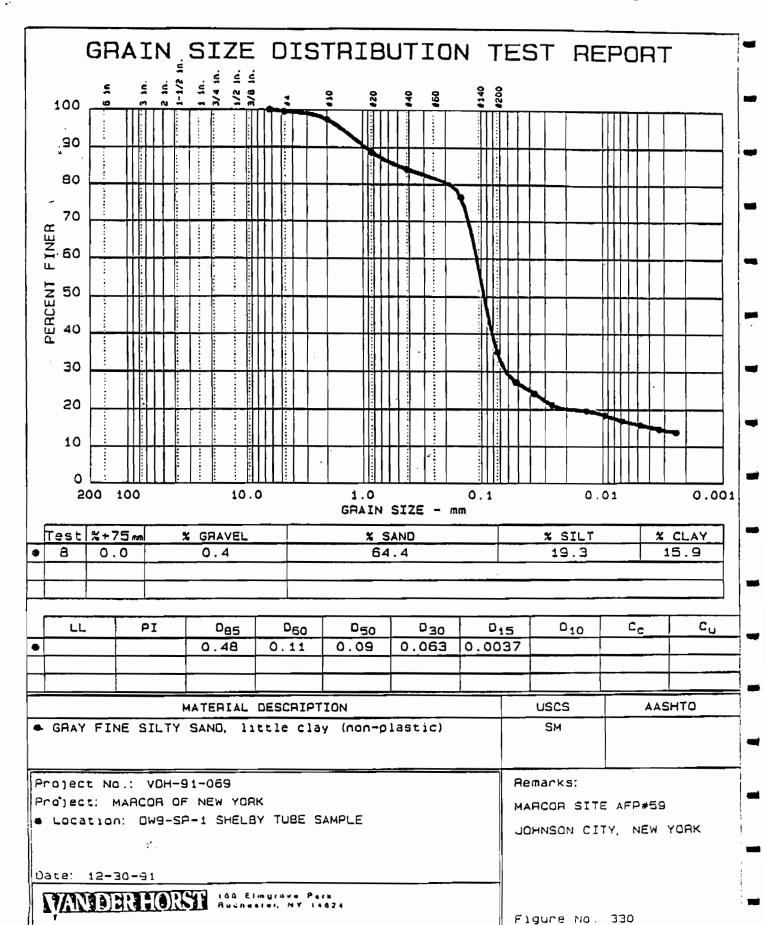
Notes: 1) This sample did not include a hydrometer analysis; the percentage of silt includes both the silt and clay size particles.

SUMMARY OF TESTS FROM JAR SAMPLES

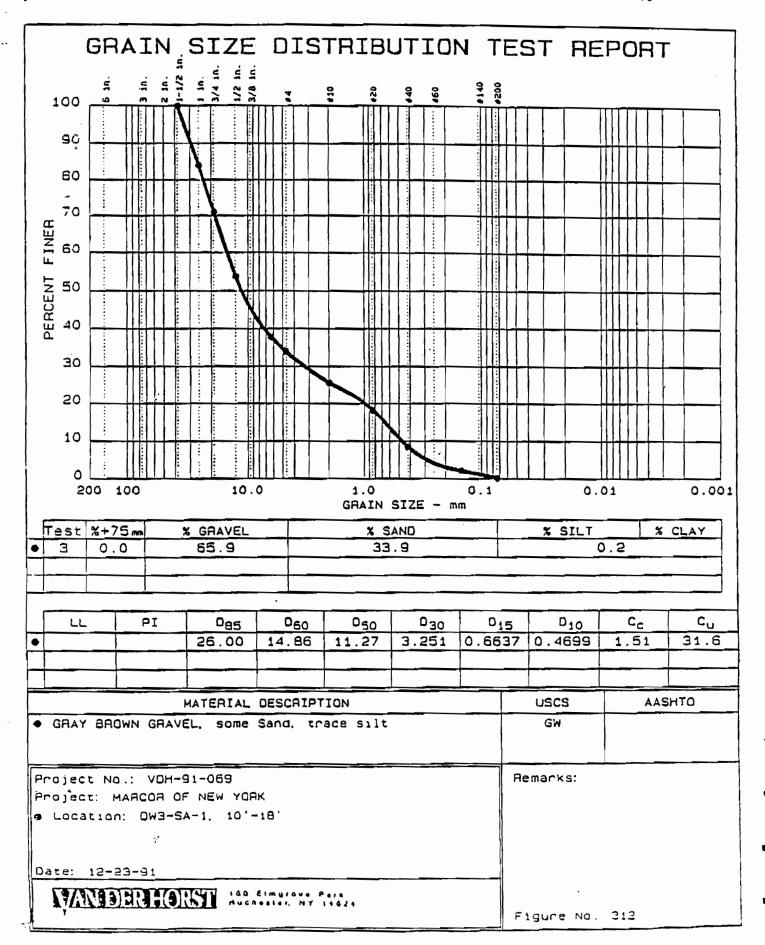
SUMMARI OF TE	SIS FROM U.		
SAMPLE I.D.	% GRAVEL	% SAND	% FINES
DW8-SA-1 (LAB 310)	0.1	24.9	75.0
DW8-8A-2 (LAB 311)	0.0	72.4	27.6
DW3-8A-1 (LAB 312)	65.9	33.9	0.2
DW5-8A-1 (LAB 314)	63.5	36.1	0.4
DW5-8A-2 (LAB 315)	38.2	53.4	8.4
DW9-8A-1 (LAB 328)	55.9	34.6	9.5
IW7-SA-1 (LAB 329)	63.7	30.4	5.9



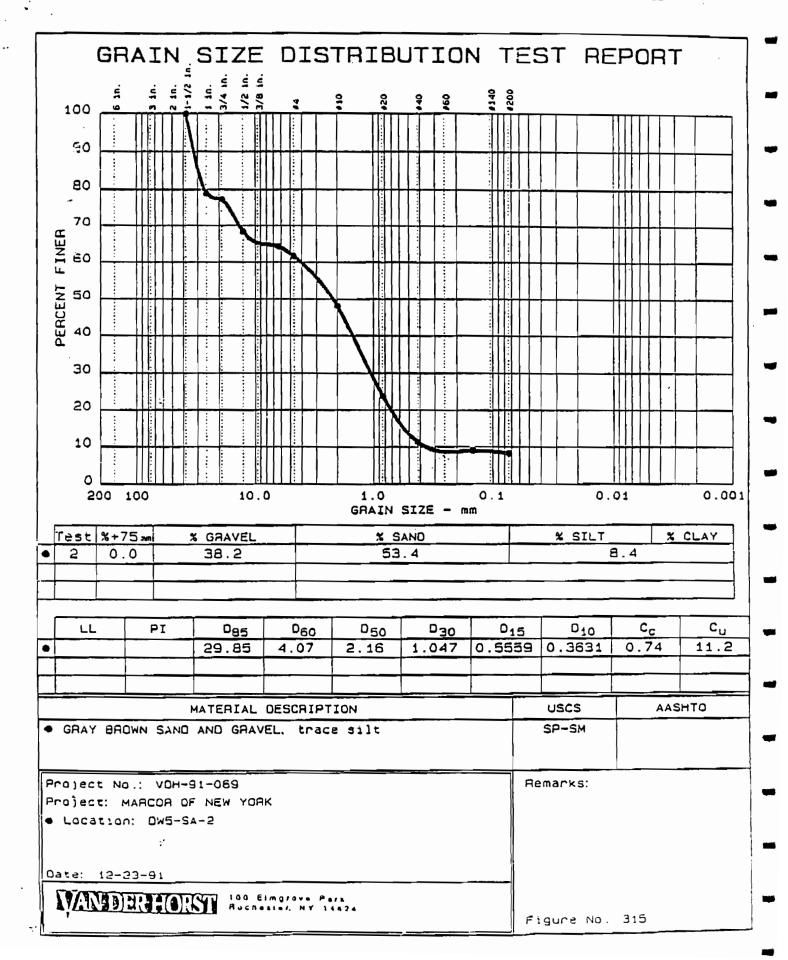




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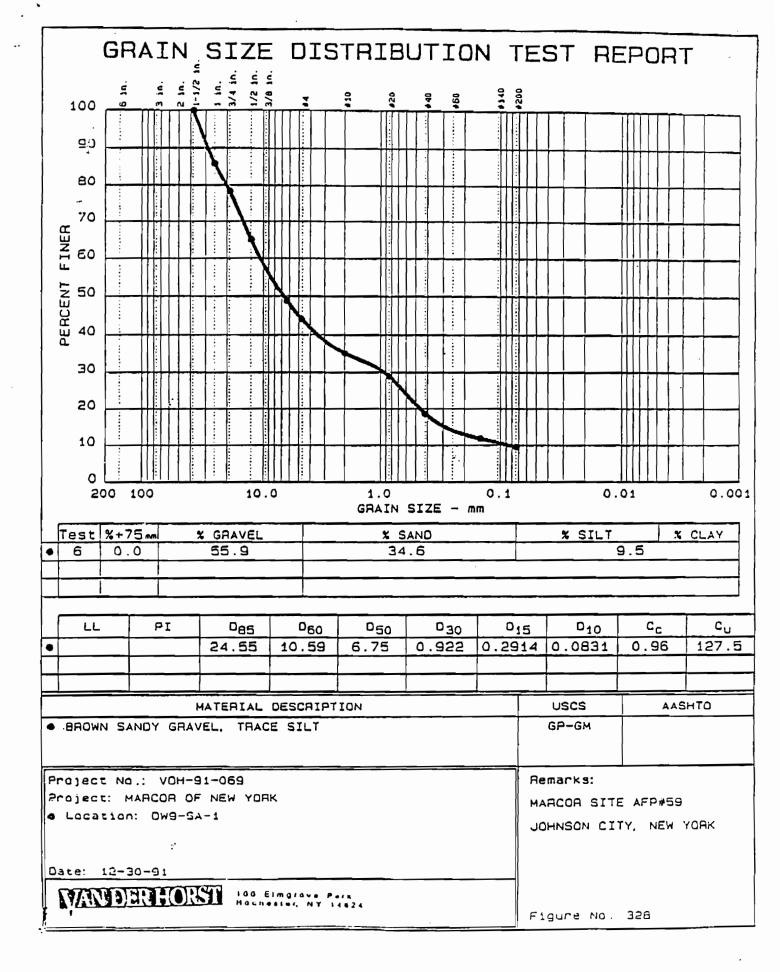
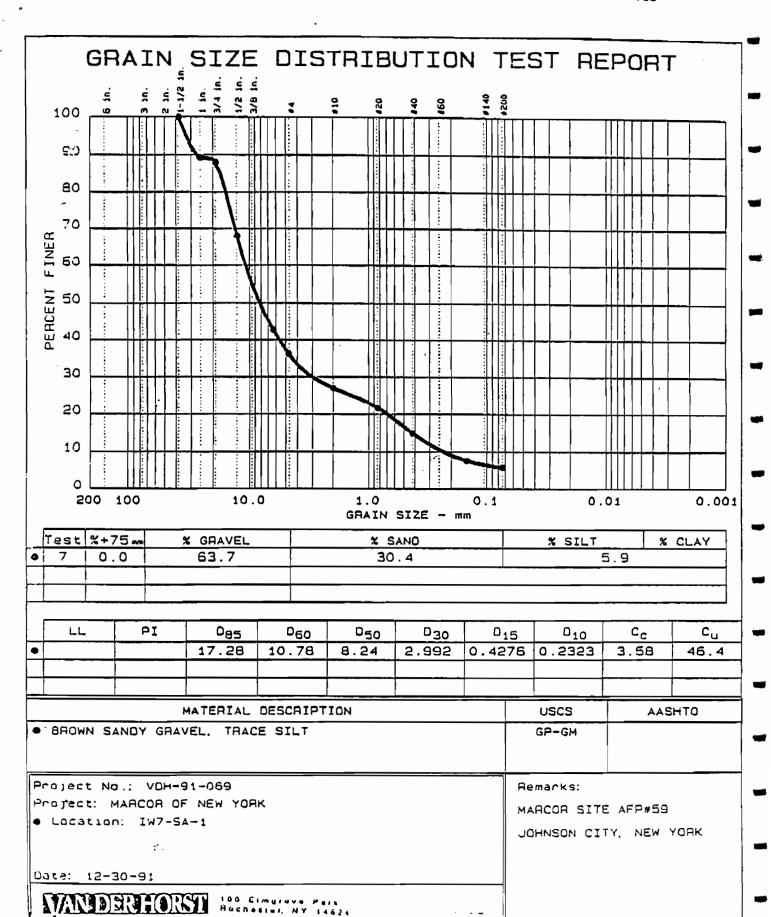


Figure No. 329



## 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-5-12,

ANLA																			
USAF		•		5	ORMATION (BC	ON (B	CHWCI												
				١.	WCM-	-DZO	svo-	SB-		Ę	-T0T	CAS-	CMA-	88	SCR-		SCR-		
AFIID				\	SOD8	CODE	сорв г	DBFTH	FFL	BLEV DEPTH	BETH	DIVM	CODE	DEFTH	LENGTH	SOLIA	DIAM	PCTOPEN	REMARKS
AFP#5					GS	3	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 D	DW3 @	08-Nov-91 USAF	USAF	MNW	GS	ပ	BTNY	64.5	23.5	829.04	88.0	4.0	PVC	67.5	20.0	0.01	4.0	~ 8.0%	12' FOOTER
AFP#59 D	DW4 2	25-Nov-91	USAF	MNW	GS	S	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 D	DWS 1	19-Nov-91	USAF	MNW	GS	S	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 D	DW6	16-voN-91	USAF	MNW	GS	₹	BTNY	53.5	13.0	828.51	66.5	4.0	PVC	\$6.5	10.0	0.01	4.0	~ 8.0%	NO WELL FOOTER
AFP#59 D	DW8 0	03-Nov-91 USAF	USAF	MNW	GS	ပ	BTNY	70.5	22.5	829.70	93.0	4.0	PVC	72.5	20.0	0.01	4.0	~ 3.0%	12' FOOTER
AFP#59 D	DW9 0	09-Dec-91 USAF	USAF	MNM	GS	S	BTNY	64.5	23.5	831.31	88.0	4.0	PVC	67.5	20.0	0.01	4.0	~ 8.0%	12' FOOTER
AFP#59 S	SW4 0	02-Dec-91 USAF	USAF	MNM	GS	3	BTNY	11.5	17.5	828.85	29.0	2.0	PVC	13.5	15.0	0.01	2.0	~ 8.0%	12' FOOTER
AFP#59 S	SWS 2	20-Nov-91	USAF	MNM	GS	3	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 S	SW6 1	17-Nov-91	USAF	MNW	S	3	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 S	SW7 0	06-Dec-91	USAF	MNM	GS	3	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 S	SW8 0	04-Nov-91	USAF	MNM	GS	3	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 S	SW9	10-Dec-91	USAF	MNM	GS	3	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 I	IW9	10-Dec-91 USAF	USAF	OBS	GS	١	BTNY	43.0	8.0	831.52	51.0	2.0	PVC	46.0	5.0	10.0	2.0	~ 8.0%	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 S	#59 IR	RP SI									
USAF IR	PIMS D	USAF IRPIMS DW1 GROUNDWATER LEVEL DAT	WATER LEVE	L DATA (B	А (ВСНGWD)						
AFIID	AFIID LOCID	LOGDATE	LOGCODELOGI		STATDEP	MESTATDEP PRODRATE PUMPDEP	PUMPDEP	DEPWAT	RECTIME	RECTIME SOUNDING	REMARKS
AFP#59	DW1	22-Nov-91	Hydro-Terra	1030	19.84	1	1	1		64.24	@ Installation
AFP#59	DW1	26-Nov-91	Hydro-Terra	1045	22.80	1	1	1	1	64.24	Check
AFP#59	DW1	12-Dec-91	Hydro-Terra	745	20.66	!	1		l   	64.24	Start Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	800	i	0.9	0.09	27.00	1	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	805	1	6.0	0.09	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		0.9	0.09	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	0.09	28.22	1	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	835	   	6.0	0.09	28.34	1	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	840	1	6.0	0.09	28.38		64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	845		6.0	0.09	28.45	1	64.24	Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	850		6.0	0.09	28.43		64.24	End Well Development
AFP#59	DW1	12-Dec-91	Hydro-Terra	855	1 1	`·! !	1	20.68	5.0	64.24	Recovery
AFP#59	DW1	02-Jan-92	Hydro-Terra	1513	20.26	1   	i 1 1		1	64.24	@ 1st Sampling
AFP#59	DW1	02-Jan-92	Hydro-Terra	1548	1	5.0	57.5	23.68	1	64.24	End Purge
AFP#59	DW1	02-Jan-92	Hydro-Terra	1553	1	1	1	20.26	5.0	64.24	Recovery
AFP#59	DW1	11-Jan-92	Hydro-Terra	1218	20.29	1	1		!	64.24	@ Slug Test
AFP#59	DW1	31-Jan-92	Hydro-Terra	1345	20.42	1				64.24	@ 2nd Sampling
AFP#59	DW1		31-Jan-92 Hydro-Terra	1410	1	0.9	57.5		1	64.24	End Purge
AFP#59	DW1		31-Jan-92 Hydro-Terra	1415	i !	1	 	20.40	5.0	64.24	Recovery

Appendix C-5-B:

IRPIMS BCHGWD

**Groundwater Information** 

ANL AFP#59 IRP SI	P#59 IR	₽ SI									
USAF IF	PIMS D	W3 GROUND	USAF IRPIMS DW3 GROUNDWATER LEVEL DAT	L DATA (B	A (BCHGWD)						
AFIID	AFIID LOCID	LOGDATE	LOGCODE LOGT	овти	STATDEP	IMESTATDEP PRODRATE PUMPDEP DEPWAT RECTIME SOUNDING	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	DW3	08-Nov-91	Hydro-Terra	1600	19.07	-	1			87.62	@ Installation
AFP#59	DWÿ	26-Nov-91	Hydro-Terra	1050	18.70	1	1	1	1	87.62	Check
AFP#59	DW3	11-Dec-91	Hydro-Terra	1112	15.29	1	! ! !	1	1	87.62	Start Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1117		7.9	88	15.92	1	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1127		7.9	88	16.04		87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1132		7.9	88	16.04	1	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1137	1	7.9	88	16.06		87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1142		7.9	88	15.41	1	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1145	1	7.9	88	1	1	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1147	1	7.9	88	15.92	1	87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1152		7.9	88	16.00		87.62	Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1157	1	7.9	85	16.02	1	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	1	87.62	End Well Development
AFP#59	DW3	11-Dec-91	Hydro-Terra	1212	1	1	     	15.35	5.0	87.62	Recovery
AFP#59	DW3	07-Jan-92	Hydro-Terra	830	15.19	1	   			87.62	@ 1st Sampling
AFP#59	DW3	07-Jan-92	Hydro-Terra	906	1	0.9	80	16.58	1	87.62	End Purge
AFP#59	DW3	07-Jan-92	Hydro-Terra	911	1	1	1	15.19	5.0	87.62	Recovery
AFP#59	DW3	07-Jan-92	Hydro-Terra	835	15.28	1	1	 	     	87.62	@ Slug Test
AFP#59	DW3	02-Feb-92	Hydro-Terra	910	15.48	 		1	1	87.62	@ 2nd Sampling
AFP#59	DW3		02-Feb-92 Hydro-Terra	945	!!	0.9	80		1	87.62	End Purge
AFP#59	bw3		02-Feb-92 Hydro-Terra	950		1 - 1	1	15.48	5.0	87.62	Recovery

REMARKS Check @ Installation Well Development Well Development Well Development Well Development 34.73 Start Well Development **Nell Development** Well Development Well Development Well Development Well Development Well Development Well Development Well Development @ 1st Sampling End Purge Well Development Well Development Well Development Well Development End Well Development Recovery Recovery @Slug Test 2nd Sampling End Purge Recovery **@** 84.73 84.73 84.73 LOGCODE LOGTIME STATDEP PRODRATE PUMPDEP DEPWAT RECTIME SOUNDING 84.73 5.0 5.0 5.0 1 | 27.14 28.79 30.43 27.62 30.74 1 - | 23.96 29.33 30.60 30.84 31.04 31.58 31.72 31.71 31.93 32.03 31.99 32.04 16.07 17.95 14.64 14.74 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 85.0 ! ! 1 1 6.0 5.0 6.0 6.0 6.0 6.0 6.0 6.0 5.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 5.0 6.0 1 1 1 | | 18.70 USAF IRPIMS DW4 GROUNDWATER LEVEL DATA (BCHGWD) 19.50 14.74 15.34 14.64 1 ! 1 1 14.61 1 | 335 1015 1105 1315 1255 330 1800 1100 955 000 1005 1010 1015 1025 1035 040 1045 1050 1055 100 1105 1110 1115 1120 1100 950 020 80 25-Nov-91 Hydro-Terra 26-Nov-91 Hydro-Terra 12-Dec-91 Hydro-Terra Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra 08-Jan-92 Hydro-Terra 08-Jan-92 Hydro-Terra 08-Jan-92 Hydro-Terra 12-Jan-92 Hydro-Terra 29-Jan-92 Hydro-Terra 29-Jan-92 Hydro-Terra 29-Jan-92 Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra 12-Dec-91 Hydro-Terra LOGDATE 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 ANL AFP#59 IRP SI DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 AFIID LOCID DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 DW4 AFP#59

ANL AFP#59 IRP SI	#59 IR	IP SI									
USAF IR	PIMS D	WS GROUND	USAF IRPIMS DW5 GROUNDWATER LEVEL DAT	⋖	(вснамр)						
AFIID	LOCID	LOGDATE	LOGCODELOGI	_	STATDEP	MESTATDEP PRODRATE PUMPDEP	PUMPDEP	DEPWAT	RECTIME	DEPWAT RECTIME SOUNDING	REMARKS
	DW5	19-Nov-91	Hydro-Terra	1530	25.26			1 1	1	82.73	@ Installation
AFP#59	DWS	26-Nov-91	Hydro-Terra	1110	24.66				-	82.73	Check
AFP#59	DW5	11-Dec-91	Hydro-Terra	1610	22.33			1	1	82.73	82.73 Start Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1619	     	7.1	81.0	24.05	1	82.73	Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1625		7.1	81.0	24.12	1	82.73	Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1630	1	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	1	82.73	Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1640		7.1	81.0	24.30	1	82.73	Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1645		7.1	81.0	24.38	1 1	82.73	Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1650	1	7.1	81.0	24.46	1	82.73	Well Development
AFP#59	DWS	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	1	82.73	Well Development
AFP#59	DWS	11-Dec-91	Hydro-Terra	1705	1	7.1	81.0	24.55		82.73	Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1710	1	7.1	81.0	24.60	   	82.73	Well Development
AFP#59	DWS	11-Dec-91	Hydro-Terra	1714	1	7.1	81.0	24.60	1 1 1	82.73	Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1720	1	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	1	82.73	Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1730	1	7.1	81.0	24.69		82.73	End Well Development
AFP#59	DW5	11-Dec-91	Hydro-Terra	1735	1	1	l     	22.90	5.0	82.73	Recovery
AFP#59	DWS	07-Jan-92	Hydro-Terra	1455	22.60	1	 	1	1	82.73	@ 1st Sampling
AFP#59	DW5	07-Jan-92	Hydro-Terra	1525	1 1 1	5.0	76.0	23.63		82.73	End Purge
AFP#59	DW5	07-Jan-92	Hydro-Terra	1530	1	1		22.60	5.0	82.73	Recovery
AFP#59	DW5	11-Jan-92	Hydro-Terra	1600	22.56	1	   		! !	82.73	@Slug Test
AFP#59	DW5	31-Jan-92	Hydro-Terra	840	22.66		1	1	!	82.73	@ 2nd Sampling
AFP#59	DWS	31-Jan-92	Hydro-Terra	915	1 1	5.0	76.0		1	82.73	End Purge
AFP#59	DW5	31-Jan-92	Hydro-Terra	920	1	!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!	1	22.66	5.0	82.73	<b>Весо</b> ину

USAF IRPIMS DW6 GROUNDWATER LEVEL	2										
AFIID LO	LOCID	LOGDATE	LOGCODE	Š	TATDEP	GTIMESTATDEP PRODRATE PUMPDEP DEPWAT RECTIME SOUNDING	UMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59 D	DW6	16-Nov-91	Hydro-Terra	1400	21.00	1 -	1	-	i	90.99	@ Installation
AFP#59 D	DW6	11-Dec-91	Hydro-Terra	1355	14.81		1	1	1	90.99	Start Well Development
AFP#59 C	DW6	11-Dec-91	Hydro-Terra	1400	1	7.4	64.0	64.00	1	90.99	Well Development
AFP#59 C	DW6	11-Dec-91	Hydro-Terra	1406	1	7.4	64.0	55.00		90.99	End Well Development
AFP#59 C	DW6	11~Dec-91	Hydro-Terra	1424		1	1	38.00	18.0	90.99	Recovery
AFP#59 C	DW6	12-Dec-91	Hydro-Terra	1510	14.92	1	1	1	1	90.99	Start Well Development
AFP#59 C	DW6	12-Dec-91	Hydro-Terra	1525	1	1.5	64.0	39.37		90.99	Well Development
AFP#59 C	DW6	12-Dec-91	Hydro-Terra	1545	1	1.5	64.0	53.00		90'99	Well Development
AFP#59 C	DW6	12~Dec-91	Hydro-Terra	1556		1.5	64.0	64.00	1	90.99	End Well Development
AFP#59 C	DW6	12-Dec-91	Hydro-Terra	1611	1	1	1	41.30	15.0	90'99	Recovery
AFP#59 C	DW6	13-Dec-91	Hydro-Terra	705	14.80	 		 	i j l	90.99	Start Well Development
AFP#59 C	DW6	13-Dec-91	Hydro-Terra	710	1	1.5	64.0	26.60	!	90.99	Well Development
AFP#59 C	DW6	13-Dec-91	Hydro-Terra	715	1	1.5	64.0	35.14		90'99	Well Development
AFP#59 C	DW6	13-Dec-91	Hydro-Terra	720	1	1.5	64.0	42.67		90'99	Well Development
AFP#59 [	DW6	13-Dec-91	Hydro-Terra	725	1	1.5	64.0	48.71	1	90'99	Well Development
AFP#59 [	DW6	13-Dec-91	Hydro-Terra	730	1	1.5	64.0	54.50		90.99	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	735	1	1.5	64.0	64.00		90.99	Well Development
AFP#59 [	DW6	13Dec-91	Hydro-Terra	740	1	1.5	64.0	64.00		90.99	Well Development
AFP#59	DW6	13-Dec-91	Hydro-Terra	745		1.5	64.0	64.00		90.99	Well Development
AFP#59 [	DW6	13-Dec-91	Hydro-Terra	750	1	1.5	64.0	64.00		90.99	End Well Development
AFP#59 [	DW6	13-Dec-91	Hydro-Terra	755	1	1	1	45.52	5.0	90'99	Recovery
AFP#59 [	DW6	06-Jan-92	Hydro-Terra	1035	14.66	1	1		1	90'99	@ 1st Sampling
AFP#59 [	DW6	06-Jan-92	Hydro-Terra	1120		0.75	29.0	29.00	1	90.99	End Purge
AFP#59	DW6	06-Jan-92	Hydro-Terra	1125	I	1	1	38.71	5.0	90.99	Recovery
AFP#59 [	DW6	12-Jan-92	12-Jan-92 Hydro-Terra	1530	14.84	1	1	!!!	!	90.99	@Slug Test
AFP#59	DW6	01-Jan-92	Hydro-Terra	845	15.08	     	1	1	1	90.99	@ 2nd Sampling
AFP#59	DW6	01-Jan-92	Hydro-Terra	915		1.0	29.0	29.00		90.99	End Purge
AFP#59	DW6		01-Jan-92 Hydro-Terra	920	1		     	29.96	2.0	90.99	Recovery

REMARKS Check Well Development @ 1st Sampling End Purge Well Development Well Development Well Development Well Development Well Development 92.50 End Well Development 92.50 Start Well Developmen Well Development Well Development Well Development Well Development Well Development Recovery Recovery @Slug Test 2nd Sampling End Purge Recovery @ Installation (0) 92.50 92.50 92.50 92.50 92.50 92.50 92.50 92.50 92.50 92.50 92.50 92.50 92.50 LOGCODE LOGTIME STATDEP PRODRATE PUMPDEP DEPWAT RECTIME SOUNDING 92.50 92.50 92.50 92.50 92.50 92.50 92.50 92.50 5.0 1 1 5.0 5.0 | 1 ! 1 | 1 25.46 25.60 25.80 25.89 27.14 25.87 26.64 26.84 27.03 15.67 15.30 15.86 1 24.81 26.64 26.77 18.51 1 1 90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0 90.0 85.0 85.0 85.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.0 6.00 1 1 6.0 1 ! ļ 1 15.86 18.37 17.92 15.30 15.60 15.37 USAF IRPIMS DW8 GROUNDWATER LEVEL DATA (BCHGWD) 1 ! 1 ! 855 905 910 915 945 1315 1450 1125 850 900 920 925 930 935 940 950 1025 1100 1105 1310 844 1520 1230 Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra 30-Jan-92 Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra 13-Jan-92 30-Jan-92 LOGDATE 09-Jan-92 09-Jan-92 30-Jan-92 03-Nov-91 26-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 13-Dec-91 09-Jan-92 ANL AFP#59 IRP SI DW8 LOCID AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 **AFP#59** AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFIID AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59

ANL AFP#59 IRP SI	#59 IR	IP SI									
USAF IR	PIMS D	W9 GROUND	USAF IRPIMS DW9 GROUNDWATER LEVEL DATA (BCHGWD)	L DATA (E	CHGWD)						
AFIID	AFIID LOCID	LOGDATE	LOGCODELOGI		STATDEP	MESTATDEP PRODRATE PUMPDEP DEPWAT RECTIME SOUNDING	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	6MQ		09-Dec-91 Hydro-Terra	1845	14.90	-	-			90.51	@ Installation
AFP#59	DWÿ	12-Dec-91	Hydro-Terra	1325	17.28	1	1	1	1	90.51	90.51 Start Well Development
AFP#59	6MQ	12~Dec-91	Hydro-Terra	1330		7.5	85.0	18.48	1	90.51	Well Development
AFP#59	6МО		12-Dec-91 Hydro-Terra	1335	     	7.5	85.0	18.42	1	90.51	Well Development
AFP#59	6MQ	12-Dec-91	Hydro-Terra	1340	1	7.5	85.0	18.43		90.51	Well Development
AFP#59	6MQ	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	6MQ	12-Dec-91	Hydro-Terra	1355		7.5	85.0	18.43		90.51	Well Development
AFP#59	6MQ	12-Dec-91	Hydro-Terra	1400	-	7.5	85.0	18.39	1	90.51	Well Development
AFP#59	6MQ	12-Dec-91	Hydro-Terra	1405	1	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	1	1	1	17.36	5.0	90.51	Recovery
AFP#59	6MO	07-Jan-92	Hydro-Terra	1400	17.41	1		l l		90.51	@ 1st Sampling
AFP#59	6MQ	07-Jan-92	Hydro-Terra	1435	1	6.0	82.0	18.39		90.51	End Purge
AFP#59	DW9	07-Jan-92	Hydro-Terra	1440	1	!	82.0	17.41	5.0	90.51	Recovery
AFP#59	6MQ	12-Jan-92	Hydro-Terra	1000	17.56	1	l l			90.51	@Slug Test
AFP#59	6MQ	03-Feb-92	Hydro-Terra	830	17.86	1	1	1		90.51	@ 2nd Sampling
AFP#59	6MQ	03-Feb-92	03-Feb-92 Hydro-Terra	905	1	6.0	82.0		1	90.51	End Purge
AFP#59	DW9	03-Feb-92	03-Feb-92 Hydro-Terra	910	1		1	17.86	5.0	90.51	Recovery

ANL AFP#59 IRP SI	P#59 IF	₹P SI									
USAF IF	PIMS S	W1 GROUND	USAF IRPIMS SW1 GROUNDWATER LEVEL DATA (BCHGWD)	L DATA (B	снамр)						
AFIID	AFIID LOCID	LOGDATE	LOGDATE LOGCODE LOG	LOGTIME	STATDEP	TIMESTATDEP PRODRATE PUMPDEP DEPWAT RECTIME SOUNDING	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW1		26-Nov-91 Hydro-Terra	1140	22.81		1		1	29.65	Check
AFP#59	SWi	07-Jan-92	07-Jan-92 Hydro-Terra	1643		1	 	1	1	29.65	@ 1st Sampling
AFP#59	SW1	07-Jan-92	07-Jan-92 Hydro-Terra	1718	1	2.0	22.5	1	1	29.65	End Purge
AFP#59	SW1		07-Jan-92 Hydro-Terra	1723	1	 	1 1 1 1		5.0	29.65	Recovery
AFP#59	SW1		13-Jan-92 Hydro-Terra	1208	20.23	1		1	1	29.65	@Slug Test
AFP#59	SW1	31-Jan-92	31-Jan-92 Hydro-Terra	1505	20.36	1	1		1	29.65	@ 2nd Sampling
AFP#59	SW1	31-Jan-92	31-Jan-92 Hydro-Terra	1530		0.3	26.0		1	29.65	End Purge
AFP#59	SW1	31-Jan-92	31-Jan-92 Hydro-Terra	1535	1	1 1	!	20.36	5.0	29.65	Recovery

ANL AFP#59 IRP SI	#59 IR	P SI									
USAF IR	S SMIc	W3 GROUND	USAF IRPIMS SW3 GROUNDWATER LEVEL DATA (BCHGWD)	DATA (B	снамр)						
AFIID LOCID	OCID.	LOGDATE	LOGDATE LOGCODE LOGTI	OGTIME	STATDEP	MESTATDEP PRODRATE PUMPDEP DEPWAT RECTIME SOUNDING	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW3	26-Nov-91 Hydro-Terra	Hydro-Terra	1150	20.87	<u> </u>		1		30.51	Check
AFP#59	SW3		07-Dec-91 Hydro-Terra	1035	17.40	 		1	     	30.51	@ 1st Sampling
AFP#59	SW3	07-Dec-91 Hydro-Terra	Hydro-Terra	1048	1	3.5	28.5	18.71	1	30.51	End Purge
AFP#59	SW3	07-Dec-91 Hydro-Terra	Hydro-Terra	1053		1	1	17.40	5.0	30.51	Recovery
AFP#59	SW3	13-Jan-92 Hydro-Terra	Hydro-Terra	910	17.51	1	   	! !	   	30.51	@Slug Test
AFP#59	SW3	02-Feb-92 Hydro-Terra	Hydro-Terra	1035	17.68	1		1		30.51	@ 2nd Sampling
AFP#59	SW3	SW3 02-Feb-92 Hydro-Terra	Hydro-Terra	1050		3.0	28.5	1	1	30.51	End Purge
AFP#59	SW3	SW3 02-Feb-92 Hydro-Terra	Hydro-Terra	1055		-  -  -	1	17.68	5.0	30.51	Recovery

REMARKS End Purge @ Installation Well Development Well Development @ 1st Sampling End Purge Start Well Development Well Development Well Development Well Development Well Development Well Development Well Development **End Well Development** Recovery Well Development Recovery Recovery @Slug Test @ 2nd Sampling 28.57 28.57 28.57 28.57 28.57 28.57 28.57 28.57 28.57 28.57 28.57 28.57 LOGCODE LOGTIMESTATDEP PRODRATE PUMPDEP DEPWAT RECTIMES OUNDING 28.57 28.57 28.57 28.57 28.57 28.57 28.57 28.57 5.0 5.0 5.0 1 | 1 1 26.00 26.00 23.35 23.95 23.37 26.00 26.00 26.00 26.00 26.00 19.78 24.40 18.48 17.98 5.63 1 26.0 26.0 26.0 26.0 26.0 26.0 26.0 26.0 26.0 26.0 26.0 26.0 1 1-1 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.30 0.3 1 | ļ 18.38 14.69 14.76 14.67 1 1 USAF IRPIMS SW4 GROUNDWATER LEVEL DATA (BCHGWD) 15.31 ! 1210 1215 1240 1400 1505 1200 1140 1145 1150 1155 1200 1205 1220 1225 1230 1205 1235 1430 1500 1134 29-Jan-92 Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra 29--Jan-92 Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra Hydro-Terra LOGDATE 08~Jan-92 08-Jan-92 13-Jan-92 29~Jan-92 08-Jan-92 02-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91 12-Dec-91  $\overline{S}$ ANL AFP#59 IRP SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 SW4 LOCID SW4 SW4 AFP#59 AFIID

ANL AFP#59 IRP SI	#59 IF	IS d≵									
USAF IR	PIMS S	WS GROUND	USAF IRPIMS SW5 GROUNDWATER LEVEL DATA	_	(вснамр)						
AFIID	LOCID	LOGDATE	AFIID LOCID LOGDATE LOGCODE LOGTIME STATDEP PRODRATE PUMPDEP DEPWAT RECTIME SOUNDING REMARKS	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59		20-Nov-91	SW5 20-Nov-91 Hydro-Terra	1100	25.40			-		30.10	30.10 @ Installation
AFP#59	SW5		26-Nov-91 Hydro-Terra	1155	24.90	1	1	.   	1	30.10 Check	Check
AFP#59	SW5		24-Nov-91 Hydro-Terra	1100	25.22	1	†     	1	1 1	30.10	30.10 Start Well Development - Bailing
AFP#59	SW5		24-Nov-91 Hydro-Terra	1130	1	0.16	28.5	25.28		30.10	30.10 Well Development - Bailing
AFP#59	SW5		24-Nov-91 Hydro-Terra	1200	l	0.16	28.5	26.35	1	30.10	30.10 End Well Development - Bailing
AFP#59	SW5		11-Dec-91 Hydro-Terra	1545	22.15	1 1		1		30.10	30.10 Start Well Development - Pump
AFP#59	SW5		11-Dec-91 Hydro-Terra	1546	1	0.25	28.5	28.50		30.10	30.10 End Well Development - Pump
AFP#59	SWS		07-Jan-92 Hydro-Terra	1640	22.50		1	1		30.10	30.10 @ 1st Sampling
AFP#59		SW5 07-Jan-92 Hydro-Terra	Hydro-Terra	1648	1	0.3	28.5	29.50		30.10	30.10 End Purge
AFP#59	SW5		07-Jan-92 Hydro-Terra	1653	-	1	1	23.45	5.0	30.10	30.10 Recovery
AFP#59	SW5		12-Jan-92 Hydro-Terra	800	22.42	1	1	1	!	30.10	30.10 @Slug Test
AFP#59	SW5		31-Jan-92 Hydro-Terra	1015	22.50		1	1	1	30.10	30.10 @ 2nd Sampling
AFP#59	SW5		31-Jan-92 Hydro-Terra	1025	   	0.3	28.5	28.50	1	30.10	30.10 End Purge
AFP#59	SW5	31-Jan-92	31-Jan-92 Hydro-Terra	1030		1	1	23.00	5.0	30.10	30.10 Recovery

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28.54 Start Well Development - Bailing 28.54 End Well Development - Bailing 28.54 Well Development - Bailing 28.54 @ 2nd Sampling 28.54 @ 1st Sampling 28.54 @ Installation LOGCODE LOGTIME STATDEP PRODRATE PUMP DEP DEPWAT RECTIME SOUNDING REMARKS 28.54 @Slug Test 28.54 End Purge 28.54 End Purge 28.54 Recovery 28.54 Recovery 28.54 Check 5.0 124.0 ! 1 20.65 15.29 20.68 16.64 15.07 1 1 i 27.0 27.0 27.0 27.0 1 1 | 3.8 3.8 1 | 0.20 0.20 -| 17.88 17.38 15.07 15.08 15.22 ---USAF IRPIMS SW6 GROUNDWATER LEVEL DATA (BCHGWD) 20.60 1 1 | 8 1020 1045 1330 1245 1250 1825 1010 1025 82 1200 000 12-Jan-92 Hydro-Terra 01-Feb-92 Hydro-Terra 01-Feb-92 Hydro-Terra 01-Feb-92 Hydro-Terra 17-Nov-91 Hydro-Terra 26-Nov-91 Hydro-Terra 23-Nov-91 Hydro-Terra 23-Nov-91 Hydro-Terra 06-Jan-92 Hydro-Terra 06-Jan-92 Hydro-Terra 06-Jan-92 Hydro-Terra 23-Nov-91 Hydro-Terra LOGDATE ANL AFP#59 IRP SI SW6 SW6 SW6 LOCID SW6 SW6 SW6 SW6 SW6 SW6 SW6 SW6 SW6 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFP#59 AFIID AFP#59

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ANL AFP#59 IRP SI	#59 IF	lb SI									
USAF IR	PIMS S	W7 GROUND	USAF IRPIMS SW7 GROUNDWATER LEVEL DATA (BCHGWD)	DATA (B	CHGWD)						
AFIID	COCID	LOGDATE	AFIID LOCID LOGDATE LOGCODE LOGTIME STATDEP PRODRATE PUMP DEP DEPWAT RECTIME SOUNDING REMARKS	OGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59	SW7		06-Dec-91 Hydro-Terra	1000	15.80	1		1		29.51	29.51 @ Installation
AFP#59	SW7.	13-Dec-91	SW7. 13-Dec-91 Hydro-Terra	1545	15.68	1	1	1	1	29.51	29.51 Start Well Development - Bailing
AFP#59	SW7	13-Dec-91	SW7 13-Dec-91 Hydro-Terra	1553	1	0.25	27.0	15.68		29.51	29.51 Well Development - Bailing
AFP#59	SW7	13-Dec-91	SW7 13-Dec-91 Hydro-Terra	1605	!	0.25	27.0	15.70	1	29.51	29.51 Well Development - Bailing
AFP#59	SW7	13-Dec-91	13-Dec-91 Hydro-Terra	1625	-	0.25	27.0	15.70		29.51	29.51 End Well Development - Bailing
AFP#59	SW7		08-Jan-92 Hydro-Terra	1350	18.23	1		1	1	29.51	29.51 @ 1st Sampling
AFP#59	SW7		08-Jan-92 Hydro-Terra	1405		2.5	27.0	20.74		29.51	29.51 End Purge
AFP#59	SW7		08-Jan-92 Hydro-Terra	1410	1	!	1	18.23	5.0	29.51	29.51 Recovery
AFP#59	SW7		13-Jan-92 Hydro-Terra	1210	18.36	1	-	1	1	29.51	29.51 @Slug Test
AFP#59	SW7		30-Jan-92 Hydro-Terra	955	18.32		!		1	29.51	29.51 @ 2nd Sampling
AFP#59	SW7		30-Jan-92 Hydro-Terra	1010	1	2.5	27.0	1		29.51	29.51 End Purge
AFP#59	SW7	30-Jan-92	30-Jan-92 Hydro-Terra	1015	I I I	]       	1	18.32	5.0	29.51	29.51 Recovery

ANL AFP#59 IRP SI	#59 IR	P SI									
USAF IR	PIMS S	W8 GROUND	USAF IRPIMS SW8 GROUNDWATER LEVEL DATA (BCHGWD)	L DATA (B	CHGWD)						
AFIID	COCID	LOGDATE	AFIID LOCID LOGDATE LOGCODE LOGTIME STATDEP PRODRATE PUMPDEP DEPWAT RECTIME SOUNDING REMARKS	LOGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDINGR	EMARKS
AFP#59	SW8	04-Nov-91	04-Nov-91 Hydro-Terra	830	13.06	1		1 -	1	22.65 @	22.65 @ Installation
AFP#59	SW8	26-Nov-91	Hydro-Terra	1205	12.65	1		1	] 	22.65 Check	heck
AFP#59	SW8	23-Nov-91	SW8 23-Nov-91 Hydro-Terra	1215	12.52	0.16		1	1	22.65 St	22.65 Start Well Development - Bailing
AFP#59	SW8	23-Nov-91	23-Nov-91 Hydro-Terra	1245	1	0.16	21.0	12.60	i !	22.65 W	22.65 Well Development - Bailing
AFP#59	SW8	- 1	23-Nov-91 Hydro-Terra	1315	1	0.16	21.0	12.60	1	22.65 Er	22.65 End Well Development - Bailing
AFP#59	SW8	09-Jan-92	09-Jan-92 Hydro-Terra	1235	12.91	     			1	22.65 @	22.65 @ 1st Sampling
AFP#59	SW8	09-Jan-92	09-Jan-92 Hydro-Terra	1250	 	0.8	21.0	14.83	!	22.65 Er	22.65 End Purge
AFP#59	SW8		09-Jan-92 Hydro-Terra	1255	 			12.91	5.0	22.65 Recovery	ecovery
AFP#59	SW8	13-Jan-92	13-Jan-92 Hydro-Terra	1520	13.03	1		1	1	22.65 @	22.65 @Slug Test
AFP#59	SW8		30-Jan-92 Hydro-Terra	1400	13.05	 	1			22.65 @	22.65 @ 2nd Sampling
AFP#59		30-Jan-92	SW8 30-Jan-92 Hydro-Terra	1415	1	0.8	21.0	1	1	22.65 Er	22.65 End Purge
AFP#59	- 1	30-Jan-92	SW8 30-Jan-92 Hydro-Terra	1420	-			13.08	5.0	22.65 Recovery	эсоvегу

	HGWD)
	USAF IRPIMS SW9 GROUNDWATER LEVEL DATA (BCHGWD)
ANL AFP#59 IRP SI	USAF IRPIMS SW9 GRO

EMARKS	27.58 @ Installation	27.58 Start Well Development - Bailing	27.58 Well Development - Bailing	27.58 Well Development - Bailing	27.58 End Well Development - Bailing	27.58 @ 1st Sampling	27.58 End Purge	27.58 Recovery	27.58 @Slug Test	27.58 @ 2nd Sampling	27.58 End Purge	27.58 Recovery
STATDEP PRODRATE PUMPDEP DEPWAT BECTIME SOUNDING REMARKS	27.58	27.58	27.58 M	27.58 M	27.58 E	27.58	27.58 E	27.58 R	27.58	27.58	27.58 E	27.58 R
RECTIME	-	-	1	1	1	1	   	5.0	     	1	1	5.0
DEPWAT			17.20	17.25	17.25	1	17.99	17.66	1		1	18.10
UMPDEP			25.0	25.0	25.0	1	25.0			 	25.0	
PRODRATE		1	0.25	0.25	0.25	1	3.5		-	1	3.5	
STATDEP	17.00	17.20	   	1	-	17.66	1		17.80	18.10	1	1
OGTIME	1000	1320	1334	1351	1400	1535	1550	1555	1050	955	1010	1015
LOGCODE	Hydro-Terra	Hydro-Terra	Hydro-Terra	Hydro-Terra	Hydro-Terra	Hydro-Terra	07-Jan-92 Hydro-Terra	Hydro-Terra	12-Jan-92 Hydro-Terra	Hydro-Terra	03-Feb-92 Hydro-Terra	Hydro-Terra
AFIID LOCID LOGDATE LOGCODELOGTIME	SW9 10-Dec-91 Hydro-Terra	SW9 13-Dec-91 Hydro-Terra	SW9 13-Dec-91 Hydro-Terra	SW9 13-Dec-91 Hydro-Terra	13-Dec-91 Hydro-Terral	SW9 07-Jan-92 Hydro-Terra	07-Jan-92	07-Jan-92 Hydro-Terra	12-Jan-92	SW9 03-Feb-92 Hydro-Terra	03-Feb-92	SW9 03-Feb-92 Hydro-Terra
OCID	SW9	SWa		SW9	SW9		SW9	SW9	SW9		SW9	1
AFIID	AFP#59	AFP#59	AFP#59	AFP#59	AFP#59	AFP#59	AFP#59	AFP#59	AFP#59	AFP#59	AFP#59	AFP#59

ANL AFP#59 IMP SI USAF IRPIMS IW9 GROUNDWATER LEVEL DATA (BCHGWD)	

200	OMIL	USAF INFINS IN SCHOOL BUILDING (BOILDING	AVIEW LEVEL	טייט (סייט							
AFIID	LOCID	AFIID LOCID LOGDATE LOGCODE LOGTIME STATDEP PRODRATE PUMP DEP DEPWAT RECTIME SOUNDING REMARKS	LOGCODE	OGTIME	STATDEP	PRODRATE	PUMPDEP	DEPWAT	RECTIME	SOUNDING	REMARKS
AFP#59		IW9 13-Dec-91 Hydro-Terra	Hydro-Terra	1405	16.72		1			53.90	53.90 Start Well Development - Bailing
AFP#59		IW9 13-Dec-91 Hydro-Terra	Hydro-Terra	1419		0.20	51.0	23.60	   	53.90	53.90 Well Development - Bailing
AFP#59		IW9 13-Dec-91 Hydro-Terra	Hydro-Terra	1440	1	0.20	51.0	25.47		53.90	53.90 Well Development - Bailing
AFP#59		IW9 13-Dec-91 Hydro-Terra	Hydro-Terra	1510	   	0.20	51.0	31.04	1	53.90	53.90 Well Development - Bailing
AFP#59		IW9 13-Dec-91 Hydro-Terra	Hydro-Terra	1520	1	0.20	51.0	36.30		53.90	53.90 Well Development - Bailing
AFP#59		IW9 13-Dec-91 Hydro-Terra	Hydro-Terra	1530		0.20	51.0	43.96	1	53.90	53.90 End Well Development - Bailing
AFP#59	ſ	IW9 12-Jan-92 Hydro-Terra	Hydro-Terra	1140	17.86	- I		1	-	53.90	53.90 @Slug Test

Appendix C-5-C:

IRPIMS BCHLTD

Lithologic Description

ANL AFP#59 IRP SI USAF IRPIMS LITHOLOGIC DESCRIPTION DATA (BCHLTD) END-LITH-ASTM-STRAT-BEG-LOCID LOGCODE DEPTH DEPTH CODE CODE ORDER LOGDATE AFIID VISDESC AFP#59 DW<sub>1</sub> Hydro - Terra 22-Nov-91 0.0 ASPT 0.3 1 Asobsit 0.3 **GPGM** AFP#59 DW<sub>1</sub> 2.0 **GVLB** Hydro-Terra 22-Nov-91 Fill and Gravel Alluvium, brown and gray AFP#59 DW<sub>1</sub> Hydro-Terra 22-Nov-91 2.0 **GVLB GPGM** 9.0 2 Fine-Grained Alluvium, brown DW<sub>1</sub> 22-Nov-91 9.0 11.5 SDGR SMSP 2 AFP#59 Hydro-Terra Fine-Grained Alluvium, bres 37.5 SDGR SMPS AFP#59 DW<sub>1</sub> Hydro-Terra 22-Nov-91 11.5 3 Glocial Outweats, brown **GPGM** 22-Nov-91 37.5 62.5 SDGR 6 **AFP#59** DW1 Hydro-Terra Coarse-Grained los-Contact Deposits, brown, heaving DW3 0.3 ASPT ---Hydro-Terra 08-Nov-91 0.0 Fill and Gravel Alluvium, brown AFP#59 GP DW3 Hydro-Terra GVLB AFP#59 08-Nov-91 0.3 5.0 FIII and Gravel Alluvium, brown Hydro-Terra 34.5 **GVLB** GW AFP#59 DW3 08-Nov-91 5.0 3 Glecial Outweets, dark brown SMML 08-Nov-91 34.5 37.5 SDSL AFP#59 DW3 Hydro-Terra Fine-Grained los-Contact Deposits, gray 47.5 SDSL SMML Hydro-Terra 37.5 AFP#59 DW3 08-Nov-91 Fine-Grained Ice-Contact Deposits, gray 47.5 51.5 SDGR SP AFP#59 DW3 Hydro - Terra 08-Nov-91 5 Glecial Lake Seds, gray SDSL SM AFP#59 DW3 Hydro-Terra 08-Nov-91 51.5 54.5 5 Glecial Lake Beds, gray DW3 08-Nov-91 54.5 57.5 SDGR SM 5 AFP#59 Hydro-Terra Glegiei Lake Sede, grav SPSM Hydro-Terra 08-Nov-91 57.5 68.5 SDSL DW3 AFP#59 Fine-Grained Ice-Contact Deposits, gray **GVLG** GMGP 08-Nov-91 68.5 88.0 6 AFP#59 DW3 Hydro-Terra Coarse-Grained los-Contact Deposits, gray 25-Nov-91 0.0 0.3 ASPT 1 DW4 Hydro-Terra AFP#59 **GVLB** GP DW4 Hydro -Terra 25-Nov-91 0.3 20 Fill and Gravel Alluvium, yellowish-brown AFP#59 **GPSP** AFP#59 DW4 Hydro - Terra 25-Nov-91 2.0 15.0 **GVLB** Glecial Outwash, brown Hydro-Terra 15.0 37.5 SDSL ML AFP#59 DW4 25-Nov-91 Fine-Grained Ice-Contact Deposits, brown to gray AFP#59 37.5 68.0 SDGR SMSP DW4 Hydro-Terra 25-Nov-91 6 Coarse-Grained Ice-Contact Deposits, brown, heaving SDGR SP DW4 25-Nov-91 68.0 87.5 Coarse-Grained Ice-Contact Deposits, gray, heaving AFP#59 Hydro-Terra SDGR **GMSP** AFP#59 DW4 Hydro - Terra 25-Nov-91 87.5 92.5 6 Coarse-Grained Ice-Contact Deposits, gray, heaving Hydro-Terra AFP#59 DW5 19-Nov-91 0.0 0.3 ASPT 1 Asonatt 3.0 GVLB SP **DW5** Hydro-Terra 19-Nov-91 0.3 FIII and Gravel Alluvium, brown AFP#59 7.0 SDSL SPSM 3 Glecial Outwesh, brewn AFP#59 **DW5** Hvdro-Terra 19-Nov-91 3.0 GVLB GP DW5 Hydro-Terra 19-Nov-91 7.0 23.0 Glecial Outween, brown AFP#59 38.0 SDSL ML Fine-Grained Ice-Contact Deposits, brown to gray AFP#59 DW5 Hydro - Terra 19-Nov-91 23.0 39.5 SDGR SPSM Fine-Grained Ice-Contact Deposits, gray AFP#59 DW5 Hydro-Terra 19-Nov-91 38.0 SDSL SMML Fine-Grained Ice-Contact Deposits, gray AFP#59 DW5 Hydro - Terra 19-Nov-91 39.5 48.0 53.5 SDSL SM 5 Glacial Lake Beds, gray AFP#59 DW5 Hydro ~ Terra 19-Nov-91 48.0 53.5 55.0 SDSL SM 5 Glacial Lake Beds, gray AFP#59 DW5 Hydro-Terra 19-Nov-91 59.5 SDSL SM 5 Glecial Lake Bods, gray AFP#59 DW5 Hydro-Terra 19-Nov-91 55.0 AFP#59 DW5 Hydro-Terra 19-Nov-91 59.5 74.5 SDSL MLSM Fine-Grained Ice-Contact Deposits, gray SMSP 19-Nov-91 74.5 82.0 SDGR 6 Coarse - Grained Ice - Contact Deposits AFP#59 DW5 Hydro-Terra

HRDP

83.0

82.0

AFP#59

DW5

Hydro-Terra 19-Nov-91

GMSP

7 Glecial THL gray, very hard

ANL AFP#59 IRP SI
USAF IRPIMS LITHOLOGIC DESCRIPTION DATA (BCHLTD)

USAF INF	IMS LII	HOLOGIC DE	SCRIPTION D	MIN (BC	HLID)				1)-representation of the second of the secon
				BEG-	END-	UTH-	ASTM-	STRAT-	
AFIID	LOCID	LOGCODE	LOGDATE	DEPTH	DEPTH	CODE	CODE	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	GР	1	FIII and Gravel Alluvium, brewn
AFP#59	DW6	Hydro — Terra	16-Nov-91	1.5	2.0	SDSL	SM	1	Fill and Gravel Alburtum, brown
AFP#59	DW6	Hydro – Terra	16-Nov-91	2.0	25.0	GVLB	GMSP	3	Glosini Outwork, brown
AFP#59	DW6	Hydro-Terra	16~Nov-91	25.0	57.5	SDSL	ML	. 4	Fine-Grained lee-Contact Deposits, gray
AFP#59	DW6	Hydro-Terra	16-Nov-91	57.5	59.0	GVLG	SP	5	Ginelal Laka Seda, gray
AFP#59	DW6	Hydro-Terra	16-Nov-91	59.0	61.5	SDSL	SMML	5	Ginelal Laka Bode, gray
AFP#59	DW6	Hydro-Terra	16-Nov-91	61.5	64.0	SDSL	SMSP	5	Glesial Lake Bods, 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, brewn
AFP#59	DW8	Hydro – Terra	03-Nov-91	9.5	13.0	SDSL	SM	3	Gineial Outweats, brown
AFP#59	DW8	Hydro — Terra	03-Nov-91	13.0	20.0	SDGR	GMSP	3	Ginelal Outwash, brown
AFP#59	DW8	Hydro —Terra	03-Nov-91	20.0	77.0	SDSL	ML	4	Fine-Grained lee-Contact Deposits, gray
AFP#59	DW8	Hydro —Terra	03-Nov-91	77.0	89.0	SDSL	SM	6	Coarso-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 turf
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	Glesiel Outwesh, dark brown
AFP#59	DW9	Hydro – Terra	09-Dec-92	4.0	10.0	SDGR	GPSP	3	Ginelal Outwash, dark brown
AFP#59	DW9	Hydro – Terra	09-Dec-92	10.0	16.0	GVLB	GMGP	3	Glacial Outwash, brows
AFP#59	DW9	Hydro-Terra	09-Dec-92	16.0	34.0	SDGR	GPSP	3	Glacial Outwests, 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	Glecial Lake Seds, gray
AFP#59	DW9	Hydro - Terra	09-Dec-92	44.0	53.0	SDSL	MLSM	5	Glecial Lake Beds, gray
AFP#59	DW9	Hydro – Terra	09-Dec-92	53.0	57.5	SDGR	GMSP	5	Glecial Lake Beds, gray
AFP#59	DW9	Hydro – Terra		<b>57</b> .5	59.5	SDGR	GMSP	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DMa	Hydro – Terra		59. <b>5</b>	60.0	SDSL	ML	4	Fine-Grained Ice-Contact Deposits, gray
AFP#59	DW9	Hydro - Terra	09-Dec-92	60.0	67.6	SDGR	GMSP	4	Fine-Grained ice-Contact Deposits, gray
AFP#59	DW9	Hydro – Terra	09-Dec-92	67.6	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, yellowsh-brown
AFP#59	SW4	Hydro - Terra	02-Dec-92	2.0	15.0	GVLB	GPSP	3	Glecial Outwash, brown
AFP#59	SW4	Hydro – Terra	02-Dec-92	15.0	29.0	SDSL	ML	4	Fine-Greined Ice-Contact Deposits, brown to gray

ANL AFP#59 IRP SI

USAF IRI	PIMS LIT	HOLOGIC DE	SCRIPTION C	DATA (BO	CHLTD)				
				BEG-	END-	LITH-	ASTM-	STRAT-	
AFIID	LOCID	LOGCODE	LOGDATE	DEPTH	DEPTH	CODE	CODE	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, brewn
AFP#59	SW5	Hydro – Terra	20-Nov-91	3.0	7.0	SDSL	SPSM	3	Glaciel Outwash, brown
AFP#59	SW5	Hydro - Terra	20-Nov-91	7.0	23.0	GVLB	GP	3	Glesiel Outween, brown
AFP#59	SW5	Hydro-Terra	20-Nov-91	23.0	30.0	SDSL	ML	4	Fine-Grained Ice-Contast 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	РТНМ	OL	1	Fill and Gravel Alluvium, grass and topoeli
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 Cutwash, brown
AFP#59	SW7	Hydro-Terra	06-Dec-92	15.0	17.0	SDGA	SP	3	Glaciel Outweet, brown
AFP#59	SW7	Hydro – Terra	06-Dec-92	17.0	26.5	GVLB	GMGP	3	Gladial Outwash, brown
AFP#59	IW7	Hydro - Terra	05-Dec-92	0.0	2.0	РТНМ	OL	1	Fill and Gravel Alluvium, grass and topsoil
AFP#59	IW7	Hydro-Terra	05-Dec-92	2.0	7.0	SDGA	GMSM	3	Glacial Outwash, brown
AFP#59	IW7	Hydro-Terra	05-Dec-92	7.0	15.0	SDGA	GMSP	3	Glacial Outwest, brown
AFP#59	IW7	Hydro – Terra	05-Dec-92	15.0	17.0	SDGR	SP	3	Glaciel Outweek, 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	SDGA	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 Alkerium, brownish-black
AFP#59	SW8	Hydro – Terra	04-Nov-91	3.0	5.0	SDSL	OL	1	Fill and Gravel Alluvium, brewn
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	Glecial Outweeh, brown, strong petroloum odor 7'-14'
AFP#59	SW8	Hydro – Terra	04-Nov-91	12.0	23.0	SDGR	GMSP	3	Glacial Outwesh, brown
AFP#59	SW9	Hydro-Terra	10-Dec-92	0.0	0.3	PTHM	OL	1	Fili and Gravel Alkerium, brown turf
AFP#59	SW9	Hydro – Terra	10-Dec-92	0.3	2.0	SDSL	SPSM	1	Fill and Cravel Alluvium, brown
AFP#59	sw9	Hydro – Terra	10-Dec-92	2.0	3.0	SD	sw	1	Fili and Gravel Alkevium, yellow
AFP#59	swe	Hydro – Terra	10-Dec-92	3.0	4.0	SDGA	SP	3	Glacial Outweek, dark brown
AFP#59	swe	Hydro – Terra	10-Dec-92	4.0	10.0	SDGR	GPSP	3	Glecial Outweek, 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) END- LITH-ASTM-STRAT-BEG-LOCID LOGCODE LOGDATE DEPTH DEPTH CODE CODE ORDER AFIID VISDESC AFP#59 IW9 Hydro - Terra 10-Dec-92 0.0 0.3 PTHM OL 1 Fill and Gravel Alluvium, brown turf 0.3 SDSL SPSM AFP#59 IW9 Hydro -Terra 10-Dec-92 2.0 FIE and Gravel Alluvium, brown 1 AFP#59 Hydro -Terra 10-Dec-92 2.0 SD SW IW9 3.0 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 Outwant, dark brown AFP#59 Hydro - Terra 10-Dec-92 16.0 **GVLB** GMGP 3 IW9 10.0 Glacial Outwash, brown AFP#59 IW9 Hydro - Terra 10-Dec-92 16.0 34.0 SDGA GPSP 3 Glacial Outwash, brown AFP#59 IW9 Hydro - Terra 10-Dec-92 34.0 37.5 SDGR SP Fine-Grained los-Contact Deposits, gray AFP#59 IW9 Hydro -Terra 10-Dec-92 37.5 41.5 SDSL MLSM Fine-Grained los-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 Glaciai Lake Seds, gray 10-Dec-92 AFP#59 **IW9** Hydro - Terra 44.0 51.0 SDSL MLSM 5 Glacial Lake Beds, gray AFP#59 **A4H1** Hydro-Terra 03-Dec-92 0.0 0.3 ASPT Asobali GP AFP#59 **A4H1** Hydro - Terra 03-Dec-92 0.3 1.5 **GVLB** 1 Fill and Gravel Alluvium, brown AFP#59 03-Dec-92 SDGR **GMSP A4H1** Hydro-Terra 1.5 18.0 Glacial Outwash, brown low ppm hydrocarbon detection AFP#59 A4H2 Hydro-Terra 03-Dec-92 0.0 0.3 ASPT Asphalt A4H2 AFP#59 Hydro-Terra 03-Dec-92 GVLB GP 0.3 2.5 1 FIII and Gravel Alluvium, bro 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 ---Fill and Gravel Alluvium, brown GPSP FILL AFP#59 A1H1 Hydro – Terra 04-Dec-92 0.5 8.0 1 FM and Gravel Alluvium, brown 04-Dec-92 8.0 14.0 SDGR SPGP AFP#59 **A1H1** Hydro - Terra 3 Glacial Outwash, oily stain, low ppm hydrocarbon detected **A3H1** Hydro -Terra 04-Dec-92 0.0 0.5 FILL AFP#59 \_\_\_ 1 FIE and Gravel Alluvium, brown 2.0 AFP#59 **A3H1** Hydro - Terra 04-Dec-92 0.5 FILL GM 1 Fill and Gravel Alluvium, brown MLSM AFP#59 A3H1 Hydro - Terra 04-Dec-92 2.0 10.0 FILL 1 FIR and Gravel Alkevium, gray, oily stain GPSP Hydro -Terra 04-Dec-92 10.0 14.0 SDGR 3 Glacial Outwash, gray, oily stain, low ppm hydrocarbon detect AFP#59 A3H1 AFP#59 A6H1 Hydro - Terra 04-Dec-92 0.0 0.3 ASPT ---1 Asphalt FILL Hydro -Terra 04-Dec-92 2.0 GP AFP#59 A6H1 0.3 1 Fill and Gravel Alkerium, brown A6H1 Hydro - Terra 04-Dec-92 2.0 10.0 FILL SP 1 Fill and Gravel Alluvium, brown AFP#59 14.0 SDGR **GPSP** 3 Glacial Outwash, brown AFP#59 A6H1 Hydro -Terra 04-Dec-92 10.0

Appendix C-5-D:

IRPIMS BCHGWD

Hydrologic Parameters

5					
AFIID	LOCID	LOGDATE	PARCODE	PARVAL	UTMCODE
AFP#59	DW1	11-Jan-92	뀢		
AFP#59	DW1	11-Jan-92	×	14.3	84/4
AFP#59	DW	11-Jan-92	s		;
AFP#59	DW1	11-Jan-92	_	1025	ft 7/d
AFP#59	DW3	07-Jan-92	¥		,
AFP#59	DW3	07 - Jan - 92	×	ત	+44
AFP#59	DW3	07 Jan-92	s		7.
AFP#59	DW3	07-Jan-92	۲	150	5 t/1
AFP#59	DW4	12-Jan-92	¥		
AFP#59	DW4	12-Jan-92	×	4.5	£+/4
AFP#59	DW4	12-Jan-92	s		,,
AFP#59	DW4	12-Jan-92	۰	325	ジルエ
AFP#59	DWS	11-Jan-92	및		,
AFP#59	DWS	11-Jan-92	×	رة	£+/2
AFP#59	SW0	11-Jan-92	s		,,,,
AFP#59	DW5	11-Jan-92	۰	125	ft%
AFP#59	9м0	12-Jan-92	R		
AFP#59	9M0	12-Jan-92	×	۵.۲	£+/4
AFP#59	DW6	12-Jan-92	s		, 181
AFP#59	9MQ	12-Jan-92	_	7	5t7d
AFP#59	DW8	13-Jan-92	및		
AFP#59	DW8	13-Jan-92	×	œ	£+/4
AFP#59	DW8	13-Jan-92	s		,,
AFP#59	DW8	13-Jan-92	_	620	17/44
AFP#59	6W0	12-Jan-92	Ä		
AFP#59	6MQ	12-Jan-92	×	3.6	7/+3
AFP#59	6MQ	12-Jan-92	s		•
AFP#59	6MQ	12-Jan-92	7	190	F+/4
AFP#59	SW1	13-Jan-92	핒		
AFP#59	SW1	13-Jan-92	×	1.0	P/+5
AFP#59	SW1	13-Jan-92	s		, 6
AFP#59	SW1	12_ lan_02	,	2	/ / / * * * *

ANL AFP#59 IRP SI			SLUG TEST		
USAF IRPIMS HYDROLOGIC PARAMETER DATA (BCHGWD)	ğ	PARAME	TER DATA	BCHGWD)	
TOCID	2	LOGDATE	PARCODE	PARVAL	UTMCODE
SW3 13	=	13-Jan-92	¥		
SW3 13	5	13-Jan-92	×	٦v	
SW3 13	==	13-Jan-92	s		
SW3 1:	-	13-Jan-92	_	NI	
SW4 13	=	13-Jan-92	岁		
SW4 13	==	13-Jan-92	×	0.7	f +/d
SW4 13	5	13-Jan-92	s		•
SW4 13	=	13-Jan-92	۰	20	9 t/d
SWS 13	=	12-Jan-92	핒		
SW5 12	12	12-Jan-92	×	8	F+/7
SW5 12	2	12-Jan-92	s	,	
SW5 12-	2	12-Jan-92	Ţ	50	p/7+4
SW6 12-	12	12-Jan-92	¥		
SW6 12-	4	12-Jan-92	×	0.05	4+/4
SW6 12	2	12-Jan-92	s	1	, 6, ,
SW6 12-	2	12-Jan-92	_	+	P/.+5
SW7 13	5	13-Jan-92	Ä		
SW7 13	5	13-Jan-92	×	٧I	
SW7 13	5	13-Jan-92	s	,	
SW7 13	5	13-Jan-92	_	$\lambda I$	
SW8 13	=======================================	13-Jan-92	¥		
SW8 13	5	13-Jan-92	×	23	7/+3
SW8	=	13-Jan-92	s		,,,,,
SW8 13	=	13-Jan-92	1	1800	4444
SW9 12	12	12-Jan-92	묒		,
SW9 12-	12	12-Jan-92	×	0.7	24/9
SW9 12	5	12-Jan-92	s		,
SW9 12	2	12-Jan-92	_	15	17 B/1
1.00	-	12-Jan-92	밀		1
EM1	=	12-Jan-92	×	N N	7
	ä	12-Jan-92	s	1	
IW9	~	12-Jan-92	<b>-</b>	3	4

\* NE cannot be determined from a slug test.

\*\* S cannot be determined relinbly from a slug test

\*\* NI means no interpretation possible; recovered in less than one unit.

NU-means-no witholdered stop test performed a

6/6 FT 50. -

Appendix C-5-E:

IRPIMS BCHGWD

**Borehole Widths** 

ANL AFP#59 IRP SI USAF IRPIMS BOREHOLE WIDTHS

		BEG-	END-	WIDTH
AFIID	LOCID	DEPTH	DEPTH	(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# <b>5</b> 9	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 POT	ENTIOMETRIC SURFACE MAPS			
AVERAGE	POTENTION	METRIC SURFACE	AVERAGE	POTENTION	METRIC SURFACE
DEEP AQU		JANUARY 17-27, 1992		AQUIFER	
EASTING	NORTHING	WATER LEVEL	EASTING	NORTHING	SWATER LEVEL
666219	771231	814.26	666222	771240	814.23
665697	770548	814.02	665697	770553	813.85
664993	771285	813.72	664994	771289	813.72
666034	770353	814.36	664972	770358	816.9
664926	770357	814,16	664931	770357	813.81
			664935	770253	813.51
STATIC PO	TENTIOME	TRIC SURFACE	665087	770231	813.84
		665235	770227		
		665382	770214	814.5	
EASTING	NORTHING	WATER LEVEL	665638	770196	815.05
666219	771231	814.28	665814	770189	815.42
664948	770534	813.76	665965	770179	815.8
665697	770548	814.14	666014	770164	816.7
664993	771285	813.41	666147	770217	817.4
664972	770831	813.67	666210	770333	817.69
666034	770353	814.33	666263	770460	818.02
664926	770357	813.75	666323	770576	818.31
			666369	770688	818.57
			666440	770917	819.12
					TRIC SURFACE
		•	SHALLOW	AQUIFER	JANUARY 11-13,1992
			EASTING	NORTHING	WATER LEVEL
			666222	771240	814.35
			664939	770535	813.46
			665697	770553	
			664994		
			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 666440	770688 770917	818.57
			000440	770917	819.12

# Appendix D:

Surveying Data Sampling Locations at P-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	Top of	Ground	NODTHING	EASTING	ELEVATION
Designation	Casing	Surface	NORTHING		
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	×		770360.55	665434.49	830.7 <b>9</b>
SW2		х	770359.64	665434.38	828.83
DW3	×		770534.20	664 <u>94</u> 8.18	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		х			829.05
DW5	Х		771284.96	664993.06	835.97
SW5	Х		771289.28	664993.62	835.84
DW5/SW5		X	771286.87	664993.43	836.24
DW6	Х		770830.91	664971.51	828.51
SW6	Х		770836.67	664971.59	828.49
DW6/SW6		X	770835.09	664971.62	828.95
SW7	х		770564.89	665376.59	831.89
SW7		×	770562.93	665376.83	828.88
DW8	х		770352.97	666034.40	829.70
SW8	х		770358.28	666033.37	829.85
DW8-SW8	х	X	770355.68	666033.65	830.20
DW9	Х		770357.35	664925.85	831.31
SW9	X		770356.75	664931.10	831.38
DW9/SW9		X	770356.97	664928.47	828.80
1W9	X		770356.21	664937.50	831.52
IW9		х	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 backgr	(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.

Backgrou	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 s	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. Se	e site map.)				

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# Appendix E:

# Chain-of-Custody Forms

44004 Page

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2/89€ □ N.A. DATE: 17776 TIME: 1.17 PARAMETERS FOR ANALYSIS × 9 ₽ FGH □'Yes Custody Seal Intact?Sample \(\infYes\) Received For Laboratory By Ш 01 7 7 Task No. LabStor. A B C D Location ۷ 7 Shipment Complete? 871 ¥ 7 NJ TIER II OTHER (Specify) Laboratory (Signature) Special QA/QC Protocol Number NJ TIER I CALIFORNIA **EPA SW 846** ₽ (Ref. #) NYS DEC NYS DOH DATE: 9 5476 7 **EPACLP** in ACSWBAS, DATE: TIME: DATE: Time: Ι SAMPLES RECEIVED BY: g E. Syracuse, New York 13057 315-432-0506 or 800-950-0506 Pour recovery Jesu885-Sumple contains L Ш 6601 Kirkville Road East Laboratories Gaison ٥ ပ B NAME: LAJURA DE Petroleum Anduct odor noted Other TIME: 0 800 HASIGNATURE: SIGNATURE: SIGNATURE: lio2 ۷ እ Aqueous NAME: NAME: Grab Comp. SAMPLERS LAURAGE OF CADSIGNATURE: NAME: BARNEYNASHOLD BARNEY WNASHOLD DATE: SNW91 75 110 ᄩ Barney Nashold(Fs) Project Manager/Contact Wyman Harrison AFP-59 IRPSyplemental SI. DATE: TIME: DATE: TIME: 100-4 Date SAMPLES RELINQUISHED BY: ASP SIGNATURE: BALMEY WY 12-16.16 SAMPLE LOCATION / SAMPLE ID REMARKS: NYS DE C Project Name TRIP BLANK JCSW 8 AS TC5W8 B5 Argonne Содпралу Nате SIGNATURE: SIGNATURE: Note. NAME: 4 .. (TRIP 1) Project No. NAME: NAME

9 2 A D B G 2 Y W PARAMETERS FOR ANALYSIS 7 NOV 91 Page 1 of Special QA/QC Protocol Project Manager/Contact (TR, Pa) Company Name

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2/89€ □ N.A. DATE: 11/7/41 TIME: 170) PARAMETERS FOR ANALYSIS ₽ 8 5 FGH  $\Box \gamma_{\theta s}$ Custody Seal Intact?Sample Tes 5 ۷ Received For Laboratory By: ш E g 29 <u>Z</u> 5 9 Task No. a o 01 Shipment Complete? (Signature) LabStor. A B Location NJ TIER II OTHER (Specify) Laboratory ID Number Special QA/QC Protocol NU TIER I CALIFORNIA **EPA SW 846** (Ref. #) NYS DEC) NYS DOH (Circle) ¥ 7 EPACLP Chain of Custody Record DATE: Time: DATE: TIME: DATE: TIME: I BY: G E. Syracuse, New York 13057 315-432-0506 or 800-950-0506 SAMPLES RECEIVED L ш 6601 Kirkville Road East \_aboratories Galson ۵ ပ 8 ノザ.や、 BuMarhola Other SIGNATURE: TIME: 1 63011 SIGNATURE: SIGNATURE: lios suceupA NAME: NAME: BAR NE Y NASHOLD DATE: 7 NOW MAME: SKGNATURE: 8 MM LALLE COL TRIP BLANKS ENCLOSED TYPE Grab rinsate of bailers Comp. SAMPLERS LAURAE. UIRIS Tueng 1500 ᄪ Barney NASHOLD WXXXV HARRISON IRP Supplemental S. I. Project Manager/Contact DATE DATE: TIME: Date TIME SAMPLES RELINQUISHED BY: NAME: BARUEY WASHOLD SAMPLE LOCATION / SAMPLE ID Project Name NYSDEC ASP HOLD ISCAM 1 RTV 7.1 HVI JCQC3 XW AFP-58 Company Name Argonne REMARKS: SIGNATURE: SIGNATURE: Project No. TRIPS NAME NAME:

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Page

Chain of Custody Record

(70/ r) M N.A. 2/89 € DATE: 77 (A) 10 5#: TIME: 145 PARAMETERS FOR ANALYSIS + ₽ کر is the letter Dinot the 7 FIGH Z Yes Custody Seal Intact?Sample [ Yes 4 フ Setro 7 7 7 W 5 7 VI 3 7 Received For Laboratory By: DE PE 15 8 70 7 7 ١ Coole 0453 10064 Task No. ΛS ð Shipment Complete? LabStor. A B C Location (Signature) 401 7 ۷ Cool 8 NJ TIER II OTHER (Specify) Laboratory ID Number Special QA/QC Protocol CALIFORNIA EPASW 846 (Ref. #) NYS DOH 3650-..) Soils in Galson Ga 15m × TIME: 1 c 1 x DATE: 15 10 10 11 "TRIP 4 (YYS DEC) 7 **EPA CLP** NUTERI DATE: DATE TIME TIME I Waters BY: g NOTE: TRIP BLANK Not Incled. Please Intel E. Syracuse, New York 13057 315-432-0506 or 800-950-0506 Note: The 4th chaineter in the 4th +6th Sample 10's strong u, SAMPLES RECEIVED ш 6601 Kirkville Road East Laboratories Galson ۵ DATE: 18 NWY NAME: 4 AURA CIECIN ပ æ ⋖ SAMPLERS BACARY NASHOLD SIGNATURE: BUNLEylute SIGNATURE: .. Other NAME: SIGNATURE: SIGNATURE: 7 lioS suceupA 3 7 7 NAME Comp. Grab TIME: 1000 HR 8 1730 1530 TIME: ルッジガネ 1430 1530 1600 DATE: 154177 0001 10 75 뺼 Barriey Nashold IRP Supplemental S. I Project Manager/Contact WYMANHAUFISON 1780/ Date 16 Nov 1800 380 7.66 16 1/21 DATE: TIME: RELINQUISHED BY: ASA BARNEY NASHOLD SAMPLE LOCATION / SAMPLE ID SIGNATURE: BAN last by collect O or norienel 2000. Project Name NAME: / ACRICION REMARKS: NYSDE SAMPLES MA COUNT てくる とれめ Jesul AS ICSDZA 565W6BS 4 1 0 5 2 b Company Name AFP-59 Argonne SIGNATURE: TRIP 4 SIGNATURE: Project No.

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