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Retrofit of Waste-To-Energy Facilities Equipped with Electrostatic Precipitators

Volume II: Field and Laboratory Reports, Part 2 of 2

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A national laboratory of the U.S. Department of Energy
Managed by the Midwest Research Institute
for the U.S. Department of Energy
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RETROFIT OF WASTE-TO-ENERGY FACILITIES EQUIPPED WITH ELECTROSTATIC PRECIPITATORS

April, 1996

VOLUME II

FIELD AND LABORATORY REPORTS

PART 2 OF 2

Prepared by
H. Gregor Rigo, Rigo & Rigo Associates, Inc.
A. John Chandler, A.J. Chandler & Associates, Ltd.

Under the direction of
ASME Research Committee on Industrial and Municipal Waste
Electrostatic Precipitator Retrofit Subcommittee
Department of Energy's National Renewable Energy Laboratory

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
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VOLUME II

FIELD AND LABORATORY REPORTS

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NOVEMBER 25, 1995

MOISTURE ANALYSIS DATA SHEET

Project #:	5916265	Client:	R&R
Date:	95-11-25	Test:	717-HCl-A
Sample Location:	Stack B	Filter I.D.:	—
Pre Weights by:	JA	Post Weights by:	JW

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	95.1	86.0	9.1
2	0.1N H2SO4	99.5	95.5	4.0
3	0.1N H2SO4	106.5	106.1	0.4
4	Blank	71.0	71.0	0
5	0.1N NaOH	99.1	99.1	0
6	0.1N NaOH	97.0	97.2	0.4
7	S.G.	123.4	122.2	1.2
8				
XAD Trap				
			Total (g)	15.1

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: [signature] Date: 95.11.26

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BOVAR-CONCORD Environmental

HCl METHOD 26 SAMPLING TRAIN
RECOVERY DATA FORM

PROJECT NO.: _____

LOCATION: BSFuK TEST #: TM-HCl-A DATE: 951125

Impingers 1 and 2	Impingers 3 and 4
Weigh impingers Empty contents into container and rinse with DI water	Weigh impingers Empty contents into container and rinse with DI water

Container TS1 Impingers 1 and 2 0.1 N H2SO4 Contents and DI Water Rinses		Container TS2 Impingers 3 and 4 0.1 N NaOH Contents and DI Water Rinses	
Final Wt.: 100.0		Final Wt.: 100.3	
Initial Wt.: 32.8	(75.5)	Initial Wt.: 32.9	(64.0)
Gain: 100.0		Gain: 100.0	?
Mark Liquid Level ✓		Seal and Label ✓	

Train Identification
Train No.:
0.1 N H2SO4 Batch No.:
DI Water Batch No.:
0.1 N NaOH Batch No.:
Train Loaded By: JA
Recovered By: JW
Reagent Blank Submitted: Yes ✓ No _____

BOVAR-CONCORD Environmental

SYSTEM CALIBRATION AND DRIFT CALCULATIONS

CLIENT	RIGO+RIGO	DATE	NOV25/95
PROJECT NUMBER	5416265	TIME START	08:18
SAMPLE LOCATION	STACK	TIME FINISH	12:20
	TEST NUMBER	T16CEMA	

INSTRUMENT SPAN VALUES

OXYGEN	25	%	CARBON DIOXIDE	20	%
SULPHUR DIOXIDE	1000	PPM	CARBON MONOXIDE	1000	PPM
NITROGEN OXIDES	1000	PPM	TOTAL HYDROCARBONS	100	PPM

ITEM	CAL.GAS VALUE	ANAL. CAL.	INITIAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	FINAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	DRIFT (% SPAN)
O2 ZERO	0	0.07	0.07	0.0	0.03	-0.2	-0.2
O2 CAL	9.91	9.93	9.86	-0.3	9.76	-0.7	-0.4
SO2 ZERO	0	0.36	0.36	0.0	2.1	0.2	0.2
SO2 SPAN	149	148	148	0.0	145	-0.3	-0.3
NOX ZERO	0	1.01	1.1	0.0	2.1	0.1	0.1
NOX SPAN	302	305	302	-0.3	145	-16.0	-15.7
CO2 ZERO	0	0	0.01	0.1	0.05	0.3	0.2
CO2 SPAN	7.01	7.04	7.02	-0.1	7	-0.2	-0.1
CO ZERO	0	0.85	-0.14	-0.1	1.01	0.0	0.1
CO SPAN	100	100.5	100.4	-0.0	102	0.2	0.2
THC ZERO	0	0.8	0.7	-0.1	3.4	2.6	2.7
THC SPAN	20.1	21.1	21.6	0.5	23.4	2.3	1.8

DRIFT CRITERIA <5% SPAN
BIAS CRITERIA <5% SPAN

METHOD 26
HCl SAMPLING DATA FORM

Company Name	DAVIS COUNTY	Plant Location	LAYTON UTAH	Source Name	STACK B
Test Date	NOV 25 1995	Test Number	T17-HCl-A	Job Number	5416265
Sampling for	HCl	Meter Box	V11.001	B.P. mm/inHg	859 mbar

ABSORBING SOL'N	15 ml 0.1 N H_2SO_4	15 ml 0.1 N H_2SO_4	15 ml 0.1 N NaOH	15 ml 0.1 N NaOH	Silica Gel	GAS	1	2	3	4
WEIGHTS	IMP 1	IMP 2	IMP 3	IMP 4	IMP 5	READINGS				
EMPTY						O2				
FILLED FINAL						C02				
FILLED INITIAL						CO				
DIFFERENCE						TIME				

OPERATOR	JM	Sample Rate (Lpm)	N 2	H20 Condensed	
Lk.Chk, (Init.)	0 cc/min	Lk. Chk. (Final)	0 cc/min	Probe Purged	(Yes) No)

Sample Time	Clock Time	Volume m^3 Desired	Volume m^3 Actual	Vacuum in.Hg	Meter Temp. °C/°F	Probe Temp. °C/°F	Box Temp. °C/°F	Impinger Temp. °C/°F
0	0		2049.0	2	66	230	223	
10	5		2059.7	2	66	292	318	
20	10		2070.6	2	68	234	320	
30	15		2081.0	2	70.5	295	284	
40	20		2091.3	2	72	246	270	
50	25		2101.45	2	71	261	252	
60	30		2111.7	2	68.5	276	243	
70	35		2121.8	2	67.5	283	233	
80	40		2131.95	2	67	227	224	
90	45		2142.1	2	68	338	224	
100	50		2152.25	2	67.5	266	230	
110	55		2162.4	2	67.5	333	228	
120	60		2172.65	2	67	264	232	
		AHH/TTS	123.65	2	68.2	272.7	252.4	

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TIME ON: 12:38

BOVAR-CONCORD Environmental

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 11-25-95
RUN : T16-OC-A
LOC. : B STACK

RUN TIME : 8:32 TO 12:09

ORGANICS CONCENTRATION	0.0 ug/DSm3	0.0000 gr/1000 DScf
	0.0 ug/Am3	0.0000 gr/1000 Acf
ORGANICS EMISSION RATE	0.000 mg/s	0.00 gr/hr
SAMPLE GAS VOLUME	1.7599 DSm3	62.143 DScf
AVERAGE ISOKINETICITY	101.4 %	

FLUE GAS CHARACTERISTICS

MOISTURE	16.72 %	
TEMPERATURE	176.2 deg C	349.1 deg F
FLOW	46899 DSm3/hr	27604 DScfm
	99704 Am3/hr	58684 Acfm
VELOCITY	19.46 m/s	3830.3 fpm

GAS ANALYSIS	O2	10.60 %
	CO2	9.60 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.07 g/gmole D.B.
	MOL. WT.	28.05 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 11-25-95
RUN : T16-OC-A
LOC. : B STACK

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	86.4 kPa	25.50 in.Hg
STATIC PRESSURE	-124.5 Pa	-0.50 in.H2O
NOZZLE DIAMETER	5.79 mm	0.2280 in.
PITOT COEFFICIENT	0.796	
METER CORRECTION FACTOR	0.983	

CONDENSATE COLLECTION

RESIN TRAP CONDENSATE	3.7 g
CONDENSATION IN IMPINGER 1	233.7 g
CONDENSATION IN IMPINGER 2	6.5 g
CONDENSATION IN IMPINGER 3	-0.3 g
CONDENSATION IN IMPINGER 4	2.0 g
SILICA GEL WEIGHT GAIN	14.4 g
TOTAL MOISTURE GAIN	260.0 g

ORGANICS COLLECTION

FILTER ORGANICS	0.0000 mg
WASHINGS ORGANICS	0.0000 mg
RESIN ORGANICS	0.0000 mg
IMPINGER ORGANICS	0.0000 mg
TOTAL ORGANICS	0.0000 mg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 11-25-95
RUN : T16-OC-A
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1													
1	0.0	345	0.600	0.85	99.30	76	246	235	44	54	3.0	1.0	103.1
1	3.0	343	0.600	0.80	100.95	76	243	242	43	46	3.0	1.0	98.6
2	6.0	348	0.650	0.88	102.53	76	244	242	44	45	4.0	2.0	100.4
2	9.0	348	0.710	0.95	104.20	77	246	242	45	45	5.0	2.0	100.5
3	12.0	351	0.670	0.90	105.95	77	246	243	45	47	4.0	3.0	100.7
3	15.0	352	0.620	0.85	107.65	77	246	243	46	48	4.0	3.0	100.4
4	18.0	353	0.630	0.87	109.28	78	246	243	46	48	4.0	4.0	100.1
4	21.0	353	0.630	0.87	110.92	78	245	242	47	49	5.0	4.0	101.3
5	24.0	354	0.670	0.92	112.58	77	245	243	46	49	5.0	5.0	100.8
5	27.0	354	0.670	1.50	114.28	77	245	244	47	50	6.0	5.0	103.4
6	30.0	355	1.050	1.50	116.02	77	247	242	48	50	6.0	6.0	101.6
6	33.0	355	1.050	1.00	118.16	78	246	244	48	51	6.0	6.0	102.3
7	36.0	356	1.000	1.45	120.32	78	248	243	49	52	6.0	7.0	103.1
7	39.0	356	1.000	1.45	122.44	79	247	245	50	52	6.0	7.0	102.4
8	42.0	356	0.930	1.40	124.55	78	246	245	52	53	5.0	8.0	103.3
8	45.0	347	0.800	1.10	126.60	78	247	245	53	53	5.0	8.0	99.8
9	48.0	338	0.650	0.88	128.45	78	247	246	56	54	5.0	9.0	98.8
9	51.0	339	0.650	0.88	130.11	78	246	245	57	54	4.0	9.0	100.7
10	54.0	330	0.600	0.85	131.80	78	246	246	59	54	4.0	10.0	100.5
10	57.0	329	0.600	0.85	133.43	78	246	245	60	54	4.0	10.0	100.5
	60.0				135.06								
TRAVERSE NO. 2													
1	0.0	355	0.850	1.30	35.54	74	243	242	56	63	5.0	1.0	105.1
1	3.0	352	0.700	0.90	37.52	74	245	245	56	53	5.0	1.0	100.8
2	6.0	353	0.850	1.20	39.25	75	245	243	54	53	6.0	2.0	101.0
2	9.0	354	0.850	1.20	41.16	76	246	242	56	53	6.0	2.0	102.5
3	12.0	354	0.960	1.40	43.10	76	245	244	57	54	6.0	3.0	102.9
3	15.0	355	0.990	1.45	45.17	77	247	240	57	54	6.0	3.0	102.7
4	18.0	356	0.990	1.45	47.27	78	247	238	58	55	6.0	4.0	103.1
4	21.0	356	0.990	1.45	49.38	78	247	238	59	56	6.0	4.0	102.1
5	24.0	357	0.850	1.20	51.47	78	246	234	59	56	6.0	5.0	101.2
5	27.0	352	0.740	1.00	53.39	78	245	234	60	57	5.0	5.0	99.6
6	30.0	352	0.800	1.10	55.16	79	246	246	60	56	5.0	6.0	100.6
6	33.0	347	0.600	0.85	57.02	79	246	245	56	54	5.0	6.0	101.4
7	36.0	350	0.940	1.40	58.65	79	245	237	56	54	6.0	7.0	102.7

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 11-25-95
RUN : T16-OC-A
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	350	0.940	1.35	60.71	78	246	247	59	55	6.0	7.0	102.8
8	42.0	352	1.000	1.45	62.77	79	247	248	58	55	6.0	8.0	101.6
8	45.0	351	0.900	1.35	64.87	79	246	248	59	55	6.0	8.0	102.4
9	48.0	341	0.780	1.05	66.88	76	244	243	60	57	5.0	9.0	98.5
9	51.0	341	0.720	1.00	68.68	77	245	248	62	55	5.0	9.0	100.0
10	54.0	337	0.630	0.85	70.44	78	244	246	57	56	5.0	10.0	99.1
10	57.0	336	0.620	0.85	72.08	78	244	246	54	56	5.0	10.0	100.5
	60.0				73.73								
		349	0.780	1.11		77	246	243	53	53	5.1		101.4

ISOKINETIC TEST DATA FORM

Sample Type: Organics Reference Method: EPA M23 Page 1 of 5

Client:	Rigo + Rigo	City, Province:	Layton, UTAH
Project Number:	5416265	Test Number:	T16-OCA
Sample Location:	B Stack	Date:	Nov 25/95
Start Time:	9:32	Finish Time:	12:09
Barometric Press. (in Hg):	25.5	Stack Press(in H_2O): + or -:	-.50
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes No

Sample Box Number:	T1	Gas Meter Factor:	0.983	Calibration Date:	Sept 19/95
Nozzle I.D.:	T1-2	Nozzle Diameter (in.):	0.228	Calibration Date:	Nov 16/95
Probe I.D.:	T2-7	Pitot Coefficient:	0.796	Calibration Date:	Sept /95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 9.6 O_2 (%): 10.6 CO (ppm): ____ Other: ____

Impinger 1 (g)	233.7	Assumed H_2O (%):	16
Impinger 2 (g)	6.5	Filter I.D. #:	—
Impinger 3 (g)	-0.3	Net Filter Wt. (g):	—
Impinger 4 (g)	2.0	Net Probe Wash Wt. (g):	—
Impinger 5 (g) S.G.	14.4	Imp. Residue Wt. (g):	—
~~Impinger 6 (g)~~ Condenser	0.0		
XAD-2 Trap (g)	3.7		
Total H_2O Condensed (g)	260.0		

Sampling Comments: Tram 03 (reused after T14-OCA)
Trap 20

Process Rate:

Control Equipment Operation:

Process Comments: Stop testing at 10:42 & restarted at 11:55 due to process (shutting slag)

Signature: [signature] Date: Nov 25/95

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	Rigo + Rigo
Date:	Nov 25/95	Test:	T16-OCA
Sample Location:	B Stack	Filter I.D.:	
Pre Weights by:	HVB	Post Weights by:	HVB/NL

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	MT	688.1	454.4	233.7
2	RODI	650.0	643.5	6.5
3	RODI	604.2	604.5	-0.3
4	MT	500.8	498.8	2.0
5	S.G.	744.2	729.8	14.4
6				
7				
8 Condenser		232.0	232.0	0.0
XAD Trap		337.8	334.1	3.7
			Total (g)	260.0

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: Train 03 (reused after T14-OCA)
Trap 20

Signature: [signature]

Date: Nov 25/95

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BOVAR-CONCORD Environmental

DATE: 11 / 25 / 95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HWB

Run #: T16-OCA Traverse #: 1 Traverse Direction: North Start Time: 8:32 Finish Time: _____

Pt. (Far wall)	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3) 1 min.	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.60	0.85	.541	99.30	345	246	235	54	44	76	75	3
	3		0.60	0.80	.541	100.95	343	243	242	46	43	76	75	3
2	6		0.65	0.88	.563	102.53	348	244	242	45	44	77	75	4
	9		0.71	0.95	.589	104.20	348	246	242	45	45	78	75	5
3	12		0.67	0.9	.572	105.95	351	246	243	47	45	78	75	5
	15		0.62	0.85	.550	107.65	352	246	243	48	46	78	75	4
4	18		0.63	0.87	.554	109.28	353	246	243	48	46	79	76	4
	21		0.63	0.87	.554	110.92	353	245	242	49	47	79	76	4
5	24		0.67	0.9	.572	112.58	354	245	243	49	46	79	75	5
	27		0.67	0.92	.572	114.28	354	245	244	50	47	79	75	5
6	30		1.05	1.5	.715	116.02	355	247	242	50	48	79	75	6
	33		1.05	1.5	.715	118.16	355	246	244	51	48	80	75	6

Pre test leak check: Rate (cfm) 0.000 at 15 inches Hg (Vacuum) Leak Volume Start: 97.56 Leak Volume End: 99.30

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: HWB

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BOVAR-CONCORD Environmental

DATE: 11/25/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: ~~[illegible]~~ T16-0CA Traverse #: 1 Traverse Direction: North Start Time: _____ Finish Time: 1132

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		1.0	1.45	.698	120.32	356	248	243	52	49	80	75	6
	39		1.0	1.45	.698	122.44	356	247	245	52	50	81	76	6
8	42		0.93	1.4	.674	124.55	356	246	245	53	52	81	75	6
	45		0.8	1.1	.625	126.60	347	247	245	53	53	81	75	5
9	48		0.65	0.88	.563	128.45	338	247	246	54	56	81	75	5
	51		0.65	0.88	.563	130.11	339	246	245	54	57	80	75	5
10	54		0.60	0.85	.541	131.80	330	246	246	54	59	80	75	4
	57		0.60	0.85	.541	133.43	329	246	245	54	60	80	75	4
	60					135.06								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.007 at 15 inches Hg (Vacuum) Leak Volume Start: 135.06 Leak Volume End: 35.28

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/25/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T16-0CA Traverse #: 2 Traverse Direction: East Start Time: 9:56 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.85	1.3	0.644	35.545	355	243	242	63	56	74	73	5
	3		0.70	0.9	0.584	37.52	352	245	245	53	56	75	73	5
2	6		0.85	0.2	0.644	39.25	353	245	243	53	54	76	74	6
	9		0.85	1.2	0.644	41.16	354	246	242	53	56	77	74	6
3	12		0.96	1.4	.684	43.10	354	245	244	54	57	78	74	6
	15		0.99	1.45	.695	45.17	355	247	240	54	57	79	75	6
4	18		0.99	1.45	.695	47.27	356	247	238	55	58	80	75	6
	21		0.99	1.45	.695	49.38	356	247	238	56	59	81	75	6
5	24		0.85	1.2	.644	51.47	357	246	234	56	59	81	75	6
	27		0.74	1.0	.601	53.39	352	245	234	57	60	81	75	5
6	30		0.80	1.1	.625	55.16	352	246	246	56	60	81	76	5
	33		0.60	0.85	.541	57.02	347	246	245	54	56	81	76	5

Pre test leak check: Rate (cfm) .008 at 15 inches Hg (Vacuum) Leak Volume Start: 35.28 Leak Volume End: 35.545

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/25/95

SAMPLING TRAINS DATA SHEET

Client: Rigo & Rigo Project #: 5416265 Sample Location: B Stack Operators: HVB

Run #: T16-OCA Traverse #: 2 Traverse Direction: East Start Time: _____ Finish Time: 12:09

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.94	1.4	.677	58.65	350	245	237	54	56	81	76	6
	39		0.94	1.35	.677	60.71	350	246	247	55	59	81	75	6
8	42		1.0	1.45	.698	62.77	352	247	248	55	58	82	76	6
	45		0.90	1.35	.663	64.87	351	246	248	55	59	82	76	6
9	48*		0.78	1.05	.647	66.88	341	244	243	57	60	76	75	5
	51		0.72	1.0	.593	68.68	341	245	248	55	62	78	75	5
10	54		0.63	0.85	.554	70.44	337	244	246	56	57	79	76	5
	57		0.62	0.85	.550	72.08	336	244	246	56	54	79	76	5
	60					73.73								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.008 at 15 inches Hg (Vacuum) Leak Volume Start: 73.73 Leak Volume End: 73.98

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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* off at 46 minute mark (10:42), volume 65.51 - probes out of the stack & sealed during downtime
Shooting slag
* on at 11:55

BOVAR-CONCORD Environmental

QA/QC CHECKLIST

PROJECT # 5416265 DATE: Nov 25/95 TEST T16-CCA

Client: Rigo + Rigo Location: B Stack Operator: HVB

Sample Type: Organics Reference Method: EPA M23

Modifications: Recovery following Env. Canada procedure with train rinse w/ acetone/DCM + proving rinse with toluene.

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	++	
Static positive or negative	++	-ve
Average Temperature	++	350 °F
Estimate % H_2O	++	16%
How estimated?	++	previous tests
Estimate Gas Composition	++	O_2% 10 CO_2(%) 10 CO(ppm) ___
How Estimated?	++	CEMS
Proper nozzle selected?	✓	
K factor	++	
Number of sampling points per traverse	++	10
Probe markings correct?	✓	
Time per point	++	6
Number of readings per point	++	2
Barometric Pressure Measured?		
Mercury		
Aneroid		
Other	✓	watch
PROBE NOZZLE:		
Nickel plated stainless steel or	✓	
Stainless Steel or		
Glass or		
Quartz		
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	Proving rinse after T15-OCB
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or	✓	
Quartz or		
Other		
Cleaned according to protocol	✓	Proving rinse after T15-OCB
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 541626.5 DATE: Nov 25/95 TEST T16-OCA

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	⟷	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	Proving rinse of Train 03 after T14-OCF
FILTER TYPE		
Glass Fibre	✓	
Quartz		
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	X	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	✓	
Cleaned according to protocol	✓	Proving rinse of Train 03 after T14-OCF
Thermocouple attached to trap	✓	
XAD-2 Trap covered with foil at all times	✓	

PROJECT # 5416265 DATE: Nov 25/95 TEST T16-OCA

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	Proving rinse of Train 03 for T16-OCA
IMPINGERS		
No. of Impingers	→	5
Contents #1	→	MT
#2	→	RODI
#3	→	RODI
#4	→	MT
#5	→	S.G.
~~#6~~	→	
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly	✓	
Modifications	→	
Grease used on joints	X	
Silica gel type	→	
New?		
Used?	✓	Y
Pre Test Leak Check		
Performed	✓	
Rate	→	0.006 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	✓	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel	→	25% spent
Leak checks at port changes Before	→	0.007 cfm@ 15 "Hg
After	→	0.008 cfm@ 15.5 "Hg
Final leak race acceptable	→	cfm@ "Hg
General comments on sampling technique	→	
Sample recovery performed on-site?	✓	
Sample recovery performed by	→	RB
Clean-up area - General Environment	→	Clean
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

PROJECT # 5416765 DATE: Nov 25/95 TEST T16-OC-A

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	⟷	Teflon
Leak free	✓	
Petri Dishes: borosilicate glass		filters in clean foil in plastic bag
plastic		
Balance Type	⟷	top loader
Calibrated or QC checked	⟷	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered		
Silica Gel		
Condition/Colour	✓	75% spent
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?	✓	Good
Colour of Filter		white
Foil Wrapped?		yes
Probe Rinses		
Acetone / DCM	✓	
Other Toluene	✓	
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents	✓	
Solvents	✓	
Resin	✓	
Blank Train	✓	
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

#18

EPS 1/RM/2
SEMI-VOLATILE ORGANIC (SVOC) SAMPLING TRAIN RECOVERY DATA FORM

LOCATION: B - Stack TEST #: 16 - OC - A DATE: Nov 25/95 PROJECT NO.: 541-1265

Nozzle, Probe Liner Front Half Filter Holder MM Cleanment	Filter	Back Half Filter Holder and Condenser Coil MM Cleanment	XAD Resin	Impingers & ~~HPLC Rinse~~ DCM	Back Half Rinse
Wash and brush 3x each with ~~hexane~~ DCM and acetone. Rinse 3x with with ~~hexane~~ DCM and and acetone.	Remove and place on pre-cleaned foil fold in half and place in ~~petri dish~~. Zip lock	**Weigh Coil & Record Weight** ~~Scale 5 minutes and with hexane and acetone. Rinse 3x with hexane and acetone.~~	**Weigh XAD Trap & Record Weight** Cap ends and wrap in foil.	Weigh impingers and record wts. Empty contents of #1, #2 and #3 into container. ~~Rinse 3x with HPLC water.~~	Rinse back half filter holder, condenser and impingers 1, 2 and 3 3x with hexane and acetone.

Container ~~TS1~~ TS2 Front Half Acetone Hexane Rinse	
Final Wt.:	473.4
Initial Wt.:	262.9
Gain:	210.5

Container ~~TS2~~ TS1 Filter	
Filter ID:	T16-OC
Colour:	off white

Container TS3 Back Half Filter and Condenser Coil	
Final Wt.:	425.9
Initial Wt.:	263.1
Gain:	162.8
Colour:	Clear

Container TS4 XAD Resin	
Wrap in Foil	
XAD:	046636
Colour:	white

Trap 20

Container TS5 Impinger Contents	
Final Wt.:	796.0
Initial Wt.:	263.4
Gain:	532.6
Colour:	Clear

Container TS6 Back Half Rinse	
Final Wt.:	
Initial Wt.:	
Gain:	
Colour:	

Mark Fluid Levels Seal and Label

Train & Proofing Identification	
Train No.:	03
~~HPLC~~ Batch No.:	Zenw 95/10/26
Acetone Batch No.:	Cmean 14123
~~Hexane~~ Batch No.:	Cmean 16700
Filter Batch No.:	Zenw 95/10/26 XAD No.: Trap 20
Train Assembled By:	HVB
Train Recovered By:	RB

Reagent Blanks Collected?	Yes
Combined Acetone/~~Hexane~~ DCM	Yes
~~Combined Glycol~~/Water	Yes
Blank Train Collected?	Yes
Comments:	

EPSREC.DRW-May 95

BOVAR-CONCORD Environmental

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : A:T16-MP-A
LOC. : B STACK

RUN TIME : 08:32 TO 12:09

METALS CONCENTRATION	478.6 mg/DSm3	0.2092 gr/DScf
	224.9 mg/Am3	0.0983 gr/Acf
@ 12% CO2	598.3 mg/DSm3	0.2615 gr/DScf
METALS EMISSION RATE	6.530 g/s	51.83 lb/hr
SAMPLE GAS VOLUME	2.0896 DSm3	73.784 DScf
AVERAGE ISOKINETICITY	100.4 %	

FLUE GAS CHARACTERISTICS

MOISTURE	16.50 %	
TEMPERATURE	176.2 deg C	349.2 deg F
FLOW	49109 DSm3/hr	28905 DScfm
	104535 Am3/hr	61527 Acfm
VELOCITY	20.40 m/s	4015.9 fpm

GAS ANALYSIS	O2	10.60 %
	CO2	9.60 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.07 g/gmole D.B.
	MOL. WT.	28.08 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : A:T16-MP-A
LOC. : B STACK

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	86.0 kPa	25.40 in.Hg
STATIC PRESSURE	-119.5 Pa	-0.48 in.H2O
NOZZLE DIAMETER	6.20 mm	0.2440 in.
PITOT COEFFICIENT	0.798	
METER CORRECTION FACTOR	1.006	

CONDENSATE COLLECTION

CONDENSATION IN IMPINGER 1	171.1 g
CONDENSATION IN IMPINGER 2	83.0 g
CONDENSATION IN IMPINGER 3	26.2 g
CONDENSATION IN IMPINGER 4	5.1 g
CONDENSATION IN IMPINGER 5	0.7 g
CONDENSATION IN IMPINGER 6	1.4 g
SILICA GEL WEIGHT GAIN	16.2 g
TOTAL MOISTURE GAIN	303.7 g

METALS COLLECTION

FILTER METALS	1.0000 g
WASHINGS METALS	0.0000 g
IMPINGER METALS	0.0000 g
TOTAL METALS	1.0000 g

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : A:T16-MP-A
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1												
1	0.0	346	0.780	1.55	196.24	76	235	248	52	4.0	1.0	104.4
1	3.0	347	0.890	1.60	198.38	77	235	252	52	4.0	1.0	98.9
2	6.0	348	0.910	1.60	200.55	78	236	250	53	4.0	2.0	97.7
2	9.0	350	0.950	1.80	202.72	79	236	248	55	4.0	2.0	99.6
3	12.0	351	1.000	2.00	204.98	79	236	251	55	4.0	3.0	102.8
3	15.0	351	0.980	1.90	207.37	80	235	251	53	4.0	3.0	101.5
4	18.0	352	1.100	2.00	209.71	80	234	250	54	4.0	4.0	99.6
4	21.0	352	1.100	2.00	212.14	80	235	249	53	4.0	4.0	98.3
5	24.0	353	1.100	2.00	214.54	80	236	252	54	4.0	5.0	98.0
5	27.0	354	1.100	2.05	216.93	80	236	251	53	4.0	5.0	99.7
6	30.0	354	1.100	2.05	219.36	81	237	252	54	4.0	6.0	99.1
6	33.0	355	1.100	2.10	221.78	81	237	252	54	4.0	6.0	100.0
7	36.0	355	1.000	2.05	224.22	81	237	249	54	4.5	7.0	104.4
7	39.0	355	1.000	2.00	226.65	81	237	253	54	4.5	7.0	105.3
8	42.0	355	0.980	1.90	229.10	81	238	249	54	4.5	8.0	102.8
8	45.0	353	0.850	1.65	231.47	81	238	249	54	4.5	8.0	102.3
9	48.0	353	0.860	1.65	233.67	81	237	251	54	4.5	9.0	101.6
9	51.0	353	0.860	1.60	235.87	81	238	254	53	4.5	9.0	101.1
10	54.0	353	0.870	1.60	238.06	81	239	250	53	4.5	10.0	99.2
10	57.0	353	0.870	1.60	240.22	81	239	249	53	4.5	10.0	99.2
	60.0				242.38							
TRAVERSE NO. 2												
1	0.0	335	0.690	1.30	242.87	78	237	255	59	3.5	1.0	98.9
1	3.0	332	0.550	0.98	244.80	78	238	256	59	3.5	1.0	101.8
2	6.0	334	0.680	1.20	246.58	79	238	256	48	3.5	2.0	93.7
2	9.0	335	0.720	1.30	248.40	79	238	256	47	3.5	2.0	98.6
3	12.0	346	1.000	2.10	250.37	80	238	256	46	4.5	3.0	101.1
3	15.0	352	1.100	2.15	252.73	80	239	256	49	4.5	3.0	100.8
4	18.0	352	1.100	2.15	255.19	80	239	257	49	5.0	4.0	102.0
4	21.0	356	1.100	2.15	257.68	81	238	255	49	5.0	4.0	101.7
5	24.0	356	0.970	1.90	260.16	81	238	255	46	5.0	5.0	101.7
5	27.0	352	0.790	1.45	262.49	81	238	250	46	5.0	5.0	99.7
6	30.0	351	0.610	1.10	264.56	81	237	255	46	5.0	6.0	99.6
6	33.0	350	0.600	1.10	266.38	81	237	255	46	4.0	6.0	99.2
7	36.0	349	0.720	1.30	268.18	81	237	253	46	4.0	7.0	97.6

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : A:T16-MP-A
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	349	0.680	1.25	270.12	81	238	255	45	3.5	7.0	98.8
8	42.0	351	0.800	1.50	272.03	81	238	254	45	4.0	8.0	98.5
8	45.0	350	0.750	1.40	274.09	81	238	252	48	4.0	8.0	99.2
9	48.0	350	0.660	1.25	276.10	75	235	255	48	3.5	9.0	102.6
9	51.0	343	0.630	1.20	278.03	76	236	255	47	3.5	9.0	101.2
10	54.0	341	0.450	0.90	279.90	76	237	256	47	3.0	10.0	102.9
10	57.0	340	0.460	0.87	281.51	76	238	257	48	3.0	10.0	99.7
	60.0				283.09							
		349	0.850	1.63		79	237	253	51	4.1		100.4

MCT. HDK
OC. HDN

ISOKINETIC TEST DATA FORM

Sample Type: M5 Reference Method: EPA M29 Page 1 of 5

Client:	Rigo+Rigo	City, Province:	Layton, Utah
Project Number:	5916265	Test Number:	716-MP-A
Sample Location:	B Stack	Date:	95/11/25
Start Time:	8:32	Finish Time:	12:09
Barometric Press. (in Hg):	25.4	Static Stack Press(in H_2O): + or -:	-.48
Stack Diameter (in.):	53	Length x Width:	x
Stack Height (ft):	116	Cyclonic Flow:	Yes No ✓

Sample Box Number:	T3	Gas Meter Factor:	1.006	Calibration Date:	Sept/95
Nozzle I.D.:	Q2	Nozzle Diameter (in.):	.244	Calibration Date:	Nov/95
Probe I.D.:	T1-7'	Pitot Coefficient:	.798	Calibration Date:	Sept/95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 4.6 O_2 (%): 10.59 CO (ppm): — Other: —

Impinger 1 (g)	171.1	Assumed H_2O (%):	16
Impinger 2 (g)	53.0	Filter I.D. #:	
Impinger 3 (g)	26.2	Net Filter Wt. (g):	
Impinger 4 (g)	5.1	Net Probe Wash Wt. (g):	
Impinger 5 (g)	0.7	Imp. Residue Wt. (g):	
Impinger 6 (g)	1.4		
~~XAD-2~~ S.G Trap (g)	16.2		
Total H_2O Condensed (g)	303.7		

Sampling Comments: 10:42 stopped sampling (46mins into 2nd traverse) - process down
11:55 - restarted sampling.

Process Rate:

Control Equipment Operation: ESP

Process Comments:

Signature: [signature] Date: 95/11/25

DATE: 95 / 11 / 25

SAMPLING TRAINS DATA SHEET

Client: Rio+Rio Project #: 5416265 Sample Location: B Street Operators: JG/Tm

Run #: T16-mp-A Traverse #: 1 Traverse Direction: IN Start Time: 8:32 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.78	1.55		196.235	346	235	248	52	NA	76	75	4.0
1	3		0.89	1.60	198.288	198.38	347	235	252	52		79	75	4.0
2	6		0.91	1.6	200.573	200.55	348	236	250	53		80	75	4.0
2	9		0.95	1.8	202.767	202.72	350	236	248	55		81	76	4.0
3	12		1.0	2.0	204.986	204.98	351	236	251	55		81	76	4.0
3	15		0.98	1.9	207.304	207.37	351	235	254	53		82	77	4.0
4	18		1.1	2.0	209.671	209.71	352	234	250	54		82	77	4.0
4	21		1.1	2.0	212.148	212.14	352	235	249	53		82	77	4.0
5	24		1.1	2.0	214.578	214.54	353	236	252	54		82	77	4.0
5	27		1.1	2.05	216.978	216.93	354	236	251	53		82	77	4.0
6	30		1.1	2.05	219.368	219.36	354	237	252	54		83	78	4.0
6	33		1.1	2.1	221.798	221.78	355	237	252	54		83	78	4.0
7	36		1.0	2.05	224.218	224.22	355	237	249	54		83	78	4.5

Pre test leak check: Rate (cfm) .004 at 18 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .002 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 25

SAMPLING TRAINS DATA SHEET

Client: Rigs & Rigs Project #: 5414265 Sample Location: R Stack Operators: JW/JM

Run #: T16-MP-A Traverse #: 1 Traverse Direction: IN Start Time: 8:32 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		1.0	2.0	226.544	226.65	355	237	253	54	NA	83	78	4.5
8	42		0.98	1.9	228.974	229.10	355	238	249	54		83	78	4.5
8	45		0.85	1.65	231.401	231.47	353	238	249	54		83	78	4.5
9	48		0.86	1.65	233.613	233.67	353	237	257	54		83	79	4.5
9	51		0.86	1.6	235.826	235.87	353	238	254	53		83	75	4.5
10	54		0.87	1.6	238.026	238.06	353	239	250	53		83	79	4.5
10	57		0.87	1.6	240.228	240.22	353	239	249	53		83	79	4.5
10	60				242.388	242.382								

Pre test leak check: Rate (cfm) .004 at 18 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .002 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95/11/25

SAMPLING TRAINS DATA SHEET

Client: Rio Algom Project #: 5416261 Sample Location: BS Pack Operators: JD/Jm

Run #: T16-MP-A Traverse #: 2 Traverse Direction: IN Start Time: 9:56 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.69	1.30		242.874	335	237	255	54	NA	78	77	3.5
1	3		0.55	0.98	244.805	244.80	332	238	256	54		79	77	3.5
2	6		0.68	1.2	246.524	246.58	334	238	256	48		80	77	3.5
2	9		0.72	1.3	248.497	248.40	335	238	256	47		81	77	3.5
3	12		1.0	2.0	250.372	250.37	346	238	256	46		82	77	4.5
3	15		1.1	2.15	252.694	252.73	352	239	256	44		82	77	4.5
4	18		1.1	2.15	255.168	255.19	352	239	257	44		83	77	5.0
4	21		1.1	2.15	257.628	257.68	356	238	255	44		83	78	5.0
5	24		0.97	1.9	260.118	260.16	356	238	255	46		83	78	5.0
5	27		0.79	1.45	262.449	262.49	352	238	250	46		83	78	5.0
6	30		0.61	1.1	264.556	264.56	351	237	255	46		83	78	5.0
6	33		0.60	1.1	266.375	266.38	350	237	255	46		83	79	4.0
7	36		0.72	1.3	268.180	268.18	349	237	253	46		83	79	4.0

Pre test leak check: Rate (cfm) 0.008 at 16" inches Hg (Vacuum) Leak Volume Start: 242.663 Leak Volume End: 242.873

Post test leak check: Rate (cfm) .006 at 18 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95/1/25

SAMPLING TRAINS DATA SHEET

Client: Rigo+Rigo Project #: 5416265 Sample Location: B Stack Operators: JL/Jim

Run #: T16-MP-A Traverse #: 2 Traverse Direction: IN Start Time: 9:56 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.68	1.25	270.152	270.12	349	238	255	45		83	79	3.5
8	42		0.80	1.5	*272.037	272.03	351	238	254	45		83	79	4.0
8	45		0.75	1.4	274.109	274.09	350	238	252	43		83	79	4.0
9	48		0.66	1.25	*276.103	276.10	340	235	255	48		75	75	3.5
9	51		0.63	1.2	277.988	278.03	343	236	255	47		76	75	3.5
10	54		0.45	.90	*279.875	279.90	341	237	256	47		76	75	3.0
10	57		0.46	0.87	281.459	281.57	340	233	257	48		77	75	3.0
10	60				283.087	283.086								

Pre test leak check: Rate (cfm) .008 at 16 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .006 at 18 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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10:42 - stopped sampling (Sample volume = 274.753)
46 mins into 2nd traverse.
11:55 - restarted sampling

BOVAR-CONCORD Environmental

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 957125 TEST 716-MP-A

Client: Rigo Rigo Location: B Stack Operator: JW

Sample Type: M5 Reference Method: EPA M29

Modifications:

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	++++	
Static positive or negative	++++	Neg.
Average Temperature	++++	
Estimate % H_2O	++++	16
How estimated?	++++	M5
Estimate Gas Composition	++++	O_2% ____ CO_2(%) ____ CO(ppm) ____
How Estimated?	++++	
Proper nozzle selected?	✓	
K factor	++++	
Number of sampling points per traverse	++++	10
Probe markings correct?	✓	
Time per point	++++	6
Number of readings per point	++++	2
Barometric Pressure Measured?		
Mercury		
Aneroid		
Other		watch.
PROBE NOZZLE:		
Nickel plated stainless steel or		
Stainless Steel or		
Glass or		
Quartz	✓	
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or		
Quartz or	✓	
Other		
Cleaned according to protocol	✓	
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 541626 DATE: 951125 TEST T16-MP-A

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	+++	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple		
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	
FILTER TYPE		
Glass Fibre		
Quartz	✓	
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	✓	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass		
Cleaned according to protocol	NA	
Thermocouple attached to trap		
XAD-2 Trap covered with foil at all times		

PROJECT # 5416265 DATE: 55125 TEST TIGMPA

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers	7	
Contents #1		
#2		
#3		
#4		
#5		
#6		
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly		
Modifications		
Grease used on joints	✓	
Silica gel type		
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate		.004 cfm@ 18 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	NA	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel		
Leak checks at port changes Before		.002 cfm@ 15 "Hg
After		.008 cfm@ 16 "Hg
Final leak race acceptable		.006 cfm@ 18 "Hg
General comments on sampling technique		
Sample recovery performed on-site?		
Sample recovery performed by		
Clean-up area - General Environment		
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

PROJECT # 541626 DATE: 97/7/25 TEST T16MP-A

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	⟷	teflon
Leak free	✓	
Petri Dishes: borosilicate glass		
plastic	✓	
Balance Type	⟷	digital top loader
Calibrated or QC checked	⟷	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour		good, pink/blue.
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		
Colour of Filter		
Foil Wrapped?		
Probe Rinses		
Acetone	✓	+ 0.1N HNO_3
Other		
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents		
Solvents		
Resin		
Blank Train		
Samples labelled and stored properly		
Liquid levels marked		
Samples delivered to lab		

MOISTURE ANALYSIS DATA SHEET

Project #:	416265	Client:	R&R
Date:	95.11.25	Test:	T16-MP-
Sample Location:	Stack B	Filter I.D.:	5296 - 102516
Pre Weights by:	JA	Post Weights by:	JA

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	669.8	498.7	171.1
2	5% HNO3 10% H2O2	669.0	586.0	83.0
3	5% HNO3 10% H2O2	619.7	593.5	26.2
4	Blank	496.7	491.6	5.1
5	KMnO4	593.5	600.2	0.7
6	KMnO4	600.5	592.1	1.4
7	S.G.	786.8	770.6	16.2
8				
XAD Trap				
			Total (g)	303.7

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights	298	295.2	✓	JA

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: _____ Date: 95.11.25

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BOVAR-CONCORD Environmental

EPA METHOD 29
METALS / PARTICULATE (MP) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: STACK B TEST #: T16-MP-A 2HB DATE: 95.11.25 PROJECT NO.: 5416265

Probe Liner, Nozzle Front Half Filter Housing	Probe Liner, Nozzle Front Half Filter Housing	Filter	Impingers 1, 2, 3	Back Half Filter Holder Filter Support	Impinger 4	Impinger 5, 6	Impinger 5, 6	Impinger 7
Brush and rinse with 100 mL acetone	Rinse with 100 mL 0.1 N HNO3	Carefully remove filter from support with Teflon-coated tweezers and place in petri dish	Weigh impingers empty contents into container	Rinse back half filter holder filter support and rinse empty impingers with 100 mL 0.1 N HNO3	weigh impinger empty contents into container 5A	Weigh impingers empty contents into container 5B	Rinse with 25 mL 8 N HCL	Weigh impinger and discard or recycle silica gel
Check visually to see if particulate is removed if not repeat step above	Container TS3 Front Half 0.1 N HNO3 Rinse Final Wt.: ~~405.0~~ Initial Wt.: 188.0 Gain: 217.7 Comments:	Brush loose particulate onto filter	Container TS4-1 Impinger 4 Contents Final Wt.: 928.6 Initial Wt.: 434.2 Gain: 494.4	Container TS4-2 0.1 N HNO3 Back Half Impinger Rinse Final Wt.: 725.5 Initial Wt.: 433.6 Gain: 291.5 Colour:	Rinse with 100 mL 0.1 N HNO3	Rinse 3x with 100 mL Acidified KMnO4	Place rinsing in Container 5C which contains 200 mL of water	
Container TS2 Front Half Acetone Rinse Final Wt.: 522.0 Initial Wt.: 433.9 Gain: 88.1 Comments:	405.7	Filter TS1 Seal petri dish with tape Colour: Filter #: 5296			Container TSA Impinger 4 Contents Final Wt.: 302.3 Initial Wt.: 187.8 Gain: 114.5	Rinse with 100 mL water Container 5B Impinger 5 & 6 KMnO4 Content and Rinses Final Wt.: 900.1 Initial Wt.: 434.2 Gain: 466.9 Colour:	Container 5C HCL Rinse Final Wt.: 674.1 Initial Wt.: 437.1 Gain: 237.0 Colour:	

Train Identification	Blanks	
Train No.:		
HNO3 / H2O2 Batch No.:	Container 9	200 mLs
DI Water Batch No.:	Container 8B	100 mLs
Acetone Batch No.:	Container 7	100 mLs
0.1 N HNO3 Batch No.:	Container 8A	300 mLs
Acidified KMnO4 Batch No.:	Container 10	100 mLs
8 N HCl / Batch No.: DI Water	Container 11	25 mL / 200 mL
Filter Number:	Container 12	* _____

Mark Liquid Level on Containers
Seal and Label Containers
Reagent Blanks Submitted? Yes ✓ No ____
Prepare Fresh Acidified KMnO4 Daily ✓

M29RECDRW-May 95

BOVAR-CONCORD Environmental

TIME ON 17:58

METHOD 26
HCl SAMPLING DATA FORM

Company Name	DAVIS COUNTY	Plant Location	LAYTON UTAH	Source Name	STACK B
Test Date	NOV 25/95	Test Number	T-12-HCl-B	Job Number	546265
Sampling for	HCl	Meter Box	N/ 1.001	B.P. mm/inHg	853 mbar

ABSORBING SOL'N	15 ml 0.1 N H_2SO_4	15 ml 0.1 N H_2SO_4	15 ml 0.1 N NaOH	15 ml 0.1 N NaOH	Silica Gel	GAS	1	2	3	4
WEIGHTS	IMP 1	IMP 2	IMP 3	IMP 4	IMP 5	READINGS				
EMPTY						O2				
FILLED FINAL						CO2				
FILLED INITIAL						CO				
DIFFERENCE						TIME				

OPERATOR	DM	Sample Rate (Lpm)	N 2	H20 Condensed	
Lk.Chk, (Init.)	0 cc/min	Lk. Chk. (Final)	0 cc/min	Probe Purged	(Yes) No)

Sample Time	Clock Time	Volume m³ Desired	Volume m³ Actual	Vacuum in.Hg	Meter Temp. °C/°F	Probe Temp. °C/°F	Box Temp. °C/°F	Impinger Temp. °C/°F
0	0		2196.85	2.5	62	262	213	
10	5		2203.4	2.5	62	295	227	
20	10		2213.6	2.5	61.5	238	296	
30	15		2223.8	2.5	62.5	334	248	
40	20		2233.9	2.5	61	260	257	
50	25		2244.0	2.5	62.5	340	259	
60	30		2254.2	3	62	288	262	
70	35		2264.25	2.5	62.5	299	260	
80	40		2274.4	2.5	61.5	241	267	
90	45		2284.6	2.5	62.5	284	268	
100	50		2294.75	2.5	62	282	267	
110	55		2305.05	2.5	64	342	267	
120	60		2315.45	2.5	63	271	267	
		AVG/TOT	122.6	2.5	62.2	286	254	

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TIME OFF: 18:58

BOVAR-CONCORD Environmental

MOISTURE ANALYSIS DATA SHEET

Project #:	54/626	Client:	RHK.
Date:	95/11/25	Test:	TB-HCl-B
Sample Location:	B Stack	Filter I.D.:	
Pre Weights by:	JW	Post Weights by:	JA

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	55	86.1	8.9
2	0.1N H_2SO_4	97.7	94.5	3.2
3	0.1N H_2SO_4	105.5	105.4	0.1
4	Blank	71.[illegible]	71.2	-0.1
5	0.1N NaOH	98.[illegible]	98.8	0.1
6	0.1N NaOH	[illegible]	97.0	0.1
7	S.G.	[illegible]	116.0	0.9
8				
XAD Trap				
			Total (g)	13.2

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights	147.5	147.7	✓	JW
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: _____ Date: 95.11.25

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BOVAR-CONCORD Environmental

HCl METHOD 26 SAMPLING TRAIN
RECOVERY DATA FORM

PROJECT NO.: 541/6265

LOCATION: Stack B TEST #: T-19-HCl A DATE: 95-11-26

Impingers 1 and 2	Impingers 3 and 4
Weigh impingers Empty contents into container and rinse with DI water	Weigh impingers Empty contents into container and rinse with DI water

Container TS1 Impingers 1 and 2 0.1 N H2SO4 Contents and DI Water Rinses		Container TS2 Impingers 3 and 4 0.1 N NaOH Contents and DI Water Rinses	
Final Wt.: 133.7		Final Wt.: 132.9	
Initial Wt.: 33.7	74.3	Initial Wt.: 32.9	138
Gain: 100.0		Gain: 100.0	

Mark Liquid Level	Seal and Label

Train Identification
Train No.:
0.1 N H2SO4 Batch No.:
DI Water Batch No.:
0.1 N NaOH Batch No.:
Train Loaded By:
Recovered By:
Reagent Blank Submitted: Yes ✓ No _____

BOVAR-CONCORD Environmental

SYSTEM CALIBRATION AND DRIFT CALCULATIONS

CLIENT	RIGO+RIGO	DATE	NOV25/95
PROJECT NUMBER	5416265	TIME START	13:12
SAMPLE LOCATION	STACK	TIME FINISH	17:41
	TEST NUMBER	T17CEMB	

INSTRUMENT SPAN VALUES

OXYGEN	25	%	CARBON DIOXIDE	20	%
SULPHUR DIOXIDE	1000	PPM	CARBON MONOXIDE	1000	PPM
NITROGEN OXIDES	1000	PPM	TOTAL HYDROCARBONS	100	PPM

ITEM	CAL.GAS VALUE	ANAL. CAL.	INITIAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	FINAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	DRIFT (% SPAN)
O2 ZERO	0	0.03	0.03	0.0	0.07	0.2	0.2
O2 CAL	9.91	9.83	9.76	-0.3	9.81	-0.1	0.2
SO2 ZERO	0	0.5	2.1	0.2	3.6	0.3	0.2
SO2 SPAN	149	149	145	-0.4	145	-0.4	0.0
NOX ZERO	0	0.5	0.7	0.0	0.4	-0.0	-0.0
NOX SPAN	302	303	303	0.0	300	-0.3	-0.3
CO2 ZERO	0	0.02	0.05	0.2	0.06	0.2	0.1
CO2 SPAN	7.01	7.03	7	-0.2	6.95	-0.4	-0.3
CO ZERO	0	1	1.01	0.0	0.98	-0.0	-0.0
CO SPAN	100	101	102	0.1	101	0.0	-0.1
THC ZERO	0	0.2	0.2	0.0	-0.9	-1.1	-1.1
THC SPAN	20.1	19.7	19.8	0.1	18.6	-1.1	-1.2

DRIFT CRITERIA <5% SPAN
BIAS CRITERIA <5% SPAN

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : T17-OC-B
LOC. : B STACK

RUN TIME : 15:04 TO 17:29

ORGANICS CONCENTRATION	591.3 mg/DSm3	0.2585 gr/DScf
	285.3 mg/Am3	0.1247 gr/Acf
@ 12% CO2	748.5 mg/DSm3	0.3272 gr/DScf
ORGANICS EMISSION RATE	7.529 g/s	59.76 lb/hr
SAMPLE GAS VOLUME	1.6913 DSm3	59.720 DScf
AVERAGE ISOKINETICITY	99.7 %	

FLUE GAS CHARACTERISTICS

MOISTURE	14.82 %	
TEMPERATURE	175.0 deg C	347.0 deg F
FLOW	45828 DSm3/hr	26974 DScfm
	94998 Am3/hr	55914 Acfm
VELOCITY	18.54 m/s	3649.6 fpm

GAS ANALYSIS	O2	10.70 %
	CO2	9.48 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.06 g/gmole D.B.
	MOL. WT.	28.27 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : T17-OC-B
LOC. : B STACK

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	86.4 kPa	25.50 in.Hg
STATIC PRESSURE	-119.5 Pa	-0.48 in.H2O
NOZZLE DIAMETER	5.79 mm	0.2280 in.
PITOT COEFFICIENT	0.796	
METER CORRECTION FACTOR	0.983	

CONDENSATE COLLECTION

RESIN TRAP CONDENSATE	0.9 g
CONDENSATION IN IMPINGER 1	189.0 g
CONDENSATION IN IMPINGER 2	5.9 g
CONDENSATION IN IMPINGER 3	1.4 g
CONDENSATION IN IMPINGER 4	1.0 g
CONDENSATION IN IMPINGER 5	0.3 g
SILICA GEL WEIGHT GAIN	18.0 g
TOTAL MOISTURE GAIN	216.5 g

ORGANICS COLLECTION

FILTER ORGANICS	1.0000 g
WASHINGS ORGANICS	0.0000 g
RESIN ORGANICS	0.0000 g
IMPINGER ORGANICS	0.0000 g
TOTAL ORGANICS	1.0000 g

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : T17-OC-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1													
1	0.0	344	0.450	0.65	75.11	77	244	253	56	65	4.0	1.0	102.4
1	3.0	340	0.450	0.60	76.56	76	245	243	60	60	4.0	1.0	97.3
2	6.0	343	0.600	0.80	77.94	76	244	244	60	50	6.0	2.0	96.0
2	9.0	344	0.600	0.85	79.51	76	244	247	58	49	6.0	2.0	101.6
3	12.0	346	0.600	0.80	81.17	77	244	249	53	46	6.0	3.0	101.0
3	15.0	346	0.600	0.80	82.82	78	244	250	52	46	6.0	3.0	100.2
4	18.0	346	0.550	0.70	84.46	77	246	246	51	46	5.0	4.0	99.7
4	21.0	345	0.500	0.68	86.02	77	245	246	52	47	5.0	4.0	100.4
5	24.0	347	0.600	0.80	87.52	77	247	251	52	47	6.0	5.0	99.8
5	27.0	347	0.600	0.80	89.15	79	246	248	53	47	6.0	5.0	99.5
6	30.0	347	0.600	0.80	90.78	78	246	244	53	47	6.0	6.0	100.2
6	33.0	349	0.950	1.40	92.42	79	246	248	54	47	8.0	6.0	101.2
7	36.0	350	0.920	1.35	94.50	79	247	248	53	47	8.0	7.0	99.9
7	39.0	349	0.900	1.30	96.52	79	247	247	54	47	8.0	7.0	100.0
8	42.0	345	0.870	1.25	98.52	80	246	249	53	47	7.0	8.0	99.7
8	45.0	346	0.890	1.25	100.49	80	248	249	56	47	7.0	8.0	99.6
9	48.0	338	0.690	0.95	102.48	80	246	247	56	48	6.0	9.0	98.9
9	51.0	335	0.650	0.85	104.23	79	247	250	58	49	6.0	9.0	97.1
10	54.0	325	0.450	0.65	105.90	79	246	247	60	49	5.0	10.0	101.4
10	57.0	325	0.500	0.70	107.36	79	247	249	60	49	6.0	10.0	99.5
	60.0				108.87								
TRAVERSE NO. 2													
1	0.0	352	0.720	1.00	9.37	78	244	250	68	64	7.0	1.0	100.9
1	3.0	353	0.810	1.20	11.17	78	245	249	55	53	7.0	1.0	102.5
2	6.0	355	0.850	1.25	13.11	79	245	248	54	50	7.0	2.0	102.7
2	9.0	356	0.750	1.00	15.10	79	246	247	54	50	7.0	2.0	98.9
3	12.0	353	0.750	1.05	16.90	79	246	248	54	50	7.0	3.0	100.3
3	15.0	355	0.920	1.35	18.73	79	247	250	53	51	8.0	3.0	101.1
4	18.0	355	0.900	1.30	20.77	80	247	249	53	51	8.0	4.0	100.1
4	21.0	354	0.900	1.30	22.77	80	247	249	54	51	8.0	4.0	101.1
5	24.0	351	0.810	1.10	24.79	80	247	248	54	52	7.0	5.0	98.8
5	27.0	352	0.840	1.20	26.67	81	248	248	56	52	7.0	5.0	98.6
6	30.0	353	0.880	1.35	28.58	81	248	248	54	52	8.0	6.0	100.5
6	33.0	353	0.880	1.30	30.57	81	247	250	55	52	8.0	6.0	100.5
7	36.0	354	0.910	1.30	32.56	81	248	249	56	52	8.0	7.0	89.3

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : T17-OC-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	351	0.910	1.30	34.36	81	247	248	57	52	8.0	7.0	107.6
8	42.0	350	0.720	0.96	36.53	81	247	248	58	52	7.0	8.0	98.4
8	45.0	350	0.720	0.97	38.30	81	247	250	59	52	7.0	8.0	100.1
9	48.0	348	0.670	0.90	40.10	82	248	249	59	52	7.0	9.0	97.2
9	51.0	349	0.780	1.05	41.79	82	246	251	60	52	7.0	9.0	97.6
10	54.0	340	0.650	0.85	43.62	82	246	246	60	52	7.0	10.0	96.4
10	57.0	338	0.600	0.88	45.28	82	246	249	60	52	7.0	10.0	100.2
	60.0				46.94								
		347	0.715	1.01		79	246	248	56	51	6.7		99.7

ISOKINETIC TEST DATA FORM

Sample Type: Organics Reference Method: EPA M23 Page 1 of 5

Client:	Rigo + Rigo	City, Province:	Layton, UTAH
Project Number:	541626.5	Test Number:	T17-OCB
Sample Location:	Fg Stack	Date:	Nov 25/95
Start Time:	15:04	Finish Time:	17:29
Barometric Press. (in Hg):	25.5	Stack Press(in H_2O): + or -:	-0.48
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes No

Sample Box Number:	T1	Gas Meter Factor:	0.983	Calibration Date:	Sept 19/95
Nozzle I.D.:	T1-2	Nozzle Diameter (in.):	0.228	Calibration Date:	Nov 16/95
Probe I.D.:	T2-7	Pitot Coefficient:	0.796	Calibration Date:	Sept/95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%):	9.48	O_2 (%):	10.7
CO (ppm):		Other:	
Impinger 1 (g)	189.0	Assumed H_2O (%):	16
Impinger 2 (g)	5.9	Filter I.D. #:	—
Impinger 3 (g)	1.4	Net Filter Wt. (g):	—
Impinger 4 (g)	1.0	Net Probe Wash Wt. (g):	—
Impinger 5 (g) S.G.	18.0	Imp. Residue Wt. (g):	—
Impinger 6 (g) Condenser	0.3		
XAD-2 Trap (g)	0.9		
Total H_2O Condensed (g)	216.5		

Sampling Comments: Train 04 (reused after T15-OCB)
Trap #25

Process Rate:

Control Equipment Operation:

Process Comments:

Signature: [illegible] Date: Nov 25/95

MOISTURE ANALYSIS DATA SHEET

Project #:	5411e2005	Client:	Rigotkeg
Date:	11/25/95	Test:	T17-OC-B
Sample Location:	Stack 15	Filter I.D.:	/
Pre Weights by:	N.L.	Post Weights by:	NL

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	MT	615.3	426.3	189.0
2	R.O	573.6	567.7	5.9
3	R.O	592.7	591.3	1.4
4	MT	486.2	485.2	1.0
5	S.G.	794.3	776.3	18.0
6				
7				
8 Condens		245.3	245.0	0.3
XAD Trap		336.5	335.6	0.9
			Total (g)	216.5

2
4.3

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: Train #04 (reused after T15-OCB)
Trap #25

Signature: [signature]

Date: Nov 25/95

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BOVAR-CONCORD Environmental

DATE: 11/25/95

SAMPLING TRAINS DATA SHEET

Client: Rigo & Rigo Project #: 5416265 Sample Location: B Stack Operators: HVB

Run #: T17-OCB Traverse #: 1 Traverse Direction: North Start Time: 15:04 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.45	0.65	.468	75.114	344	244	253	65	56	77	76	4
	3		0.45	0.60	.468	76.56	340	245	243	60	60	75	75	4
2	6		0.60	0.80	.541	77.94	343	244	244	50	60	77	75	6
	9		0.60	0.85	.541	79.51	344	245	247	49	58	72	75	6
3	12		0.60	0.80	.541	81.17	346	245	249	46	53	78	75	6
	15		0.60	0.80	.541	82.82	346	245	250	46	52	79	76	6
4	18		0.55	0.70	.518	84.46	346	246	246	46	51	79	75	5
	21		0.50	0.68	.494	86.02	345	245	246	47	52	79	75	5
5	24		0.60	0.80	.541	87.52	347	247	251	47	52	79	75	6
	27		0.60	0.80	.541	89.15	347	246	248	47	53	80	77	6
6	30		0.60	0.80	.541	90.78	347	246	244	47	53	80	76	6
	33		0.95	1.4	.681	92.42	349	246	248	47	54	81	76	8

Pre test leak check: Rate (cfm) 0.012 at 15 inches Hg (Vacuum) Leak Volume Start: 74.525 Leak Volume End: 75.114

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/25/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 3416265 Sample Location: B Stack Operators: NUB

Run #: T17-UCB Traverse #: 1 Traverse Direction: North Start Time: _____ Finish Time: 16:04

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.92	1.35	.670	94.50	350	247	248	47	53	81	76	8
	39		0.90	1.3	.663	96.52	349	247	247	47	54	81	76	8
8	42		0.87	1.25	.652	98.52	345	246	249	47	53	82	77	7
	45		0.89	1.25	.659	100.49	346	248	249	47	56	82	77	7
9	48		0.69	0.95	.580	102.48	338	246	247	48	56	82	77	6
	51		0.65	0.85	.563	104.23	335	247	250	49	58	82	76	6
10	54		0.45	0.65	.476	105.90	325	246	247	49	60	81	77	5
	57		0.50	0.7	.502	107.36	325	247	249	49	60	81	77	6
	60					108.87								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.006 at 15 inches Hg (Vacuum) Leak Volume Start: 108.87 Leak Volume End: 109.13

K value calculated by: _____ Checked by: _____ Operator Signature: [illegible]

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BOVAR-CONCORD Environmental

DATE: 11/25/95

SAMPLING TRAINS DATA SHEET

Client: Rust + Rugo Project #: 5416265 Sample Location: B Stack Operators: HVB

Run #: T17-OCB Traverse #: 2 Traverse Direction: East Start Time: 16:29 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.72	1.0	.602	9.37	352	244	250	64	68	78	77	7
	3		0.81	1.2	.639	11.17	353	245	249	53	55	79	77	7
2	6		0.85	1.25	.654	13.11	355	245	248	50	54	80	77	7
	9		0.75	1.0	.605	15.10	356	246	247	50	54	80	77	7
3	12		0.75	1.05	.605	16.90	353	246	248	50	54	81	77	7
	15		0.92	1.35	.670	18.73	355	247	250	51	53	81	77	8
4	18		0.90	1.3	.663	20.77	355	247	249	51	53	82	77	8
	21		0.90	1.3	.663	22.77	354	247	249	51	54	82	77	8
5	24		0.81	1.1	.629	24.79	351	247	248	52	54	82	78	7
	27		0.84	1.2	.640	26.67	352	248	248	52	56	83	78	7
6	30		0.88	1.35	.655	28.58	353	248	248	52	54	83	78	8
	33		0.88	1.30	.655	30.57	353	247	250	52	55	83	78	8

Pre test leak check: Rate (cfm) 0.000 at 16 inches Hg (Vacuum) Leak Volume Start: 9.13 Leak Volume End: 9.37

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [illegible]

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BOVAR-CONCORD Environmental

DATE: 11/25/95

SAMPLING TRAINS DATA SHEET

Client: Rigu + Riga Project #: 5416265 Sample Location: B Stack Operators: HVB

Run #: T17-OCB Traverse #: 2 Traverse Direction: East Start Time: _____ Finish Time: 17:29

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.91	1.3	.666	32.56	354	248	249	52	56	84	78	8
	39		0.91	1.3	.666	34.36	351	247	248	52	57	83	78	8
8	42		0.72	0.96	.593	36.53	350	247	248	52	58	84	78	7
	45		0.72	0.97	.593	38.30	350	247	250	52	59	84	78	7
9	48		0.67	0.9	.572	40.10	348	248	249	52	59	84	79	7
	51		0.78	1.05	.617	41.79	349	246	251	52	60	84	79	7
10	54		0.65	0.85	.563	43.62	340	246	246	52	60	84	79	7
	57		0.60	0.88	.541	45.28	338	246	249	52	60	84	79	7
	60					46.94								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.08 at 16 inches Hg (Vacuum) Leak Volume Start: 46.94 Leak Volume End: 47.22

K value calculated by: _____ Checked by: _____ Operator Signature: [illegible]

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BOVAR-CONCORD Environmental

PROJECT # 541626.5 DATE: Nov 25/95 TEST T17-OCB

Client: Rigo Rigo Location: B Stack Operator: HCB

Sample Type: Organics Reference Method: EPA M23

Modifications: Recovery following Envir. Canada w/ train rinse w/ acetone/DCM followed by train flushing w/ toluene

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	↔	
Static positive or negative	↔	-ve
Average Temperature	↔	350°F
Estimate % H_2O	↔	16
How estimated?	↔	previous tests
Estimate Gas Composition	↔	O_2% 16 CO_2(%) 10 CO(ppm) ___
How Estimated?	↔	CEM
Proper nozzle selected?	✓	
K factor	↔	.6968 at 350°F
Number of sampling points per traverse	↔	10
Probe markings correct?	✓	
Time per point	↔	6
Number of readings per point	↔	2
Barometric Pressure Measured?		
Mercury		
Aneroid		
Other	✓	Watch
PROBE NOZZLE:		
Nickel plated stainless steel or	✓	
Stainless Steel or		
Glass or		
Quartz		
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	Pre-run rinse following T16-OCA
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or	✓	
Quartz or		
Other		
Cleaned according to protocol	✓	Pre-run rinse following T16-OCA
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 541C265 DATE: Nov 25/95 TEST T17-OCB

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	↔	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	Proving of Train 04 after T15-OCB
FILTER TYPE		
Glass Fibre	✓	
Quartz		
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	✓	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	✓	
Cleaned according to protocol	✓	Proving of Train 04 after T15-OCB
Thermocouple attached to trap	✓	
XAD-2 Trap covered with foil at all times	✓	

PROJECT # 5416265 DATE: Nov 25/95 TEST T17-OCB

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers	→	5
Contents #1	→	MT
#2	→	RCDI
#3	→	RCDI
#4	→	MT
#5	→	S.G.
~~#6~~	→	
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly	✓	
Modifications	→	
Grease used on joints	X	
Silica gel type	→	
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate	→	0.002 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	✓	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel	→	
Leak checks at port changes Before	→	0.006 cfm@ 15 "Hg
After	→	0.008 cfm@ 16 "Hg
Final leak race acceptable	→	0.008 cfm@ 16 "Hg
General comments on sampling technique	→	
Sample recovery performed on-site?	✓	
Sample recovery performed by	→	MB
Clean-up area - General Environment	→	clean
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

PROJECT # 5416265 DATE: Nov 25/95 TEST T17-OCB

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	↔	Teflon
Leak free	✓	
Petri Dishes: borosilicate glass		filter – aluminum foil – plastic bag
plastic		
Balance Type	↔	Top loader
Calibrated or QC checked	↔	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered		
Silica Gel		
Condition/Colour	✓	25% spent
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		Good
Colour of Filter		white
Foil Wrapped?		Yes
Probe Rinses		
Acetone / DCM	✓	
Other / Toluene	✓	
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents	✓	
Solvents	✓	
Resin	✓	
Blank Train	✓	
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

#19

EPS 1/RM/2
SEMI-VOLATILE ORGANIC (SVOC) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: D-Stack TEST #: 17-CC-13 DATE: Nov 25/95 PROJECT NO.: 591-6265

Nozzle, Probe Liner Front Half Filter Holder	Filter	Back Half Filter Holder and Condenser Coil	XAD Resin	Impingers & ~~HPLC~~ Rinse	Back Half Rinse
Wash and brush 3x each with hexane and acetone. Rinse 3x with with hexane and and acetone.	Remove and place on pre-cleaned foil fold in half and place in ~~petri dish~~.	**Weigh Coil & Record Weight** ~~Soak 5 minutes each with hexane and acetone. Rinse 3x with hexane and acetone.~~	**Weigh XAD Trap & Record Weight** Cap ends and wrap in foil.	Weigh impingers and record wts. Empty contents of #1, #2 and #3 into container. ~~Rinse 3x with HPLC water.~~	Rinse back half filter holder, condenser and impingers 1, 2 and 3 3x with hexane and acetone.

Container ~~TS1~~ TS2 Front Half Acetone Hexane Rinse	
Final Wt.:	439.5
Initial Wt.:	262.6
Gain:	177.2

Container ~~TS2~~ TS1 Filter	
Filter ID:	T17-CC
Colour:	White

Container TS3 Back Half Filter and Condenser Coil	
Final Wt.:	436.4
Initial Wt.:	262.9
Gain:	173.5
Colour:	Clear

Container TS4 XAD Resin	
Wrap in Foil	
XAD:	046641
Colour:	White

- Trap 25

Container TS5 Impinger Contents	
Final Wt.:	641.4
Initial Wt.:	262.3
Gain:	379.1
Colour:	Clear

Container TS6 Back Half Rinse	
Final Wt.:	
Initial Wt.:	
Gain:	
Colour:	

Mark Fluid Levels Seal and Label

Train & Proofing Identification	
Train No.:	04
~~HPLC~~ Batch No.:	Zenow 95/10/26
Acetone Batch No.:	Chromadow 14123
~~Hexane~~ Batch No.:	Chromadow 16700
Filter Batch No.: Zenow 95/10/26	XAD No.: Trap 25
Train Assembled By:	HUB/NOL
Train Recovered By:	RG

Reagent Blanks Collected?	Yes
Combined Acetone/~~Hexane~~	Yes
~~Combined Glycol~~/Water	Yes
Blank Train Collected?	Yes
Comments:	

EPSREC.DRW-May 95

BOVAR-CONCORD Environmental

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : T17-MP-B
LOC. : B STACK

RUN TIME : 15:04 TO 17:29

METALS CONCENTRATION	506.6 mg/DSm3	0.2214 gr/DScf
	241.8 mg/Am3	0.1057 gr/Acf
@ 12% CO2	641.2 mg/DSm3	0.2803 gr/DScf
METALS EMISSION RATE	6.715 g/s	53.30 lb/hr
SAMPLE GAS VOLUME	1.9743 DSm3	69.712 DScf
AVERAGE ISOKINETICITY	97.6 %	

FLUE GAS CHARACTERISTICS

MOISTURE	14.78 %	
TEMPERATURE	174.7 deg C	346.5 deg F
FLOW	47713 DSm3/hr	28083 DScfm
	99974 Am3/hr	58843 Acfm
VELOCITY	19.51 m/s	3840.7 fpm

GAS ANALYSIS	O2	10.70 %
	CO2	9.48 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.06 g/gmole D.B.
	MOL. WT.	28.28 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : T17-MP-B
LOC. : B STACK

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	85.4 kPa	25.20 in.Hg
STATIC PRESSURE	-124.5 Pa	-0.50 in.H2O
NOZZLE DIAMETER	6.20 mm	0.2440 in.
PITOT COEFFICIENT	0.798	
METER CORRECTION FACTOR	1.006	

CONDENSATE COLLECTION

CONDENSATION IN IMPINGER 1	165.2 g
CONDENSATION IN IMPINGER 2	60.3 g
CONDENSATION IN IMPINGER 3	9.0 g
CONDENSATION IN IMPINGER 4	1.9 g
CONDENSATION IN IMPINGER 5	0.0 g
CONDENSATION IN IMPINGER 6	0.4 g
SILICA GEL WEIGHT GAIN	15.0 g
TOTAL MOISTURE GAIN	251.8 g

METALS COLLECTION

FILTER METALS	1.0000 g
WASHINGS METALS	0.0000 g
IMPINGER METALS	0.0000 g
TOTAL METALS	1.0000 g

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : T17-MP-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1												
1	0.0	339	0.760	1.45	284.32	77	237	255	60	2.0	1.0	99.0
1	3.0	336	0.600	1.05	286.38	78	236	251	58	2.0	1.0	96.9
2	6.0	336	0.750	1.40	288.18	78	236	250	57	2.0	2.0	98.7
2	9.0	346	0.850	1.65	290.23	79	236	251	56	2.0	2.0	99.7
3	12.0	345	0.890	1.65	292.42	79	236	254	56	2.0	3.0	96.8
3	15.0	346	0.870	1.65	294.60	80	236	252	60	2.0	3.0	98.3
4	18.0	345	0.850	1.60	296.79	81	237	252	56	2.0	4.0	97.9
4	21.0	344	0.850	1.55	298.95	81	236	252	55	2.0	4.0	96.9
5	24.0	346	0.950	1.80	301.09	81	235	252	56	2.0	5.0	97.0
5	27.0	346	0.940	1.80	303.35	81	234	250	55	2.0	5.0	98.4
6	30.0	346	0.930	1.75	305.63	81	234	250	52	2.0	6.0	98.9
6	33.0	348	0.980	1.75	307.91	82	234	248	51	2.0	6.0	95.0
7	36.0	348	0.950	1.75	310.16	82	234	250	49	2.0	7.0	96.8
7	39.0	348	0.920	1.75	312.42	83	235	246	49	2.0	7.0	97.4
8	42.0	349	0.910	1.70	314.66	83	235	250	49	2.0	8.0	97.9
8	45.0	350	0.970	1.80	316.90	83	235	251	49	2.0	8.0	98.8
9	48.0	351	0.880	1.60	319.23	84	235	250	49	2.0	9.0	97.3
9	51.0	351	0.870	1.59	321.42	84	235	251	49	2.0	9.0	95.7
10	54.0	351	0.730	1.35	323.56	84	235	252	49	2.0	10.0	98.5
10	57.0	351	0.800	1.95	325.58	84	236	250	50	2.0	10.0	97.1
	60.0				327.66							
TRAVERSE NO. 2												
1	0.0	343	0.700	1.30	328.21	81	237	252	53	2.0	1.0	97.2
1	3.0	339	0.800	1.45	330.16	82	238	257	46	2.0	1.0	95.2
2	6.0	340	0.780	1.45	332.21	82	239	255	46	2.0	2.0	96.8
2	9.0	338	0.700	1.25	334.27	83	239	256	46	2.0	2.0	95.0
3	12.0	339	0.830	1.55	336.19	83	239	256	47	2.0	3.0	95.9
3	15.0	352	1.000	2.00	338.30	84	239	256	47	2.0	3.0	99.4
4	18.0	353	1.000	2.00	340.68	84	240	256	47	2.0	4.0	101.2
4	21.0	353	0.880	1.60	343.10	84	240	253	48	2.0	4.0	97.5
5	24.0	351	0.890	1.60	345.29	84	239	255	48	2.0	5.0	97.2
5	27.0	351	0.950	1.80	347.49	84	239	256	48	2.0	5.0	98.5
6	30.0	351	0.650	1.25	349.79	84	239	255	48	2.0	6.0	98.6
6	33.0	351	0.650	1.25	351.70	84	239	255	48	2.0	6.0	99.1
7	36.0	352	0.600	1.05	353.62	84	239	256	48	2.0	7.0	96.7

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 25
RUN : T17-MP-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	350	0.550	1.00	355.42	84	239	255	47	2.0	7.0	96.9
8	42.0	350	0.550	1.00	357.15	84	239	255	47	2.0	8.0	96.4
8	45.0	350	0.530	0.96	358.87	84	239	254	47	2.0	8.0	97.0
9	48.0	348	0.500	0.94	360.57	84	239	256	46	2.0	9.0	99.2
9	51.0	344	0.630	1.25	362.26	84	239	254	46	2.0	9.0	99.7
10	54.0	342	0.550	1.00	364.17	84	239	254	46	2.0	10.0	97.6
10	57.0	340	0.500	0.95	365.92	84	239	254	46	2.0	10.0	96.4
	60.0				367.57							
		346	0.779	1.48		82	237	253	50	2.0		97.6

ISOKINETIC TEST DATA FORM

Sample Type: M5 - Metals Reference Method: EPA M29 Page 1 of 5

Client:	Rigo & Rigo	City, Province:	Layton, Utah
Project Number:	54162601	Test Number:	T17-MP-B
Sample Location:	B Stack	Date:	95 11 25
Start Time:	15:04	Finish Time:	17:29
Barometric Press. (in Hg):	25.2	Stack Press(in H_2O): + or -:	-.5
Stack Diameter (in.):	53	Length x Width:	____ x ____
Stack Height (ft):	116	Cyclonic Flow:	Yes ____ No ✓

Sample Box Number:	T3	Gas Meter Factor:	1.006	Calibration Date:	Sept 95
Nozzle I.D.:	Q2	Nozzle Diameter (in.):	0.244	Calibration Date:	Nov 95
Probe I.D.:	T1-7	Pitot Coefficient:	0.798	Calibration Date:	Sept 95

Equipment Comments: ____

STACK GAS COMPOSITION

CO_2 (%): 9.45 O_2 (%): 10.7 CO (ppm): ____ Other: ____

Impinger 1 (g)	165.2	Assumed H_2O (%):	16
Impinger 2 (g)	60.3	Filter I.D. #:	____
Impinger 3 (g)	9.0	Net Filter Wt. (g):	____
Impinger 4 (g)	1.9	Net Probe Wash Wt. (g):	____
Impinger 5 (g)	-0	Imp. Residue Wt. (g):	____
Impinger 6 (g)	0.4		
~~XAD-2 Trap~~ SiO_2 Gel (g)	15.0		
Total H_2O Condensed (g)	281.8		

Sampling Comments: ____

Process Rate: ____

Control Equipment Operation: ESP

Process Comments: ____

Signature: [signature] Date: 95 11 25

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	R&R
Date:	95.11.25	Test:	T1A-MAD-
Sample Location:	Stack B	Filter I.D.:	-5297
Pre Weights by:	JA	Post Weights by:	JA

Impinger #	Impinger Contents Blank	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	5% HNO_3 10% H_2O_2	665.6	500.2	165.2
2	5% HNO_3 10% H_2O_2	626.1	565.8	60.3
3	↓	624.6	615.6	9.0
4	Blank	493.3	491.4	1.9
5	$KMnO_4$	593.4	593.9	Ø
6	$KMnO_4$	604.9	604.5	0.4
7	S.G.	817.7	802.7	15.0
8				
XAD Trap				
			Total (g)	251.8

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights	295.0	295.2	✓	JA
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: _____ Date: 95.11.2

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BOVAR-CONCORD Environmental

DATE: 5/11/25

SAMPLING TRAINS DATA SHEET

Client: Rizo Rizo | Project #: 5416265 | Sample Location: B Stack | Operators: JW/JM

Run #: T17-MP-B | Traverse #: 1 | Traverse Direction: IN | Start Time: 1504 | Finish Time:

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.76	1.45		284.315	339	237	255	60	NA	77	76	2.0
1	3		0.60	1.05	286.341	286.38	336	236	257	58		79	76	2.0
2	6		0.75	1.4	288.180	288.18	336	236	250	57		80	76	2.0
2	9		0.85	1.65	290.193	290.23	346	236	257	56		81	76	2.0
3	12		0.89	1.65	292.373	292.42	345	236	254	56		81	77	2.0
3	15		0.87	1.65	294.613	294.60	346	236	252	60		82	77	2.0
4	18		0.85	1.6	296.768	296.79	345	237	252	56		83	78	2.0
4	21		0.85	1.55	298.933	298.95	344	236	252	55		83	78	2.0
5	24		0.95	1.8	301.093	301.09	346	235	252	56		83	78	2.0
5	27		0.94	1.8	303.356	303.35	346	234	250	55		83	78	2.0
6	30		0.93	1.75	305.604	305.63	346	234	250	52		83	78	2.0
6	33		0.98	1.75	307.872	307.91	348	234	248	57		84	79	2.0
7	30		0.95	1.75	310.211	310.16	348	234	250	49		85	79	2.0

Pre test leak check: Rate (cfm) .005 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .01 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

DATE: 95 / 11 / 25

SAMPLING TRAINS DATA SHEET

Client: Rigo & Rigo Project #: 5416265 Sample Location: B. Stack Operators: JW/SM

Run #: T17-MP-B Traverse #: 1 Traverse Direction: IN Start Time: 15:09 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.92	1.75	312.426	312.42	348	235	246	49		85	80	2.0
8	42		0.91	1.7	314.650	314.660	349	235	250	49		86	80	2.0
8	45		0.97	1.8	316.877	316.90	350	235	251	49		85	80	2.0
9	48		0.88	1.6	319.189	319.23	351	235	250	49		86	81	2.0
9	51		0.87	1.55	321.411	321.42	351	235	251	49		86	81	2.0
10	54		0.73	1.35	323.588	323.56	351	235	252	49		86	81	2.0
10	57		0.80	1.45	325.540	325.58	351	236	250	50		86	81	2.0
10	60				327.659	327.657								

Pre test leak check: Rate (cfm) .005 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .005 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

DATE: 55 / 11 / 25

SAMPLING TRAINS DATA SHEET

Client: Rysthign Project #: 5416265 Sample Location: B Stack Operators: JW/Jm

Run #: T17-MP-B Traverse #: 2 Traverse Direction: IN Start Time: 16:29 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.70	1.3		328.208	343	237	252	53	NA	81	80	2.0
1	3		0.80	1.45	330.153	330.16	335	238	257	46		83	80	2.0
2	6		0.78	1.45	332.239	332.21	340	239	255	46		84	80	2.0
2	9		0.70	1.25	334.263	334.27	338	239	256	46		85	80	2.0
3	12		0.83	1.55	336.215	336.19	339	239	256	47		85	81	2.0
3	15		1.0	2.0	338.308	338.30	352	239	256	47		86	81	2.0
4	18		1.0	2.0	340.624	340.68	353	240	256	47		86	81	2.0
4	21		0.88	1.6	343.004	343.10	353	240	253	48		86	81	2.0
5	24		0.89	1.6	345.281	345.29	351	239	255	48		86	81	2.0
5	27		0.95	1.8	347.483	347.49	351	239	256	48		86	81	2.0
6	30		0.65	1.25	349.756	349.79	351	239	255	48		86	82	2.0
6	33		0.65	1.25	351.664	351.70	351	239	255	48		86	82	2.0
7	36		0.60	1.05	353.574	353.62	352	239	256	48		86	82	2.0

Pre test leak check: Rate (cfm) 0.008 at 16 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .008 at 21 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95/11/25

SAMPLING TRAINS DATA SHEET

Client: Rigos Rigo Project #: 5416265 Sample Location: B Stack Operators: JW/JM

Run #: T17-MP-B Traverse #: 2 Traverse Direction: IN Start Time: _____ Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.55	1.0	355.42	355.42	350	239	255	47		86	82	2.0
8	42		0.55	1.0	*357.144	357.15	350	239	255	47		86	82	2.0
8	45		0.53	0.96	358.874	358.87	350	239	254	47		86	82	2.0
9	48		0.50	0.94	*360.560	360.57	348	239	256	46		86	82	2.0
9	51		0.63	1.25	362.214	362.26	344	239	254	46		86	82	2.0
10	54		0.55	1.0	*364.105	364.17	342	239	254	46		86	82	2.0
10	57		0.50	0.95	365.894	365.92	340	239	254	46		86	82	2.0
10	60				367.564	367.568								

Pre test leak check: Rate (cfm) .008 at 16 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .008 at 21 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

QA/QC CHECKLIST

PROJECT # 5416265 DATE: ~~[illegible]~~ 957125 TEST T17-MP-B

Client: Rizzo + Rizzo Location: B Stack Operator: JW/JM

Sample Type: MS Reference Method: EPA M29

Modifications:

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	→	
Static positive or negative	→	Neg.
Average Temperature	→	
Estimate % H_2O	→	16
How estimated?	→	MS
Estimate Gas Composition	→	O_2% ____ CO_2(%) ____ CO(ppm) ____
How Estimated?	→	
Proper nozzle selected?		
K factor	→	
Number of sampling points per traverse	→	10
Probe markings correct?	✓	
Time per point	→	6
Number of readings per point	→	2
Barometric Pressure Measured?	✓	
Mercury		
Aneroid		
Other		watch
PROBE NOZZLE:		
Nickel plated stainless steel or		
Stainless Steel or		
Glass or		
Quartz	✓	
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or		
Quartz or	✓	
Other		
Cleaned according to protocol	✓	
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 951123 TEST T17-MP-B

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	++++	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor		
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	
FILTER TYPE		
Glass Fibre		
Quartz	✓	
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	✓	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass		
Cleaned according to protocol	NA	
Thermocouple attached to trap		
XAD-2 Trap covered with foil at all times		

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 5/1/95 TEST 777-MP-B

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers	7	
Contents #1		
#2		
#3		
#4		
#5		
#6		
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly		
Modifications		
Grease used on joints	✓	
Silica gel type		
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate		.005 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	N/A	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel		good
Leak checks at port changes Before		.01 cfm@ 15 "Hg
After		.008 cfm@ 16 "Hg
Final leak race acceptable		.008 cfm@ 21 "Hg
General comments on sampling technique		
Sample recovery performed on-site?		
Sample recovery performed by		JA/JW
Clean-up area - General Environment		
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

PROJECT # 5416265 DATE: 951125 TEST T17-MP-B

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	++	teflon
Leak free		
Petri Dishes: borosilicate glass		
plastic	✓	
Balance Type	++	digital top loader
Calibrated or QC checked	++	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently		
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour		good - pink/blue.
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		
Colour of Filter		
Foil Wrapped?	✓	
Probe Rinses		
Acetone		
Other		
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents		
Solvents		
Resin		
Blank Train		
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

EPA METHOD 29
METALS / PARTICULATE (MP) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: STACK B TEST #: T87-MP-B DATE: 95.11-25 PROJECT NO.: 5416265

Probe Liner, Nozzle Front Half Filter Housing	Probe Liner, Nozzle Front Half Filter Housing	Filter	Impingers 1, 2, 3	Back Half Filter Holder Filter Support	Impinger 4	Impinger 5, 6	Impinger 5, 6	Impinger 7
Brush and rinse with 100 mL acetone	Rinse with 100 mL 0.1 N HNO3	Carefully remove filter from support with Teflon-coated tweezers and place in petri dish	Weigh impingers empty contents into container	Rinse back half filter holder filter support and rinse empty impingers with 100 mL 0.1 N HNO3	weigh impinger empty contents into container 5A	Weigh impingers empty contents into container 5B	Rinse with 25 mL 8 N HCL	Weigh impinger and discard or recycle silica gel
Check visually to see if particulate is removed if not repeat step above.	**Container TS3 Front Half 0.1 N HNO3 Rinse** Final Wt.: 756.7 Initial Wt.: 433.4 Gain: 323.3 Comments:	Brush loose particulate onto filter	**Container TS4-1 Impinger 4 Contents** Final Wt.: 879.7 Initial Wt.: 436.2 Gain: 443.5	**Container TS4-2 0.1 N HNO3 Back Half Impinger Rinse** Final Wt.: 697.8 Initial Wt.: 432.5 Gain: 265.3 Colour:	Rinse with 100 mL 0.1 N HNO3	Rinse 3x with 100 mL Acidified KMnO4	Place rinsing in Container 5C which contains 200 mL of water	
Container TS2 Front Half Acetone Rinse Final Wt.: 541.3 Initial Wt.: 431.6 Gain: 109.7 Comments:		**Filter TS2 Seal petri dish with tape** Colour: Filter #: 5257 102517			**Container TSA Impinger 4 Contents** Final Wt.: 311.0 Initial Wt.: 187.9 Gain: 123.1	Rinse with 100 mL water **Container 5B Impinger 5 & 6 KMnO4 Content and Rinses** Final Wt.: 872.6 Initial Wt.: 431.4 Gain: 440.2 Colour:	**Container 5C HCL Rinse** Final Wt.: 674.4 Initial Wt.: 433.6 Gain: 240.8 Colour:	

Train Identification	Blanks	
Train No.:		
HNO3 / H2O2 Batch No.:	Container 9	200 mLs
DI Water Batch No.:	Container 8B	100 mLs
Acetone Batch No.:	Container 7	100 mLs
0.1 N HNO3 Batch No.:	Container 8A	300 mLs
Acidified KMnO4 Batch No.:	Container 10	100 mLs
8 N HCl / Batch No.: DI Water	Container 11	25 mL / 200 mL
Filter Number:	Container 12	* _____

Mark Liquid Level on Containers
Seal and Label Containers
Reagent Blanks Submitted? Yes ✓ No ____
Prepare Fresh Acidified KMnO4 Daily ✓

M29REC.DRW-May 95

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ISOKINETIC TEST DATA FORM

Sample Type: Organics (Blank #3) Reference Method: EPA M23 Page 1 of 2

Client:	Rigo + Rigo	City, Province:	Layton, UT/A
Project Number:	5416265	Test Number:	B3-OC
Sample Location:	B Stack	Date:	Nov 25/95
Start Time:	18.26	Finish Time:	—
Barometric Press. (in Hg):	—	Stack Press(in H_2O): + or -:	—
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes (No)

Sample Box Number:	T1	Gas Meter Factor:	0.983	Calibration Date:	Sept 19/95
Nozzle I.D.:	T1-2	Nozzle Diameter (in.):	0.229	Calibration Date:	Nov 16/95
Probe I.D.:	T2-7	Pitot Coefficient:	0.796	Calibration Date:	Sept/95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): ____ O_2 (%): ____ CO (ppm): ____ Other: ____

Impinger 1 (g)	0.0	Assumed H_2O (%):	—
Impinger 2 (g)	0.0	Filter I.D. #:	—
Impinger 3 (g)	0.0	Net Filter Wt. (g):	—
Impinger 4 (g)	0.3	Net Probe Wash Wt. (g):	—
Impinger 5 (g) S.G.	1.6	Imp. Residue Wt. (g):	—
~~Impinger 6 (g)~~ Condenser	0.0		
XAD-2 Trap (g)	0.0		
Total H_2O Condensed (g)	1.9		

Sampling Comments: Train 03 (Reused after T16-OCA) Trap # 24

Process Rate: Note: 1.5 ft^3 of ambient air drawn through blank train set up on the platform.

Control Equipment Operation:

Process Comments:

Signature: [signature] Date: Nov 25/95

MOISTURE ANALYSIS DATA SHEET

Project #:	5416268	Client:	Ricoh Co
Date:	11/25/95	Test:	B3-OC
Sample Location:	Stack B	Filter I.D.:	—
Pre Weights by:	N.L.	Post Weights by:	

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	MT	455.0	455.0	0.0
2	R.O.	643.9	643.9	0.0
3	R.O.	549.7	549.7	0.0
4	M.T.	474.4	474.1	0.3
5	S.G.	795.9	794.3	1.6
6				
7				
8	Condenser	231.8	231.8	0.0
XAD Trap		318.9	318.9	0.0
			Total (g)	1.9

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: Train 03 (reused after T16-OCA)
Trap 24

Signature: [signature]

Date: Nov 25/95

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DATE: 11/27/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HWB

Run #: B3-OC Traverse #: — Traverse Direction: — Start Time: 13:26 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading		Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
					Desired (ft^3)	Actual (ft^3)								
						47.188						84	84	
						48.688								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: JW

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QA/QC CHECKLIST

PROJECT # 5416265 DATE: Nov 25/95 TEST B3-OC

Client: Rigo + Rigo Layton, UTAH Location: B Stack Operator: NUB

Sample Type: Organics Blank Reference Method: EPA M23

Modifications: Recovery following Emm. Canister, train rinse w/ acetone/DCM, train proving w/ toluene.

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	NA
Avg. ΔP	⟷	"
Static positive or negative	⟷	"
Average Temperature	⟷	"
Estimate % H_2O	⟷	"
How estimated?	⟷	"
Estimate Gas Composition	⟷	O_2% ____ CO_2(%) ____ CO(ppm) ____
How Estimated?	⟷	NA
Proper nozzle selected?	✓	
K factor	⟷	NA
Number of sampling points per traverse	⟷	"
Probe markings correct?		"
Time per point	⟷	"
Number of readings per point	⟷	"
Barometric Pressure Measured?		"
Mercury		
Aneroid		
Other		
PROBE NOZZLE:		
Nickel plated stainless steel or	✓	
Stainless Steel or		
Glass or		
Quartz		
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	Proving rinse after T17-OCB
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or	✓	
Quartz or		
Other		
Cleaned according to protocol	✓	Proving rinse after T17-OCB
PROBE HEATING SYSTEM:		
Checked		NA
Temperature 250 ± 25°F		"
Stable		"

PROJECT # 541626.5 DATE: Nov 25/95 TEST B3-OC

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	----	
Connected to:		NA
inclined manometer		"
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak		NA
Pitot pressure gauge zeroed		"
Orifice pressure gauge zeroed	✓	"
Meter box levelled	✓	
Gas Temperature Sensor		NA
Thermocouple		"
Type		"
Temp. checked against ambient temp		"
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	Previously Train 03 after T16-OCA
FILTER TYPE		
Glass Fibre	✓	
Quartz		
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	X	
Filter heated		NA
Temperature (250 ± 25°F)		"
CONDENSER/XAD-2 TRAP		
Glass	✓	
Cleaned according to protocol	✓	Previously Train 03 after T16-OCA
Thermocouple attached to trap		NA
XAD-2 Trap covered with foil at all times	✓	

QA/QC CHECKLIST

PROJECT # 541626.5 DATE: Nov 25 /95 TEST B3-OC

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	Proving of Train-03 after T16-OCA
IMPINGERS		
No. of Impingers	→	5
Contents #1	→	MT
#2	→	RODI
#3	→	RODI
#4	→	MT
#5	→	S.G.
~~#6~~	→	
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly		NA
Modifications	→	
Grease used on joints	X	
Silica gel type	→	
New?		
Used?	✓	
Pre Test Leak Check		
Performed	X	
Rate	→	cfm@ "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off		NA
Is care taken to avoid scraping nipple or stackwall		"
Effective seal around probe when in-stack		"
Probe moved to traverse point at right time		"
Nozzle and pitot tube kept parallel to stack at all times		"
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F		NA
Probe temperature 250 ± 25°F		"
Filter box temperature 250 ± 25°F		"
Data forms completed and data recorded properly	✓	
Ice level checked		NA
Condition of silica gel	→	25% spent
Leak checks at port changes Before	→	NA cfm@ "Hg
After	→	" cfm@ "Hg
Final leak race acceptable	→	" cfm@ "Hg
General comments on sampling technique	→	
Sample recovery performed on-site?	✓	
Sample recovery performed by	→	RB
Clean-up area - General Environment	→	Clean
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

QA/QC CHECKLIST

PROJECT # 541,265 DATE: Nov 25/95 TEST B3-OC

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	↔	Teflon
Leak free	✓	
Petri Dishes: borosilicate glass		filter in cleaned foil in plastic bag
plastic		
Balance Type	↔	Top loader
Calibrated or QC checked	↔	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour	✓	25% spent
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		Good
Colour of Filter		white
Foil Wrapped?		yes
Probe Rinses		
Acetone (Dry)	✓	
Other (Toluene)	✓	
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents	✓	
Solvents	✓	
Resin	✓	
Blank Train	✓	
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

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EPS 1/RM/2
SEMI-VOLATILE ORGANIC (SVOC) SAMPLING TRAIN RECOVERY DATA FORM

LOCATION: B-STACK TEST #: B3-OC DATE: Nov 25/95 PROJECT NO.: 541-6265

Nozzle, Probe Liner Front Half Filter Holder All Equipment	Filter	Back Half Filter Holder and Condenser Coil All Equipment	XAD Resin	Impingers & ~~HPLC~~ Rinse Rose	Back Half Rinse
Wash and brush 3x each with ~~hexane~~ DCM and acetone. Rinse 3x with with ~~hexane~~ DCM and and acetone.	Remove and place on pre-cleaned foil fold in half and place in ~~petri dish~~. Ziplock bag	**Weigh Coil & Record Weight** ~~Soak 5 minutes each with hexane and acetone. Rinse 3x with hexane and acetone.~~ Toluene Rinse	**Weigh XAD Trap & Record Weight** Cap ends and wrap in foil.	Weigh impingers and record wts. Empty contents of #1, #2 and #3 into container #4. ~~Rinse 3x with HPLC water.~~	Rinse back half filter holder, condenser and impingers 1, 2 and 3 3x with hexane and acetone.

Container ~~TS1~~ TS2 Front Half Acetone Hexane Rinse	
Final Wt:	2520
Initial Wt:	263.3
Gain:	188.7

Container TS2 Filter	
Filter ID:	B3-OC
Colour:	White

Container TS3 Back Half Filter and Condenser Coil	
Final Wt:	438.4
Initial Wt:	263.1
Gain:	175.3
Colour:	Clear

Container TS4 XAD Resin

Wrap in Foil	
XAD:	046640
Colour:	White

Trap 24

Container TS5 Impinger Contents	
Final Wt:	474.3
Initial Wt:	263.2
Gain:	211.1
Colour:	Clear

Container TS6 Back Half Rinse	
Final Wt.:	
Initial Wt.:	
Gain:	
Colour:	

Mark Fluid Levels Seal and Label

Train & Proofing Identification	
Train No.:	03
~~HPLC~~ Rose Batch No.:	Zenow 95/10/26
Acetone Batch No.:	Cmedow 14123
~~Hexane~~ DCM Batch No.:	Cmedow 16700
Filter Batch No.:	Zenow 95/10/26 XAD No.: Trap 24
Train Assembled By:	HUB / NL
Train Recovered By:	RB

Reagent Blanks Collected?	Yes.
Combined Acetone/~~Hexane~~ DCM	Yes.
~~Combined Gly~~col/Water	Yes.
Blank Train Collected?	Yes.
Comments:	

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BOVAR-CONCORD Environmental

NOVEMBER 26, 1995

HCl METHOD 26 SAMPLING TRAIN
RECOVERY DATA FORM

PROJECT NO.: 5916265

LOCATION: _____ TEST #: 119-HCl DATE: 95-0

Impingers 1 and 2	Impingers 3 and 4
Weigh impingers Empty contents into container and rinse with DI water	Weigh impingers Empty contents into container and rinse with DI water

Container TS1 Impingers 1 and 2 0.1 N H2SO4 Contents and DI Water Rinses	Container TS2 Impingers 3 and 4 0.1 N NaOH Contents and DI Water Rinses
Final Wt.: 3[illegible]	Final Wt.: 132.7
Initial Wt.: 32.8	Initial Wt.: 32.7
Gain:	Gain: 100.0

77.1 65.1

Mark Liquid Level	Seal and Label

Train Identification
Train No.:
0.1 N H2SO4 Batch No.:
DI Water Batch No.:
0.1 N NaOH Batch No.:
Train Loaded By:
Recovered By:
Reagent Blank Submitted: Yes _____ No _____

SYSTEM CALIBRATION AND DRIFT CALCULATIONS

CLIENT	RIGO+RIGO	DATE	NOV26/95
PROJECT NUMBER	5416265	TIME START	08:18
SAMPLE LOCATION	STACK	TIME FINISH	11:02
	TEST NUMBER	T18CEMA	

INSTRUMENT SPAN VALUES

OXYGEN	25	%	CARBON DIOXIDE	20	%
SULPHUR DIOXIDE	1000	PPM	CARBON MONOXIDE	1000	PPM
NITROGEN OXIDES	1000	PPM	TOTAL HYDROCARBONS	100	PPM

ITEM	CAL.GAS VALUE	ANAL. CAL.	INITIAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	FINAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	DRIFT (% SPAN)
O2 ZERO	0	0.03	0.03	0.0	0	-0.1	-0.1
O2 CAL	9.91	9.84	9.8	-0.2	9.5	-1.4	-1.2
SO2 ZERO	0	1.1	1.9	0.1	1.3	0.0	-0.1
SO2 SPAN	149	149	145	-0.4	148	-0.1	0.3
NOX ZERO	0	0.9	1.7	0.1	2.7	0.2	0.1
NOX SPAN	302	305	304	-0.1	306	0.1	0.2
CO2 ZERO	0	0.03	0.04	0.1	0.06	0.2	0.1
CO2 SPAN	7.01	7.01	6.98	-0.2	7.07	0.3	0.5
CO ZERO	0	0.9	1	0.0	0.9	0.0	-0.0
CO SPAN	100	101	101	0.0	102	0.1	0.1
THC ZERO	0	0.3	0.13	-0.2	-1.1	-1.4	-1.2
THC SPAN	20.1	22.2	22.2	0.0	20.9	-1.3	-1.3

DRIFT CRITERIA <5% SPAN
BIAS CRITERIA <5% SPAN

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T18-OC-A
LOC. : B STACK

RUN TIME : 08:36 TO 10:56

ORGANICS CONCENTRATION	628.2 ug/DSm3	0.2745 gr/1000 DScf
	301.4 ug/Am3	0.1317 gr/1000 Acf
@ 12% CO2	747.1 ug/DSm3	0.3265 gr/1000 DScf
ORGANICS EMISSION RATE	7.649 mg/s	424.96 gr/hr
SAMPLE GAS VOLUME	1.5921 DSm3	56.220 DScf
AVERAGE ISOKINETICITY	98.1 %	

FLUE GAS CHARACTERISTICS

MOISTURE	14.96 %	
TEMPERATURE	171.5 deg C	340.7 deg F
FLOW	43830 DSm3/hr	25797 DScfm
	91351 Am3/hr	53768 Acfm
VELOCITY	17.83 m/s	3509.5 fpm

GAS ANALYSIS	O2	10.02 %
	CO2	10.09 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.13 g/gmole D.B.
	MOL. WT.	28.31 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO	DATE : 95 11 26
JOBSITE : LAYTON UTAH	RUN : T18-OC-A
REF.No. : 5416265	LOC. : B STACK

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	85.4 kPa	25.20 in.Hg
STATIC PRESSURE	-99.6 Pa	-0.40 in.H2O
NOZZLE DIAMETER	5.79 mm	0.2280 in.
PITOT COEFFICIENT	0.796	
METER CORRECTION FACTOR	0.983	

CONDENSATE COLLECTION

RESIN TRAP CONDENSATE	0.0 g
CONDENSATION IN IMPINGER 1	190.3 g
CONDENSATION IN IMPINGER 2	2.3 g
CONDENSATION IN IMPINGER 3	0.5 g
CONDENSATION IN IMPINGER 4	0.1 g
CONDENSATION IN IMPINGER 5	0.0 g
SILICA GEL WEIGHT GAIN	12.9 g
TOTAL MOISTURE GAIN	206.1 g

ORGANICS COLLECTION

FILTER ORGANICS	1.0000 mg
WASHINGS ORGANICS	0.0000 mg
RESIN ORGANICS	0.0000 mg
IMPINGER ORGANICS	0.0000 mg
TOTAL ORGANICS	1.0000 mg

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T18-OC-A
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1													
1	0.0	334	0.500	0.70	50.38	82	243	240	50	42	8.0	1.0	99.9
1	3.0	335	0.500	0.68	51.90	81	243	242	45	41	9.0	1.0	98.7
2	6.0	334	0.500	0.67	53.40	81	242	242	40	37	9.0	2.0	98.0
2	9.0	332	0.500	0.70	54.89	81	244	244	40	36	9.0	2.0	99.8
3	12.0	334	0.450	0.63	56.41	81	243	243	40	36	8.0	3.0	99.1
3	15.0	336	0.550	0.70	57.84	81	243	245	40	36	9.0	3.0	98.7
4	18.0	340	0.600	0.75	59.41	80	244	245	40	36	9.0	4.0	97.2
4	21.0	343	0.600	0.78	61.02	80	243	243	39	36	9.0	4.0	96.9
5	24.0	344	0.550	0.70	62.62	80	243	245	40	37	9.0	5.0	96.1
5	27.0	344	0.550	0.75	64.14	80	244	243	40	37	9.0	5.0	96.1
6	30.0	341	0.680	0.90	65.66	79	245	243	40	37	10.0	6.0	97.8
6	33.0	340	0.700	0.95	67.38	79	243	246	40	38	11.0	6.0	98.6
7	36.0	340	0.700	0.94	69.14	79	244	245	40	38	11.0	7.0	98.6
7	39.0	340	0.660	0.88	70.90	79	246	249	40	38	10.0	7.0	98.7
8	42.0	335	0.770	1.05	72.61	79	245	244	40	38	11.0	8.0	97.5
8	45.0	335	0.800	1.10	74.44	79	244	242	40	39	12.0	8.0	97.9
9	48.0	325	0.550	0.72	76.31	79	245	244	40	39	9.0	9.0	96.5
9	51.0	325	0.550	0.75	77.85	79	244	244	40	39	9.0	9.0	97.1
10	54.0	320	0.450	0.65	79.40	79	244	244	40	39	8.0	10.0	100.1
10	57.0	320	0.450	0.64	80.85	79	244	244	40	39	8.0	10.0	99.4
	60.0				82.29								
TRAVERSE NO. 2													
1	0.0	344	0.680	0.90	82.87	76	243	236	41	40	11.0	1.0	98.1
1	3.0	344	0.660	0.90	84.58	76	242	236	41	39	11.0	1.0	98.9
2	6.0	343	0.660	0.90	86.28	77	243	234	41	39	11.0	2.0	98.7
2	9.0	346	0.720	1.00	87.98	77	244	237	42	39	11.0	2.0	99.2
3	12.0	348	0.880	1.10	89.76	77	244	248	42	39	12.0	3.0	93.3
3	15.0	349	0.880	1.15	91.61	77	245	243	42	40	12.0	3.0	92.9
4	18.0	351	0.900	1.35	93.45	77	244	241	42	40	13.0	4.0	98.0
4	21.0	351	0.900	1.35	95.41	78	244	244	43	41	14.0	4.0	99.8
5	24.0	353	0.900	1.35	97.41	78	246	242	43	43	14.0	5.0	100.0
5	27.0	350	0.800	1.15	99.41	78	245	239	44	43	13.0	5.0	101.0
6	30.0	347	0.620	0.85	101.32	78	244	241	46	44	10.0	6.0	98.2
6	33.0	348	0.800	1.15	102.96	78	246	235	46	44	12.0	6.0	98.2
7	36.0	353	0.940	1.40	104.82	78	244	239	45	45	14.0	7.0	99.8

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T18-OC-A
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	351	0.700	0.95	106.86	78	245	237	45	45	12.0	7.0	98.4
8	42.0	351	0.700	0.95	108.60	78	245	244	45	45	12.0	8.0	98.4
8	45.0	350	0.760	1.05	110.34	78	245	244	48	48	12.0	8.0	98.2
9	48.0	347	0.680	0.92	112.15	78	244	237	47	47	11.0	9.0	99.0
9	51.0	344	0.680	0.92	113.88	78	245	239	47	47	11.0	9.0	97.6
10	54.0	330	0.600	0.85	115.59	78	244	241	47	47	11.0	10.0	99.4
10	57.0	330	0.600	0.85	117.24	78	243	240	45	45	10.0	10.0	98.8
	60.0				118.88								
		341	0.660	0.92		79	244	242	42	40	10.6		98.1

ISOKINETIC TEST DATA FORM

Sample Type: Organics Reference Method: EPA M23 Page 1 of 5

Client:	Rigo + Rigo	City, Province:	Layton, UTAH
Project Number:	5416265	Test Number:	T18-dA
Sample Location:	B Stack	Date:	Nov 26/95
Start Time:	8:36	Finish Time:	10:56
Barometric Press. (in Hg):	25.2	Stack Press(in H_2O): + or -:	-0.40
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes No

Sample Box Number:	T1	Gas Meter Factor:	0.983	Calibration Date:	Sept 19/95
Nozzle I.D.:	T1-2	Nozzle Diameter (in.):	0.228	Calibration Date:	Nov 16/95
Probe I.D.:	T2-7	Pitot Coefficient:	0.796	Calibration Date:	Sept/95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 10.09 O_2 (%): 10.02 CO (ppm): ____ Other: ____

Impinger 1 (g)	190.3	Assumed H_2O (%):	16
Impinger 2 (g)	2.3	Filter I.D. #:	—
Impinger 3 (g)	0.5	Net Filter Wt. (g):	—
Impinger 4 (g)	0.1	Net Probe Wash Wt. (g):	—
Impinger 5 (g) S.G.	12.9	Imp. Residue Wt. (g):	—
~~Impinger 6 (g)~~ Condenser	0.0		
XAD-2 Trap (g)	0.0		
Total H_2O Condensed (g)	206.1		

Sampling Comments: Train 08
Trap #8

Process Rate:

Control Equipment Operation:

Process Comments:

Signature: [signature] Date: Nov 26/95

MOISTURE ANALYSIS DATA SHEET

Project #:	541626 E	Client:	Ecofuel
Date:	11/26/95	Test:	TRS-OC-A
Sample Location:	stack B	Filter I.D.:	
Pre Weights by:	N.L	Post Weights by:	NL

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	MT	624.6	434.3	190.3
2	RODI	571.5	569.2	2.3
3	RODI	591.1	590.6	0.5
4	MT	471.9	471.8	0.1
5	S.G.	808.8	795.9	12.9
6				
7				
8	Condenser	279.7	279.7	0.0
XAD Trap		249.9	249.9	0.0
			Total (g)	206.1

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: Trap #08
Train 08

Signature: [signature]

Date: Nov 26/95

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1 2
4 3

BOVAR-CONCORD Environmental

DATE: 11 / 26 / 95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: NUB

Run #: T8-OCIA Traverse #: 1 Traverse Direction: North Start Time: 8:36 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.50	0.7	.494	50.38	334	243	240	42	50	82	81	8
	3		0.50	0.68	.494	51.90	335	243	242	41	45	82	80	9
2	6		0.50	0.67	.494	53.40	334	242	242	37	40	82	80	9
	9		0.50	0.7	.502	54.89	332	244	244	36	40	82	80	9
3	12		0.45	0.63	.468	56.41	334	243	243	36	40	82	80	8
	15		0.55	0.70	.518	57.84	336	243	245	36	40	82	79	9
4	18		0.60	0.75	.541	59.41	340	244	245	36	40	81	79	9
	21		0.60	0.78	.541	61.02	343	243	243	36	39	81	78	9
5	24		0.55	0.70	.518	62.62	344	243	245	37	40	81	79	9
	27		0.55	0.75	.518	64.14	344	244	243	37	40	81	79	9
6	30		0.68	0.90	.576	65.66	341	245	243	37	40	80	78	10
	33		0.70	0.95	.584	67.38	340	243	246	38	40	80	78	11

Pre test leak check: Rate (cfm) 0.012 at 15 inches Hg (Vacuum) Leak Volume Start: 49.665 Leak Volume End: 50.38

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/26/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T18-OCA Traverse #: 1 Traverse Direction: North Start Time: _____ Finish Time: 9:36

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.70	0.94	.584	69.14	340	244	245	38	40	80	78	11
	39		0.66	0.88	.567	70.90	340	246	249	38	40	80	78	10
8	42		0.77	1.05	.613	72.61	335	245	244	38	40	80	78	11
	45		0.80	1.10	.625	74.44	335	244	242	39	40	80	77	12
9	48		0.55	0.72	.527	76.31	325	245	244	39	40	80	77	9
	51		0.55	0.75	.527	77.85	325	244	244	39	40	80	77	9
10	54		0.45	0.65	.476	79.40	320	244	244	39	40	80	77	8
	57		0.45	0.64	.476	80.85	320	244	244	39	40	80	77	8
	60					82.29								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.01 at 15 inches Hg (Vacuum) Leak Volume Start: 82.29 Leak Volume End: 82.60

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/26/95

SAMPLING TRAINS DATA SHEET

Client: Regu + Regu Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T18-OCA Traverse #: 2 Traverse Direction: East Start Time: 9:56 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.68	0.90	.576	82.87	344	243	236	40	41	76	75	11
	3		0.66	0.90	.567	84.58	344	242	236	39	41	77	75	11
2	6		0.66	0.90	.567	86.28	343	243	234	39	41	78	75	11
	9		0.72	1.0	.593	87.98	346	244	237	39	42	78	75	11
3	12		0.80	1.1	.625	89.76	348	244	248	39	42	79	75	12
	15		0.80	1.15	.625	91.61	349	245	243	40	42	79	75	12
4	18		0.90	1.35	.663	93.45	351	244	241	40	42	79	75	13
	21		0.90	1.35	.663	95.41	351	244	244	41	43	80	76	14
5	24		0.90	1.35	.663	97.41	353	246	242	43	43	80	76	14
	27		0.80	1.15	.625	99.41	350	245	239	43	44	80	76	13
6	30		0.62	0.85	.550	101.32	347	244	241	44	46	80	76	10
	33		0.80	1.15	.625	102.96	348	246	235	44	46	80	76	12

Pre test leak check: Rate (cfm) .009 at 15 inches Hg (Vacuum) Leak Volume Start: 82.60 Leak Volume End: 82.87

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11 / 26 / 95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HWB

Run #: T18-OCA Traverse #: 2 Traverse Direction: East Start Time: _____ Finish Time: 10:56

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.94	1.4	.677	104.82	353	244	239	45	50	80	76	14
	39		0.70	0.95	.584	106.86	351	245	237	45	50	80	76	12
8	42		0.70	0.95	.584	108.60	351	245	244	45	55	80	76	12
	45		0.76	1.05	.609	110.34	350	245	244	48	58	80	76	12
9	48		0.68	0.92	.576	112.15	347	244	237	47	51	80	76	11
	51		0.68	0.92	.576	113.88	344	245	239	47	51	80	76	11
10	54		0.60	0.85	.541	115.59	330	244	241	47	51	80	76	11
	57		0.60	0.82	.541	117.24	330	243	240	45	50	80	76	10
	60					118.88								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.01 at 16 inches Hg (Vacuum) Leak Volume Start: 118.88 Leak Volume End: 119.20

K value calculated by: _____ Checked by: _____ Operator Signature: HWB

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BOVAR-CONCORD Environmental

QA/QC CHECKLIST

PROJECT # 5416265 DATE: Nov 26/95 TEST T18-OCA

Client: Rigo + Rigo Layton, UTAH Location: B3 Stack Operator: HWB

Sample Type: Organics Reference Method: EPA M23

Modifications: Recovery following Env. Canada procedure with train rinse w/ acetone / DCM + proving rinse with toluene

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	↔	
Static positive or negative	↔	-ve
Average Temperature	↔	350°F
Estimate % H_2O	↔	16
How estimated?	↔	previous tests
Estimate Gas Composition	↔	O_2% 10 CO_2(%) 10 CO(ppm) ___
How Estimated?	↔	CEM
Proper nozzle selected?	✓	
K factor	↔	0.098 at 350°F
Number of sampling points per traverse	↔	10
Probe markings correct?	✓	
Time per point	↔	6
Number of readings per point	↔	2
Barometric Pressure Measured?		
Mercury		
Aneroid		
Other	✓	Watch
PROBE NOZZLE:		
Nickel plated stainless steel or	✓	
Stainless Steel or		
Glass or		
Quartz		
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	Proving rinse after B3-OC
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or	✓	
Quartz or		
Other		
Cleaned according to protocol	✓	Proving rinse after B3-OC
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 5416265 DATE: Nov 26/95 TEST T18-OCA

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	↔	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	
FILTER TYPE		
Glass Fibre	✓	
Quartz		
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	X	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	✓	
Cleaned according to protocol	✓	
Thermocouple attached to trap	✓	
XAD-2 Trap covered with foil at all times	✓	

PROJECT # 5416265 DATE: Nov 26/95 TEST T18-OCA

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers		5
Contents #1		MT
#2		ROI
#3		ROI
#4		MT
#5		S.G
~~#6~~		
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly	✓	
Modifications		
Grease used on joints	X	
Silica gel type		
New?		
Used?	✓	8
Pre Test Leak Check		
Performed	✓	
Rate		0.012 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	✓	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel		25% spent
Leak checks at port changes Before		0.01 cfm@ 15 "Hg
After		0.009 cfm@ 15 "Hg
Final leak race acceptable		0.01 cfm@ 10 "Hg
General comments on sampling technique		
Sample recovery performed on-site?	✓	
Sample recovery performed by		RB
Clean-up area - General Environment		Clean
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

PROJECT # 5416265 DATE: Nov 26/95 TEST T18-OCA

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	↔	Teflon
Leak free	✓	
Petri Dishes: borosilicate glass		filters in cleaned foil in plastic bag
plastic		
Balance Type	↔	top loader
Calibrated or QC checked	↔	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour	✓	50% spent
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		Good
Colour of Filter		white
Foil Wrapped?		yes
Probe Rinses		
Acetone DCM	✓	
Other Toluene	✓	
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents	✓	
Solvents	✓	
Resin	✓	
Blank Train	✓	
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

-1121

EPS 1/RM/2
SEMI-VOLATILE ORGANIC (SVOC) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: B-Stack TEST #: T18-OC-A DATE: Nov. 26/95 PROJECT NO.: 541 6265

Nozzle, Probe Liner Front Half Filter Holder All Equipment	Filter	Back Half Filter Holder and Condenser Coil All Equipment	XAD Resin	Impingers & ~~HPLC~~ Rinse RODS	Back Half Rinse
Wash and brush 3x each with ~~hexane~~ DCM and acetone. Rinse 3x with with ~~hexane~~ and and acetone. DCM	Remove and place on pre-cleaned foil fold in half and place in ~~petri dish~~. Ziploc bag	**Weigh Coil & Record Weight** ~~Soak 5 minutes each with hexane and acetone. Rinse 3x with hexane and acetone.~~ Toluene Rinse	**Weigh XAD Trap & Record Weight** Cap ends and wrap in foil.	Weigh impingers and record wts. Empty contents of #1, #2 and #3 into container. ~~Rinse 3x with HPLC water.~~	Rinse back half filter holder, condenser and impingers 1, 2 and 3 3x with hexane and acetone.

Container ~~TS1~~ TS1 Front Half Acetone Hexane Rinse	
Final Wt.:	519.8
Initial Wt.:	344.8
Gain:	175.0

Container TS2 Filter	
Filter ID:	T18-OC
Colour:	White

Container TS3 Back Half Filter and Condenser Coil	
Final Wt.:	544.1
Initial Wt.:	344.6
Gain:	199.5
Colour:	Clear

Container TS4 XAD Resin	
Wrap in Foil	
XAD:	046624
Colour:	White

Train 8

Container TS5 Impinger Contents	
Final Wt.:	664.9
Initial Wt.:	263.8
Gain:	401.1
Colour:	Clear

Container TS6 Back Half Rinse	
Final Wt.:	
Initial Wt.:	
Gain:	
Colour:	

Mark Fluid Levels Seal and Label

Train & Proofing Identification	
Train No.:	08
RODS ~~HPLC~~ Batch No.:	Zenon 95/10/26
Acetone Batch No.:	Caledon 14123
DCM ~~Hexane~~ Batch No.:	Caledon 16700
Filter Batch No.:	Zenon 95/10/26 XAD No.: Train 8
Train Assembled By:	HVB / NL
Train Recovered By:	RB

Reagent Blanks Collected?	Yes
Combined Acetone/~~Hexane~~ DCM	Yes
Combined Glycol/Water	Yes
Blank Train Collected?	Yes
Comments:	

EPSREC.DRW-May 95

BOVAR-CONCORD Environmental

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.26
RUN : T18-MP-A
LOC. : STABK B

RUN TIME : 8:36 TO 10:56

METALS CONCENTRATION	0.0 ug/DSm3	0.0000 gr/1000 DScf
	0.0 ug/Am3	0.0000 gr/1000 Acf
METALS EMISSION RATE	0.000 mg/s	0.00 gr/hr
SAMPLE GAS VOLUME	1.8754 DSm3	66.222 DScf
AVERAGE ISOKINETICITY	97.1 %	

FLUE GAS CHARACTERISTICS

MOISTURE	15.04 %	
TEMPERATURE	172.0 deg C	341.6 deg F
FLOW	45555 DSm3/hr	26813 DScfm
	95169 Am3/hr	56015 Acfm
VELOCITY	18.57 m/s	3656.1 fpm

GAS ANALYSIS	O2	10.02 %
	CO2	10.09 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.13 g/gmole D.B.
	MOL. WT.	28.30 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO	DATE : 95.11.26
JOBSITE : LAYTON UTAH	RUN : T18-MP-A
REF.No. : 5416265	LOC. : STABK B

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	85.4 kPa	25.20 in.Hg
STATIC PRESSURE	-129.5 Pa	-0.52 in.H2O
NOZZLE DIAMETER	6.20 mm	0.2440 in.
PITOT COEFFICIENT	0.798	
METER CORRECTION FACTOR	1.006	

CONDENSATE COLLECTION

CONDENSATION IN IMPINGER 1	191.9 g
CONDENSATION IN IMPINGER 2	37.6 g
CONDENSATION IN IMPINGER 3	5.0 g
CONDENSATION IN IMPINGER 4	0.2 g
CONDENSATION IN IMPINGER 5	-0.1 g
CONDENSATION IN IMPINGER 6	0.5 g
SILICA GEL WEIGHT GAIN	9.1 g
TOTAL MOISTURE GAIN	244.2 g

METALS COLLECTION

FILTER METALS	0.0000 mg
WASHINGS METALS	0.0000 mg
IMPINGER METALS	0.0000 mg
TOTAL METALS	0.0000 mg

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.26
RUN : T18-MP-A
LOC. : STABK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1												
1	0.0	337	0.690	1.25	368.59	82	235	245	42	1.0	1.0	96.6
1	3.0	337	0.670	1.25	370.52	83	235	246	42	1.0	1.0	96.9
2	6.0	337	0.650	1.20	372.43	84	236	252	36	1.0	2.0	96.0
2	9.0	335	0.650	1.20	374.30	84	236	238	35	1.5	2.0	95.9
3	12.0	333	0.580	1.15	376.17	84	236	255	33	1.5	3.0	100.8
3	15.0	338	0.820	1.55	378.03	84	236	250	33	1.5	3.0	98.5
4	18.0	341	0.950	1.80	380.18	85	235	242	33	1.5	4.0	98.8
4	21.0	343	0.970	1.80	382.50	85	236	243	33	2.0	4.0	97.0
5	24.0	343	0.850	1.55	384.80	85	236	250	34	2.0	5.0	97.7
5	27.0	343	0.670	1.25	386.97	85	236	248	35	2.0	5.0	97.8
6	30.0	340	0.670	1.25	388.90	85	237	253	35	2.0	6.0	96.6
6	33.0	340	0.690	1.25	390.81	85	237	252	35	2.0	6.0	95.2
7	36.0	340	0.670	1.25	392.72	85	237	249	36	2.0	7.0	96.1
7	39.0	339	0.650	1.25	394.62	85	237	254	36	2.0	7.0	97.5
8	42.0	341	0.820	1.50	396.52	85	237	250	36	2.0	8.0	94.8
8	45.0	343	0.930	1.55	398.59	85	237	249	36	2.0	8.0	93.0
9	48.0	343	0.750	1.40	400.75	85	237	243	36	2.0	9.0	98.2
9	51.0	344	0.830	1.55	402.80	85	237	258	36	2.0	9.0	98.5
10	54.0	344	0.770	1.40	404.96	85	239	245	36	2.0	10.0	97.0
10	57.0	345	0.710	1.30	407.01	85	239	245	37	2.0	10.0	96.6
	60.0				408.97							
TRAVERSE NO. 2												
1	0.0	322	0.600	1.05	409.68	82	236	259	35	2.0	1.0	97.3
1	3.0	324	0.550	1.00	411.51	82	236	241	35	2.0	1.0	97.2
2	6.0	326	0.550	0.99	413.26	83	236	252	35	2.0	2.0	96.7
2	9.0	326	0.610	1.05	415.00	83	236	258	35	2.0	2.0	95.0
3	12.0	338	0.810	1.50	416.80	83	238	251	35	2.0	3.0	96.0
3	15.0	339	0.760	1.50	418.88	84	238	245	35	2.0	3.0	97.2
4	18.0	348	0.950	1.80	420.92	84	238	262	35	2.0	4.0	99.1
4	21.0	351	0.940	1.80	423.23	84	238	260	35	2.0	4.0	97.2
5	24.0	350	0.940	1.80	425.48	84	238	260	35	2.0	5.0	98.4
5	27.0	349	0.750	1.40	427.76	84	238	256	37	2.0	5.0	98.8
6	30.0	347	0.600	1.00	429.81	84	238	252	37	2.0	6.0	97.3
6	33.0	348	0.670	1.25	431.62	84	237	254	37	2.0	6.0	97.8
7	36.0	353	0.670	1.25	433.54	84	237	250	37	2.0	7.0	98.6

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.26
RUN : T18-MP-A
LOC. : STABK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	351	0.600	1.00	435.47	84	238	253	37	2.0	7.0	95.4
8	42.0	350	0.550	0.99	437.24	84	238	253	37	2.0	8.0	97.3
8	45.0	349	0.600	1.00	438.97	84	238	259	37	2.0	8.0	95.3
9	48.0	350	0.720	1.35	440.74	84	232	254	37	2.0	9.0	96.0
9	51.0	348	0.670	1.30	442.69	84	235	253	37	2.0	9.0	99.8
10	54.0	344	0.550	1.00	444.65	84	238	250	37	2.0	10.0	98.1
10	57.0	343	0.580	1.00	446.40	84	239	250	37	2.0	10.0	96.5
	60.0				448.17							
		342	0.711	1.32		84	237	251	36	1.9		97.1

ISOKINETIC TEST DATA FORM

Sample Type: M5 - metals Reference Method: EPA M29 Page 1 of 5

Client:	Rigo + Rigo	City, Province:	Layton, Utah
Project Number:	541626	Test Number:	T18-MP-A
Sample Location:	B Stack	Date:	951126
Start Time:	8:36	Finish Time:	10:50
Barometric Press. (in Hg):	25.2	Stack Press(in H_2O): + or -:	
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes No ✓

Sample Box Number:	T3	Gas Meter Factor:	1.006	Calibration Date:	Sept 95
Nozzle I.D.:	Q2	Nozzle Diameter (in.):	.244	Calibration Date:	Nov 95
Probe I.D.:	T1-7'	Pitot Coefficient:	.798	Calibration Date:	Sept 95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): ____ O_2 (%): ____ CO (ppm): ____ Other: ____

Impinger 1 (g)	191.9	Assumed H_2O (%):	16
Impinger 2 (g)	37.6	Filter I.D. #:	
Impinger 3 (g)	5.0	Net Filter Wt. (g):	
Impinger 4 (g)	0.2	Net Probe Wash Wt. (g):	
Impinger 5 (g)	-.1	Imp. Residue Wt. (g):	
Impinger 6 (g)	0.5		
~~XAD 2 Trap~~ (g) S.G.	9.1		
Total H_2O Condensed (g)	244.2		

Sampling Comments:

Process Rate:

Control Equipment Operation: ESP

Process Comments:

Signature: [signature] Date: 951126

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	R&R
Date:	95·11·26	Test:	T18-MP-A
Sample Location:	Stack B	Filter I.D.:	528
Pre Weights by:	JD	Post Weights by:	JP

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	661.4	469.5	191.9
2	5% HNO_3 10% H_2O_2	617.2	579.6	37.6
3	5% HNO_3 10% H_2O_2	613.4	608.4	5.0
4	Blank	493.0	492.8	0.2
5	$KMnO_4$	579.4	579.5	-0.1
6	$KMnO_4$	604.5	578.5	0.5
7	S.G.	834.5	823.4	9.1
8				
XAD Trap				
			Total (g)	244.2

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights	295.0	295.3	✓	JA
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments:

Signature: [signature]

Date: 95. 11.26

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 26

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: SW/JM

Run #: T18mp-A Traverse #: 2 Traverse Direction: IN Start Time: 9:56 Finish Time: 10:56

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		.60	1.05		409.678	322	236	259	35	NA	82	81	2.0
1	3		0.55	1.0	411.478	411.51	324	236	241	35		83	81	2.0
2	6		0.55	0.99	413.234	413.26	326	236	252	35		84	81	2.0
2	9		0.61	1.05	415.011	415.00	326	236	258	35		84	81	2.0
3	12		0.81	1.5	416.844	416.80	338	238	257	35		85	81	2.0
3	15		0.76	1.5	418.925	418.88	339	238	245	35		86	81	2.0
4	18		0.95	1.8	420.906	420.92	348	238	262	35		86	81	2.0
4	21		0.94	1.8	423.186	423.23	351	238	260	35		86	81	2.0
5	24		0.94	1.8	425.484	425.48	350	238	260	35		86	81	2.0
5	27		0.75	1.4	427.734	427.76	349	238	256	37		86	82	2.0
6	30		0.60	1.0	429.773	429.81	347	238	252	37		86	82	2.0
6	33		0.67	1.25	431.610	431.62	348	237	254	37		86	82	2.0
7	36		0.67	1.25	433.523	433.54	353	237	250	37		86	82	2.0

Pre test leak check: Rate (cfm) .007 at 17 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .007 at 16.5 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 26

SAMPLING TRAINS DATA SHEET

Client: Rhodia Project #: 5416265 Sample Location: B Stack Operators: Tim/Jim

Run #: T18-mP-A Traverse #: 2 Traverse Direction: IN Start Time: 9:56 Finish Time: 10:56

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.60	1.0	435.443	435.47	351	238	253	37	NA	86	82	2.0
8	42		0.55	0.99	*437.27	437.24	350	238	253	37		86	82	2.0
8	45		0.60	1.0	438.964	438.97	349	238	259	37		86	82	2.0
9	48		0.72	1.35	*440.77	440.74	350	232	254	37		86	82	2.0
9	51		0.67	1.3	442.712	442.69	348	235	253	37		86	82	2.0
10	54		0.55	1.0	*444.593	444.65	344	238	250	37		86	82	2.0
10	57		0.58	1.0	446.374	446.40	343	239	250	37		86	82	2.0
10	60				448.171	448.174								

Pre test leak check: Rate (cfm) .007 at 17 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .007 at 11.5 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

DATE: 95 / 11 / 26

SAMPLING TRAINS DATA SHEET

Client: Rigs + Rigs Project #: 5416265 Sample Location: B Stack Operators: SW/JW

Run #: T18-MP-A Traverse #: 1 Traverse Direction: IN Start Time: 8:36 Finish Time: 9:36

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.69	1.25		368.592	337	235	245	42	NA	82	81	1.0
1	3		0.67	1.25	370.523	370.52	337	235	246	42		84	81	1.0
2	6		0.65	1.2	372.423	372.43	337	236	252	36		86	82	1.0
2	9		0.65	1.2	374.304	374.30	335	236	238	35		86	82	1.5
3	12		0.58	1.15	376.174	376.17	333	236	255	33		86	82	1.5
3	15		0.82	1.55	377.941	378.03	338	236	250	33		86	82	1.5
4	18		0.95	1.8	380.135	380.18	341	235	242	33		87	83	1.5
4	21		0.97	1.8	382.446	382.50	343	236	243	33		87	83	2.0
5	24		0.85	1.55	384.789	384.80	343	236	250	34		87	83	2.0
5	27		0.67	1.25	386.943	386.97	343	236	248	35		87	83	2.0
6	30		0.67	1.25	388.873	388.90	340	237	253	35		87	83	2.0
6	33		0.69	1.25	390.803	390.81	340	237	252	35		87	83	2.0
7	36		0.67	1.25	392.741	392.72	340	237	249	36		87	83	2.0

Pre test leak check: Rate (cfm) .003 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .008 at 22 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

BOVAR-CONCORD Environmental

DATE: 95 / 11 / 26

SAMPLING TRAINS DATA SHEET

Client: Rig+Flag Project #: 5416265 Sample Location: B Stack Operators: JW/Jm

Run #: TIB-MP-A Traverse #: 1 Traverse Direction: 1X Start Time: 8:36 Finish Time: 9:36

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
											NA			
7	39		0.65	1.25	394.623	394.62	339	237	254	36		87	83	2.0
8	42		0.82	1.5	*396.494	396.52	341	237	250	36		87	83	2.0
8	45		0.83	1.55	398.625	398.59	343	237	249	36		87	83	2.0
9	48		0.75	1.4	*400.708	400.75	343	237	243	36		87	83	2.0
9	51		0.83	1.55	402.763	402.80	344	237	258	36		87	83	2.0
10	54		0.77	1.4	*404.918	404.96	344	239	245	36		87	83	2.0
10	57		0.71	1.3	407.000	407.01	345	239	245	37		87	83	2.0
10	60				408.969	408.969								

Pre test leak check: Rate (cfm) .003 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .008 at 22 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

PROJECT # 5416265 DATE: 95/1/26 TEST T18-MP-A

Client: Rizo + Rizo Location: B Stack Operator: SW

Sample Type: M5 - Metals Reference Method: EPA M29

Modifications:

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	↔	
Static positive or negative	↔	neg
Average Temperature	↔	
Estimate % H_2O	↔	16
How estimated?	↔	M5
Estimate Gas Composition	↔	O_2% ____ CO_2(%) ____ CO(ppm) ____
How Estimated?	↔	
Proper nozzle selected?		
K factor	↔	
Number of sampling points per traverse	↔	10
Probe markings correct?	✓	
Time per point	↔	6
Number of readings per point	↔	2
Barometric Pressure Measured?	✓	
Mercury		
Aneroid		
Other		watch.
PROBE NOZZLE:		
Nickel plated stainless steel or		
Stainless Steel or		
Glass or		
Quartz	✓	
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or		
Quartz or	✓	
Other		
Cleaned according to protocol	✓	
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 5416265 DATE: 951126 TEST T18 MP-A

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	→	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type	✓	K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	
FILTER TYPE		
Glass Fibre		
Quartz	✓	
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	✓	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass		
Cleaned according to protocol	NA	
Thermocouple attached to trap		
XAD-2 Trap covered with foil at all times		

PROJECT # 5416265 DATE: 951126 TEST T1B-MP-A

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers	7	
Contents #1		
#2		
#3		
#4		
#5		
#6		
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly		
Modifications		
Grease used on joints	✓	
Silica gel type		
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate		.003 cfm@ 15 "Hg
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	NA	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel		good
Leak checks at port changes Before		.008 cfm@ 22 "Hg
After		.007 cfm@ 17 "Hg
Final leak race acceptable		.007 cfm@ 16.5 "Hg
General comments on sampling technique		
Sample recovery performed on-site?	✓	
Sample recovery performed by		JA
Clean-up area - General Environment		
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

PROJECT # 5416265 DATE: 95/11/26 TEST T/B-MP-A

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	⟷	teflon
Leak free	✓	
Petri Dishes: borosilicate glass		
plastic	✓	
Balance Type	⟷	digital top loader
Calibrated or QC checked	⟷	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour		good - pink/blue.
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		
Colour of Filter		
Foil Wrapped?		
Probe Rinses		
Acetone	✓	
Other	✓	HNO_3
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents		
Solvents		
Resin		
Blank Train		
Samples labelled and stored properly		
Liquid levels marked		
Samples delivered to lab		

EPA METHOD 29
METALS / PARTICULATE (MP) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: Stack B TEST #: T18-MP-A DATE: 95.11.26 PROJECT NO.: 5416265

Probe Liner, Nozzle Front Half Filter Housing	Probe Liner, Nozzle Front Half Filter Housing	Filter	Impingers 1, 2, 3	Back Half Filter Holder Filter Support	Impinger 4	Impinger 5, 6	Impinger 5, 6	Impinger 7
Brush and rinse with 100 mL acetone	Rinse with 100 mL 0.1 N HNO3	Carefully remove filter from support with Teflon-coated tweezers and place in petri dish	Weigh impingers empty contents into container	Rinse back half filter holder filter support and rinse empty impingers with 100 mL 0.1 N HNO3	weigh impinger empty contents into container 5A	Weigh impingers empty contents into container 5B	Rinse with 25 mL 8 N HCL	Weigh impinger and discard or recycle silica gel
Check visually to see if particulate is removed if not repeat step above	Container TS3 Front Half 0.1 N HNO3 Rinse Final Wt.: 585.3 Initial Wt.: 432.5 Gain: 152.8 Comments:	Brush loose particulate onto filter	Container TS4-1 Impinger 4 Contents Final Wt.: 870.7 Initial Wt.: 431.7 Gain: 439.0	Container TS4-2 0.1 N HNO3 Back Half Impinger Rinse Final Wt.: 632.8 Initial Wt.: 432.1 Gain: 200.7 Colour:	Rinse with 100 mL 0.1 N HNO3	Rinse 3x with 100 mL Acidified KMnO4	Place rinsing in Container 5C which contains 200 mL of water	
Container TS2 Front Half Acetone Rinse Final Wt.: 514.5 Initial Wt.: 431.6 Gain: 82.9 Comments:		Filter TS2 Seal petri dish with tape Colour: Filter #:			Container TSA Impinger 4 Contents Final Wt.: 527.3 Initial Wt.: 431.2 Gain: 96.1	Rinse with 100 mL water Container 5B Impinger 5 & 6 KMnO4 Content and Rinses Final Wt.: 891.1 Initial Wt.: 433.3 Gain: 457.8 Colour:	Container 5C HCL Rinse Final Wt.: 672.6 Initial Wt.: 431.5 Gain: 241.1 Colour:	

Train Identification	Blanks	
Train No.:		
HNO3 / H2O2 Batch No.:	Container 9	200 mLs
DI Water Batch No.:	Container 8B	100 mLs
Acetone Batch No.:	Container 7	100 mLs
0.1 N HNO3 Batch No.:	Container 8A	300 mLs
Acidified KMnO4 Batch No.:	Container 10	100 mLs
8 N HCl / Batch No.: DI Water	Container 11	25 mL / 200 mL
Filter Number:	Container 12	* _____

Mark Liquid Level on Containers
Seal and Label Containers
Reagent Blanks Submitted? Yes ✓ No ____
Prepare Fresh Acidified KMnO4 Daily ✓

M29REC.DRW-May 95

BOVAR-CONCORD Environmental

METHOD 26
HCl SAMPLING DATA FORM

Company Name	DAVIS COUNTY	Plant Location	LAYTON UTAH	Source Name	STACK 5
Test Date	NOV 26/95	Test Number	[illegible] 4/13	Job Number	5211265
Sampling for	HCl	Meter Box	111/1.001	B.P. mm/inHg	852 mbar

ABSORBING SOL'N	15 ml 0.1 N H_2SO_4	15 ml 0.1 N H_2SO_4	15 ml 0.1 N NaOH	15 ml 0.1 N NaOH	Silica Gel	GAS	1	2	3	4
WEIGHTS	IMP 1	IMP 2	IMP 3	IMP 4	IMP 5	READINGS				
EMPTY						O2				
FILLED FINAL						CO2				
FILLED INITIAL						CO				
DIFFERENCE						TIME				

OPERATOR	JM	Sample Rate (Lpm)	N2	H20 Condensed	
Lk.Chk, (Init.)	0 cc/min	Lk. Chk. (Final)	0 cc/min	Probe Purged	(Yes) No)

Sample Time	Clock Time	Volume m^3 L Desired	Actual	Vacuum in.Hg	Meter Temp. °C/°F	Probe Temp. °C/°F	Box Temp. °C/°F	Impinger Temp. °C/°F
0			248.6	4	32.5	240	208	
10	5		248.95	4	33.5	260	203	
20	10		249.7	4	36	330	221	
30	15		249.75	3.5	35.5	267	284	
40	20		250.6	3	37.5	336	271	
50	25		252.75	3	36.5	264	257	
60	30	0	253.1	3	40	341	250	
70	35		254.3	3	38	268	243	
80	40		255.5	3	38.5	244	239	
90	45		256.7		40.5	332	233	
100	50		257.75	3	39	270	232	
110	55		258.75	3	40	290	248	
120	60		259.7	3	38	224	241	
		AVG/TOT	173.1	3.2	37.3	286	241	

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@ 16:17

BOVAR-CONCORD Environmental

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	R & R
Date:	95.11.26	Test:	120-HCl
Sample Location:	Stack 3	Filter I.D.:	—
Pre Weights by:	JA	Post Weights by:	JA

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	~~0.1 H_2SO_4~~ Blank	96.6	86.0	10.6
2	0.1 H_2SO_4	99.8	95.4	4.8
3	0.1 H_2SO_4	106.6	106.4	0.2
4	Blank	71.3	71.1	0.2
5	0.1N NaOH	98.7	98.7	0
6	0.1N NaOH	96.9	~~71~~ 96.8	0.1
7	S.G.	118.7	118.0	0.7
8				
XAD Trap				
			Total (g)	16.6

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights	147.5	147.7	✓	JA

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: _____ Date: 95.11.27

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BOVAR-CONCORD Environmental

HCl METHOD 26 SAMPLING TRAIN
RECOVERY DATA FORM

PROJECT NO.: 5416265

LOCATION: Stack B TEST #: T20-HCl-B DATE: 95.11.26

Impingers 1 and 2	Impingers 3 and 4
Weigh impingers Empty contents into container and rinse with DI water	Weigh impingers Empty contents into container and rinse with DI water

Container TS1 Impingers 1 and 2 0.1 N H2SO4 Contents and DI Water Rinses		Container TS2 Impingers 3 and 4 0.1 N NaOH Contents and DI Water Rinses	
Final Wt.:	134.2	Final Wt.:	173.5
Initial Wt.:	34.2	Initial Wt.:	33.9
Gain:	100.0	Gain:	100.0

787

61.5

Mark Liquid Level	Seal and Label

34.2

Train Identification
Train No.:
0.1 N H2SO4 Batch No.:
DI Water Batch No.:
0.1 N NaOH Batch No.:
Train Loaded By: JA
Recovered By: JA
Reagent Blank Submitted: Yes _____ No _____

787

M26RBC.DRW-May 95

BOVAR-CONCORD Environmental

SYSTEM CALIBRATION AND DRIFT CALCULATIONS

CLIENT	RIGO+RIGO	DATE	NOV26/95
PROJECT NUMBER	5416265	TIME START	11:34
SAMPLE LOCATION	STACK	TIME FINISH	15:54
	TEST NUMBER	T19CEMB	

INSTRUMENT SPAN VALUES

OXYGEN	25	%	CARBON DIOXIDE	20	%
SULPHUR DIOXIDE	1000	PPM	CARBON MONOXIDE	1000	PPM
NITROGEN OXIDES	1000	PPM	TOTAL HYDROCARBONS	100	PPM

ITEM	CAL.GAS VALUE	ANAL. CAL.	INITIAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	FINAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	DRIFT (% SPAN)
O2 ZERO	0	-0.03	0	0.1	-0.04	-0.0	-0.2
O2 CAL	9.91	9.9	9.9	0.0	9.8	-0.4	-0.4
SO2 ZERO	0	0.3	1.3	0.1	2.9	0.3	0.2
SO2 SPAN	149	152	148	-0.4	148	-0.4	0.0
NOX ZERO	0	2.3	2.7	0.0	2.2	-0.0	-0.1
NOX SPAN	302	306	306	0.0	306	0.0	0.0
CO2 ZERO	0	0.05	0.04	-0.1	0.08	0.2	0.2
CO2 SPAN	7.01	7.08	6.98	-0.5	7.1	0.1	0.6
CO ZERO	0	1	1	0.0	0.8	-0.0	-0.0
CO SPAN	100	101	101	0.0	102	0.1	0.1
THC ZERO	0	-1.3	-1.1	0.2	-2.1	-0.8	-1.0
THC SPAN	20.1	20.4	20.9	0.5	21	0.6	0.1

DRIFT CRITERIA <5% SPAN
BIAS CRITERIA <5% SPAN

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T19-OC-B
LOC. : B STACK

RUN TIME : 13:21 TO 15:51

ORGANICS CONCENTRATION	628.5 ug/DSm3	0.2747 gr/1000 DScf
	296.5 ug/Am3	0.1296 gr/1000 Acf
@ 12% CO2	784.0 ug/DSm3	0.3427 gr/1000 DScf
ORGANICS EMISSION RATE	7.533 mg/s	418.51 gr/hr
SAMPLE GAS VOLUME	1.5912 DSm3	56.186 DScf
AVERAGE ISOKINETICITY	99.6 %	

FLUE GAS CHARACTERISTICS

MOISTURE	16.08 %	
TEMPERATURE	173.1 deg C	343.6 deg F
FLOW	43140 DSm3/hr	25391 DScfm
	91453 Am3/hr	53828 Acfm
VELOCITY	17.85 m/s	3513.4 fpm

GAS ANALYSIS	O2	10.48 %
	CO2	9.62 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.07 g/gmole D.B.
	MOL. WT.	28.13 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T19-OC-B
LOC. : B STACK

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	85.4 kPa	25.20 in.Hg
STATIC PRESSURE	-112.1 Pa	-0.45 in.H2O
NOZZLE DIAMETER	5.79 mm	0.2280 in.
PITOT COEFFICIENT	0.796	
METER CORRECTION FACTOR	0.983	

CONDENSATE COLLECTION

RESIN TRAP CONDENSATE	0.1 g
CONDENSATION IN IMPINGER 1	208.3 g
CONDENSATION IN IMPINGER 2	0.9 g
CONDENSATION IN IMPINGER 3	0.2 g
CONDENSATION IN IMPINGER 4	0.0 g
CONDENSATION IN IMPINGER 5	0.2 g
SILICA GEL WEIGHT GAIN	14.6 g
TOTAL MOISTURE GAIN	224.3 g

ORGANICS COLLECTION

FILTER ORGANICS	1.0000 mg
WASHINGS ORGANICS	0.0000 mg
RESIN ORGANICS	0.0000 mg
IMPINGER ORGANICS	0.0000 mg
TOTAL ORGANICS	1.0000 mg

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T19-OC-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1													
1	0.0	340	0.550	0.75	19.90	74	242	235	42	43	3.0	1.0	101.8
1	3.0	341	0.500	0.70	21.48	77	242	241	42	39	4.0	1.0	100.8
2	6.0	345	0.660	0.88	22.98	77	244	240	41	37	5.0	2.0	99.2
2	9.0	346	0.660	0.88	24.67	78	243	241	41	36	5.0	2.0	100.3
3	12.0	347	0.550	0.75	26.38	78	244	241	42	37	5.0	3.0	98.3
3	15.0	349	0.550	0.75	27.91	78	244	241	42	38	5.0	3.0	102.2
4	18.0	348	0.600	0.70	29.50	78	245	245	42	38	4.0	4.0	92.9
4	21.0	346	0.500	0.70	31.01	79	245	243	42	39	4.0	4.0	100.9
5	24.0	348	0.550	0.74	32.51	79	245	243	42	39	5.0	5.0	99.4
5	27.0	348	0.550	0.74	34.06	79	245	243	42	39	5.0	5.0	100.1
6	30.0	350	0.900	1.35	35.62	79	245	244	42	39	6.0	6.0	101.6
6	33.0	351	0.950	1.40	37.64	79	245	243	42	39	6.0	6.0	100.0
7	36.0	349	0.800	1.15	39.68	79	245	242	43	39	6.0	7.0	101.2
7	39.0	347	0.680	0.90	41.58	79	244	244	42	39	5.0	7.0	98.1
8	42.0	342	0.730	1.00	43.28	79	245	243	42	39	6.0	8.0	99.4
8	45.0	343	0.750	1.00	45.07	79	243	244	43	39	6.0	8.0	99.2
9	48.0	335	0.640	0.85	46.88	79	245	242	42	39	5.0	9.0	97.9
9	51.0	335	0.640	0.85	48.54	80	243	243	42	39	5.0	9.0	97.9
10	54.0	325	0.500	0.72	50.20	79	243	241	43	39	5.0	10.0	102.2
10	57.0	325	0.500	0.70	51.74	79	243	242	44	39	5.0	10.0	99.5
	60.0				53.24								
TRAVERSE NO. 2													
1	0.0	346	0.660	0.85	53.77	74	241	236	47	40	5.0	1.0	99.8
1	3.0	347	0.710	0.95	55.46	77	242	237	43	38	5.0	1.0	100.3
2	6.0	347	0.700	0.95	57.23	79	243	246	43	38	5.0	2.0	100.2
2	9.0	346	0.700	0.95	58.99	79	245	239	42	38	5.0	2.0	99.0
3	12.0	347	0.750	1.05	60.73	79	245	238	42	39	5.0	3.0	98.9
3	15.0	347	0.770	1.10	62.53	79	245	236	42	39	6.0	3.0	100.9
4	18.0	346	0.710	0.95	64.39	79	246	233	42	40	5.0	4.0	98.2
4	21.0	346	0.710	0.95	66.13	79	246	235	42	40	5.0	4.0	98.8
5	24.0	347	0.810	1.15	67.88	79	245	230	42	41	6.0	5.0	99.4
5	27.0	347	0.810	1.15	69.76	80	244	230	42	41	6.0	5.0	102.0
6	30.0	345	0.680	0.90	71.69	79	245	230	42	40	5.0	6.0	98.6
6	33.0	344	0.680	0.90	73.40	79	245	230	42	40	5.0	6.0	98.5
7	36.0	345	0.690	0.92	75.11	79	244	237	41	41	5.0	7.0	97.9

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T19-OC-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	344	0.620	0.88	76.82	79	244	235	40	40	5.0	7.0	101.4
8	42.0	343	0.600	0.85	78.50	78	244	230	41	41	5.0	8.0	100.7
8	45.0	344	0.730	1.00	80.14	78	244	235	41	41	5.0	8.0	99.8
9	48.0	343	0.660	0.90	81.93	78	242	235	41	41	5.0	9.0	100.1
9	51.0	342	0.610	0.88	83.64	78	242	235	40	40	5.0	9.0	101.1
10	54.0	333	0.500	0.70	85.30	78	242	235	40	40	5.0	10.0	100.2
10	57.0	334	0.500	0.70	86.80	78	241	234	40	40	4.0	10.0	97.6
	60.0				88.26								
		344	0.654	0.90		78	244	238	42	39	5.1		99.6

ISOKINETIC TEST DATA FORM

Sample Type: Organics Reference Method: EPA M23 Page 1 of 5

Client:	Rigo + Rigo	City, Province:	Layton, UTAH
Project Number:	541626.5	Test Number:	T19-OCB
Sample Location:	B Stack	Date:	Nov 26/95
Start Time:	13:21	Finish Time:	15:51
Barometric Press. (in Hg):	25.2	Stack Press(in H_2O): + or -:	-0.45
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes No

Sample Box Number:	T1	Gas Meter Factor:	0.983	Calibration Date:	Sept 19/95
Nozzle I.D.:	T1-2	Nozzle Diameter (in.):	0.228	Calibration Date:	Nov 16/95
Probe I.D.:	T2-7	Pitot Coefficient:	0.796	Calibration Date:	Sept/95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): ~~10.48~~ 9.62	O_2 (%): 10.48	CO (ppm): —	Other: —
Impinger 1 (g)	205.3	Assumed H_2O (%):	16
Impinger 2 (g)	0.9	Filter I.D. #:	—
Impinger 3 (g)	0.2	Net Filter Wt. (g):	—
Impinger 4 (g)	0.0	Net Probe Wash Wt. (g):	—
Impinger 5 (g) S.G.	14.6	Imp. Residue Wt. (g):	—
Impinger 6 (g) Condenser	0.2		
XAD-2 Trap (g)	0.1		
Total H_2O Condensed (g)			

Sampling Comments: Train 03 (reused after B3-OC) Trap #2

Process Rate:

Control Equipment Operation:

Process Comments:

Signature: [illegible] Date: Nov 26/95

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	Rigo + Rigo
Date:	Nov 26/95	Test:	T19 - OCB
Sample Location:	B Stack	Filter I.D.:	—
Pre Weights by:	N.L.	Post Weights by:	HWB

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	MT	663.7	455.4	208.3
2	ROOI	584.4	583.5	0.9
3	ROOI	541.7	541.5	0.2
4	MT	499.7	499.7	0.0
5	S.G.	823.4	808.8	14.6
6				
7				
~~8~~ Condenser		232.1	231.9	0.2
XAD Trap		338.2	338.1	0.1
			Total (g)	224.3

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: Trap #2
Train 03 (reused after B3 - OC)

Signature: [signature]

Date: Nov 26/95

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BOVAR-CONCORD Environmental

DATE: 11 / 26 / 95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HWB / JVM

Run #: J19-OCB Traverse #: 1 Traverse Direction: North Start Time: 13:21 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.55	0.75	.518	19.903	340	242	235	43	42	77	76	3
	3		0.50	0.70	.494	21.48	341	242	241	39	42	78	76	4
2	6		0.66	0.88	.567	22.98	345	244	240	37	41	78	76	5
	9		0.66	0.88	.567	24.67	346	243	241	36	41	79	76	5
3	12		0.55	0.75	.518	26.38	347	244	241	37	42	80	76	5
	15		0.55	0.75	.518	27.91	349	244	241	38	42	80	76	5
4	18		0.50	0.70	.494	29.50	348	245	245	38	42	80	76	4
	21		0.50	0.70	.494	31.01	346	245	243	39	42	81	76	4
5	24		0.55	0.74	.518	32.51	348	245	243	39	42	81	77	5
	27		0.55	0.74	.518	34.06	348	245	243	39	42	81	77	5
6	30		0.90	1.35	.663	35.62	350	245	244	39	42	81	77	6
	33		0.95	1.4	.681	37.64	351	245	243	39	42	81	76	6

Pre test leak check: Rate (cfm) .011 at 15 inches Hg (Vacuum) Leak Volume Start: 119.61 Leak Volume End: 119.903

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: HWB

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BOVAR-CONCORD Environmental

DATE: 11/26/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HWB / JM

Run #: T19-OCB Traverse #: 1 Traverse Direction: North Start Time: _____ Finish Time: 14:21

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.80	1.15	.625	39.68	349	245	242	39	43	82	76	6
	39		0.68	0.90	.576	41.58	347	244	244	39	42	82	76	5
8	42		0.73	1.0	.597	43.28	342	245	243	39	42	82	76	6
	45		0.73	1.0	.605	45.07	343	243	244	39	43	82	76	6
9	48		0.64	0.85	.559	46.88	335	245	242	39	42	82	76	5
	51		0.64	0.85	.559	48.54	335*	243	243	39	42	82	77	5
10	54		0.50	0.72	.502	50.20	325	243	241	39	43	81	76	5
	57		0.50	0.70	.502	51.74	325	243	242	39	44	81	76	5
	60					53.24								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.012 at 15 inches Hg (Vacuum) Leak Volume Start: 53.24 Leak Volume End: 53.53

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/26/95

SAMPLING TRAINS DATA SHEET

Client: Rizzo + Rizzo Project #: 5416265 Sample Location: B Stack Operators: HUB / JM

Run #: T19-OCB Traverse #: 2 Traverse Direction: East Start Time: 14:51 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.66	0.85	.567	53.77	346	241	236	40	47	72	76	5
	3		0.71	0.95	.589	55.46	347	242	237	38	43	78	76	5
2	6		0.70	0.95	.584	57.23	347	243	246	38	43	80	77	5
	9		0.70	0.95	.584	58.99	346	245	239	38	42	81	76	5
3	12		0.75	1.05	.605	60.73	347	245	238	39	42	81	77	5
	15		0.77	1.1	.613	62.53	347	245	236	39	42	81	77	6
4	18		0.71	0.95	.589	64.39	346	246	233	40	42	81	77	5
	21		0.71	0.95	.589	66.13	346	246	235	40	42	81	76	5
5	24		0.81	1.15	.629	67.88	347	245	230	41	42	82	76	6
	27		0.81	1.15	.629	69.76	347	244	230	41	42	82	77	6
6	30		0.68	0.90	.576	71.69	345	245	230	40	42	81	76	5
	33		0.68	0.90	.576	73.40	344	245	230	40	42	81	76	5

Pre test leak check: Rate (cfm) 0.012 at 15 inches Hg (Vacuum) Leak Volume Start: 53.53 Leak Volume End: 53.77

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

DATE: 11/26/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: NWB / JM

Run #: T19-αB Traverse #: 2 Traverse Direction: East Start Time: _____ Finish Time: 15:51

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.69	0.92	.580	75.11	345	244	237	39	41	81	76	5
	39		0.62	0.88	.550	76.82	344	244	235	39	40	81	76	5
8	42		0.60	0.85	.541	78.50	343	244	230	39	41	80	75	5
	45		0.73	1.00	.597	80.14	344	244	235	39	41	80	75	5
9	48		0.66	0.90	.567	81.93	343	242	235	39	41	80	75	5
	51		0.61	0.88	.546	83.64	342	242	235	38	40	80	75	5
10	54		0.50	0.70	.494	85.30	333	242	235	38	40	80	75	5
	57		0.50	0.70	.494	86.80	334	241	235	38	40	80	75	4
	60					88.26								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.08 at 15 inches Hg (Vacuum) Leak Volume Start: 88.26 Leak Volume End: 88.52

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

PROJECT # 5416265 DATE: Nov 26/95 TEST T19-OCB

Client: Rigo Rigo Layton, UTAH Location: B Stack Operator: WM/JM

Sample Type: Organics Reference Method: EPA M23

Modifications: Recovery following Env. Canc, train rinse w/ acetone/DCM followed by pouring rinse w/ toluene.

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	⟷	
Static positive or negative	⟷	-ve
Average Temperature	⟷	350°F
Estimate % H_2O	⟷	16
How estimated?	⟷	previous tests
Estimate Gas Composition	⟷	O_2% 10 CO_2(%) 10 CO(ppm) ___
How Estimated?	⟷	CEM
Proper nozzle selected?	✓	
K factor	⟷	0.698 at 350°F
Number of sampling points per traverse	⟷	10
Probe markings correct?	✓	
Time per point	⟷	6
Number of readings per point	⟷	2
Barometric Pressure Measured?		
Mercury		
Aneroid		
Other	✓	Watch
PROBE NOZZLE:		
Nickel plated stainless steel or	✓	
Stainless Steel or		
Glass or		
Quartz		
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	Pouring rinse after T18-OCA
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or	✓	
Quartz or		
Other		
Cleaned according to protocol	✓	Pouring rinse after T18-OCA
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 5916265 DATE: Nov 26/95 TEST T19-OCB

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	↔	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	Pre-run rinse of Train 03 after B3-OC
FILTER TYPE		
Glass Fibre	✓	
Quartz		
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	X	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	✓	
Cleaned according to protocol	✓	Pre-run rinse of Train 03 after B3-OC
Thermocouple attached to trap	✓	
XAD-2 Trap covered with foil at all times	✓	

PROJECT # 5416265 DATE: Nov 26/95 TEST T19-OCB

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	Pre-run rinse of Train 63 after B3-OC
IMPINGERS		
No. of Impingers	→	5
Contents #1	→	MT
#2	→	RODI
#3	→	RODI
#4	→	MT
#5	→	S.G.
#6	→	
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly	✓	
Modifications	→	
Grease used on joints	X	
Silica gel type	→	
New?		
Used?	✓	
Pre Test Leak Check		
Performed	✓	
Rate	→	0.011 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	✓	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel	→	50% spent
Leak checks at port changes Before	→	0.012 cfm@ 15 "Hg
After	→	0.012 cfm@ 15 "Hg
Final leak race acceptable	→	0.008 cfm@ 15 "Hg
General comments on sampling technique	→	
Sample recovery performed on-site?	✓	
Sample recovery performed by	→	RB
Clean-up area - General Environment	→	Clean
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

PROJECT # 5416265 DATE: Nov 26/95 TEST T19-CCB

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	↔	teflon
Leak free	✓	
Petri Dishes: borosilicate glass		filters in cleaned foil in plastic bag
plastic		
Balance Type	↔	Top loader
Calibrated or QC checked	↔	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour	✓	75% spent
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		Good
Colour of Filter		white
Foil Wrapped?		yes
Probe Rinses		
Acetone / DCM	✓	
Other Toluene	✓	
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents	✓	
Solvents	✓	
Resin	✓	
Blank Train	✓	
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

#22

EPS 1/RM/2
SEMI-VOLATILE ORGANIC (SVOC) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: B- Stack TEST #: Trg-oc-B DATE: Nov 26/95 PROJECT NO.: 541-6265

Nozzle, Probe Liner Front Half Filter Holder All Equipment	Filter	Back Half Filter Holder and Condenser Coil All Equipment	XAD Resin	Impingers & ~~HPLC~~ Rinse RoDS	~~Back Half Rinse~~
Wash and brush 3x each with ~~hexane~~ DCM and acetone. Rinse 3x with with ~~hexane~~ and and acetone. DCM	Remove and place on pre-cleaned foil fold in half and place in ~~petri dish~~. Zip Loc bag	**Weigh Coil & Record Weight** ~~Soak 5 minutes each with hexane and acetone. Rinse 3x with hexane and acetone.~~	**Weigh XAD Trap & Record Weight** Cap ends and wrap in foil.	Weigh impingers and record wts. Empty contents of #1, #2 and #3 into container. ~~Rinse 3x with HPLC water.~~	~~Rinse back half filter holder, condenser and impingers 1, 2 and 3 3x with hexane and acetone.~~

Container ~~TS1~~ TS2 Front Half Acetone Hexane Rinse	
Final Wt.:	487.9
Initial Wt.:	265.3
Gain:	222.6

Container ~~TS2~~ TS1 Filter	
Filter ID:	Trg-oc
Colour:	White

Container TS3 Back Half Filter and Condenser Coil	
Final Wt.:	476.7
Initial Wt.:	265.3
Gain:	211.6
Colour:	Clear

Container TS4 XAD Resin	
Wrap in Foil	
XAD:	046638
Colour:	White

Trap 22

Container TS5 Impinger Contents	
Final Wt.:	643.2
Initial Wt.:	264.0
Gain:	379.2
Colour:	Clear

~~Container TS6 Back Half Rinse~~	
~~Final Wt.:~~	
~~Initial Wt.:~~	
~~Gain:~~	
~~Colour:~~	

Mark Fluid Levels Seal and Label

Train & Proofing Identification	
Train No.:	03
RoDS ~~HPLC~~ Batch No.:	Zenow 95/10/26
Acetone Batch No.:	Caledon 14123
DCM ~~Hexane~~ Batch No.:	Caledon 16700
Filter Batch No.:	Zenow 95/10/26 XAD No.: Trap 22
Train Assembled By:	HVB / NL
Train Recovered By:	RB

Reagent Blanks Collected?	Yes
Combined Acetone/~~Hexane~~ DCM	Yes
Combined Glycol/Water	Yes
Blank Train Collected?	Yes
Comments:	

EPSREC.DRW-May 95

BOVAR-CONCORD Environmental

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T19-MET-B
LOC. : B STACK

RUN TIME : 13:21 TO 15:51

METALS CONCENTRATION	1077.0 mg/DSm3	0.4707 gr/DScf
	507.5 mg/Am3	0.2218 gr/Acf
@ 12% CO2	1343.4 mg/DSm3	0.5872 gr/DScf
METALS EMISSION RATE	13.380 g/s	106.19 lb/hr
SAMPLE GAS VOLUME	1.8573 DSm3	65.583 DScf
AVERAGE ISOKINETICITY	98.0 %	

FLUE GAS CHARACTERISTICS

MOISTURE	16.01 %	
TEMPERATURE	173.9 deg C	345.0 deg F
FLOW	44719 DSm3/hr	26321 DScfm
	94897 Am3/hr	55854 Acfm
VELOCITY	18.52 m/s	3645.7 fpm

GAS ANALYSIS	O2	10.48 %
	CO2	9.62 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.07 g/gmole D.B.
	MOL. WT.	28.14 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T19-MET-B
LOC. : B STACK

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	85.4 kPa	25.20 in.Hg
STATIC PRESSURE	-112.1 Pa	-0.45 in.H2O
NOZZLE DIAMETER	6.20 mm	0.2440 in.
PITOT COEFFICIENT	0.798	
METER CORRECTION FACTOR	1.006	

CONDENSATE COLLECTION

CONDENSATION IN IMPINGER 1	138.9 g
CONDENSATION IN IMPINGER 2	83.4 g
CONDENSATION IN IMPINGER 3	21.2 g
CONDENSATION IN IMPINGER 4	2.7 g
CONDENSATION IN IMPINGER 5	1.7 g
CONDENSATION IN IMPINGER 6	0.5 g
SILICA GEL WEIGHT GAIN	12.1 g
TOTAL MOISTURE GAIN	260.5 g

METALS COLLECTION

FILTER METALS	1.0000 g
WASHINGS METALS	1.0000 g
IMPINGER METALS	0.0000 g
TOTAL METALS	2.0000 g

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T19-MET-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1												
1	0.0	345	0.920	1.70	449.28	77	233	248	42	4.0	1.0	98.5
1	3.0	343	0.710	1.30	451.50	79	233	263	40	4.0	1.0	100.5
2	6.0	347	0.920	1.70	453.50	80	235	244	39	4.0	2.0	97.8
2	9.0	349	0.890	1.70	455.71	80	234	249	38	4.0	2.0	98.5
3	12.0	349	0.810	1.50	457.90	81	234	257	38	4.0	3.0	98.4
3	15.0	348	0.710	1.25	459.99	81	233	255	38	3.0	3.0	99.9
4	18.0	347	0.750	1.30	461.98	82	234	255	38	3.0	4.0	97.0
4	21.0	346	0.680	1.25	463.97	82	235	253	39	3.0	4.0	98.2
5	24.0	348	0.850	1.60	465.89	82	235	250	39	3.5	5.0	97.2
5	27.0	348	0.850	1.60	468.01	82	234	258	39	3.5	5.0	99.1
6	30.0	349	0.920	1.70	470.17	83	236	252	39	4.0	6.0	98.2
6	33.0	350	0.940	1.70	472.40	83	235	252	39	4.0	6.0	96.8
7	36.0	348	0.780	1.40	474.62	83	237	245	39	4.0	7.0	97.9
7	39.0	347	0.680	1.25	476.67	83	246	246	40	4.0	7.0	98.0
8	42.0	348	0.780	1.40	478.59	83	258	258	40	4.0	8.0	95.4
8	45.0	347	0.790	1.40	480.59	83	250	250	40	4.0	8.0	97.1
9	48.0	348	0.780	1.40	482.64	83	249	249	39	4.0	9.0	97.3
9	51.0	348	0.740	1.40	484.68	83	248	248	40	4.0	9.0	98.0
10	54.0	347	0.700	1.35	486.68	84	259	259	40	4.0	10.0	99.6
10	57.0	346	0.650	1.25	488.66	84	256	256	40	3.0	10.0	98.0
	60.0				490.54							
TRAVERSE NO. 2												
1	0.0	342	0.600	1.10	491.53	80	233	252	37	3.0	1.0	99.1
1	3.0	341	0.620	1.10	493.35	81	235	254	36	3.0	1.0	97.3
2	6.0	343	0.600	1.10	495.17	82	236	262	36	3.0	2.0	98.4
2	9.0	342	0.550	0.56	496.98	82	237	247	36	3.0	2.0	96.2
3	12.0	340	0.780	1.50	498.68	82	236	249	36	3.0	3.0	96.6
3	15.0	342	0.780	1.50	500.71	83	236	246	37	3.5	3.0	98.0
4	18.0	343	0.760	1.45	502.77	84	235	232	37	3.5	4.0	99.7
4	21.0	345	0.800	1.50	504.84	84	235	246	37	3.5	4.0	98.2
5	24.0	346	0.880	1.60	506.93	84	236	237	37	3.5	5.0	97.3
5	27.0	346	0.860	1.60	509.10	84	235	228	37	3.5	5.0	96.2
6	30.0	345	0.600	1.00	511.22	84	235	238	37	3.5	6.0	99.7
6	33.0	344	0.530	0.95	513.06	83	235	239	37	3.0	6.0	97.5
7	36.0	344	0.550	0.95	514.75	83	236	240	37	3.0	7.0	99.1

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 26
RUN : T19-MET-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	343	0.450	0.90	516.50	83	235	229	36	3.0	7.0	99.4
8	42.0	342	0.480	0.90	518.09	83	236	250	36	3.0	8.0	100.4
8	45.0	342	0.550	0.96	519.75	83	237	247	35	3.0	8.0	97.2
9	48.0	342	0.550	0.96	521.47	83	239	248	35	3.0	9.0	96.1
9	51.0	341	0.580	1.00	523.17	83	238	242	34	3.0	9.0	95.8
10	54.0	342	0.450	0.90	524.91	83	238	242	34	3.0	10.0	99.4
10	57.0	338	0.480	0.90	526.50	83	239	250	34	3.0	10.0	97.8
	60.0				528.12							
		345	0.700	1.29		82	238	248	38	3.5		98.0

MOISTURE ANALYSIS DATA SHEET

Project #:	5416885	Client:	R&R
Date:	95.11.27	Test:	TG-MP-B
Sample Location:	Stack B	Filter I.D.:	52 ZGN-01-102580
Pre Weights by:	JA	Post Weights by:	JA

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	639.6	500.7	138.9
2	5% HNO_3 10% H_2O_2	645.8	562.4	83.4
3	5% HNO_3 10% H_2O_2	639.3	618.1	21.2
4	Blank	493.3	490.6	2.7
5	$KMnO_4$	592.0	590.3	1.7
6	$KMnO_4$	600.0	599.5	0.5
7	Silica Gel	798.5	786.4	12.1
8				
XAD Trap				
			Total (g)	260.5

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: _____ Date: 95.11.27

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BOVAR-CONCORD Environmental

ISOKINETIC TEST DATA FORM

Sample Type: 5416265 Reference Method: EPA M29 Page 1 of 5

Client:	Rio+Rio	City, Province:	Layton Utah
Project Number:	5416265	Test Number:	TIS-MP-B
Sample Location:	B Stack	Date:	95 11 26
Start Time:	13:21	Finish Time:	15:51
Barometric Press. (in Hg):	25.2	Stack Press(in H_2O): + or -:	-0.45
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes No ✓

Sample Box Number:	T3	Gas Meter Factor:	1.006	Calibration Date:	Sept 95
Nozzle I.D.:	Q2	Nozzle Diameter (in.):	.244	Calibration Date:	Nov 95
Probe I.D.:	77-7'	Pitot Coefficient:	.798	Calibration Date:	Sept 95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 9.62 O_2 (%): 10.48 CO (ppm): Other:

Impinger 1 (g)	138.9	Assumed H_2O (%):	16
Impinger 2 (g)	83.4	Filter I.D. #:	
Impinger 3 (g)	21.2	Net Filter Wt. (g):	
Impinger 4 (g)	2.7	Net Probe Wash Wt. (g):	
Impinger 5 (g)	1.7	Imp. Residue Wt. (g):	
Impinger 6 (g)	0.5		
~~XAD-2 Trap~~ (g) S.G.	12.1		
Total H_2O Condensed (g)	260.5		

Sampling Comments:

Process Rate:

Control Equipment Operation: ESP

Process Comments:

Signature: [signature] Date: 95/11/26

DATE: 95 / 11 / 26

SAMPLING TRAINS DATA SHEET

Client: Risotherm Project #: 5416265 Sample Location: B Stack Operators: SW/JM

Run #: T19-MT-B Traverse #: 1 Traverse Direction: IN Start Time: 13:21 Finish Time: 14:21

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		.92	1.7		449.280	345	233	248	42	NA	78	76	4.0
1	3		0.71	1.3	451.51	451.50	343	233	263	40		81	76	4.0
2	6		0.92	1.7	*453.459	453.50	347	235	244	39		82	77	4.0
2	9		0.89	1.7	455.730	455.71	349	234	249	38		83	77	4.0
3	12		0.81	1.5	*457.903	457.90	349	234	251	38		83	78	4.0
3	15		0.71	1.25	459.992	459.99	348	233	251	38		84	78	3.0
4	18		0.75	1.3	*461.949	461.98	347	234	255	38		84	79	3.0
4	21		0.68	1.25	463.993	463.97	346	235	253	39		84	79	3.0
5	24		0.85	1.6	*465.887	465.89	349	235	250	39		84	79	3.5
5	27		0.85	1.6	468.033	468.01	348	234	258	39		84	79	3.5
6	30		0.92	1.7	*470.153	470.17	349	236	252	39		85	80	4.0
6	33		0.94	1.7	472.40	472.40	350	235	252	39		85	80	4.0
7	36		0.78	1.4	*474.654	474.62	349	237	245	39		85	80	4.0

Pre test leak check: Rate (cfm) .01 at 16 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95/11/26

SAMPLING TRAINS DATA SHEET

Client: Rigotherm Project #: 5416265 Sample Location: B Stack Operators: JW/JM

Run #: TP-MP-B Traverse #: 1 Traverse Direction: IN Start Time: 13:21 Finish Time: 14:21

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
											NA			
7	39		.68	1.25	476.673	476.67	347	237	246	40		85	81	4.0
8	42		0.73	1.4	*478.587	478.59	348	238	258	40		85	81	4.0
8	45		0.79	1.40	480.643	480.59	347	237	250	40		85	81	4.0
9	48		0.78	1.40	*482.656	482.64	348	237	249	39		85	81	4.0
9	51		0.74	1.4	484.693	484.68	348	237	248	40		85	81	4.0
10	54		0.70	1.35	*486.680	486.68	347	238	259	40		86	81	4.0
10	57		0.65	1.25	488.625	488.66	346	239	256	40		86	81	3.0
10	60				490.534	490.537								

Pre test leak check: Rate (cfm) .01 at 16 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.012 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

DATE: 95 / 11 / 26

SAMPLING TRAINS DATA SHEET

Client: Rayo Alto Project #: 5416265 Sample Location: B Stack Operators: JW/JM

Run #: T19 MPB Traverse #: 2 Traverse Direction: IN Start Time: 14:57 Finish Time: 15:51

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.60	1.0		491.527	342	233	252	37	NA	80	80	3.0
1	3		0.62	1.0	493.327	493.35	341	235	254	36		82	80	3.0
2	6		0.60	1.1	*495.180	495.17	343	236	262	36		83	80	3.0
2	9		0.55	0.96	496.97	496.98	342	237	247	36		84	80	3.0
3	12		0.78	1.5	*498.704	498.68	340	236	249	36		84	80	3.0
3	15		0.78	1.5	500.733	500.71	342	236	246	37		85	80	3.5
4	18		0.76	1.45	*502.763	502.77	343	235	232	37		86	81	3.5
4	21		0.80	1.5	504.796	504.84	345	235	246	37		86	81	3.5
5	24		0.88	1.6	*506.919	506.93	346	236	237	37		86	81	3.5
5	27		0.86	1.6	509.111	509.10	346	235	228	37		86	81	3.5
6	30		0.60	1.0	*511.256	511.22	345	235	238	37		86	81	3.5
6	33		0.53	0.95	513.02	513.06	344	235	239	37		85	81	3.0
7	36		0.55	0.97	*514.753	514.75	344	230	240	37		85	81	3.0

Pre test leak check: Rate (cfm) .015 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .012 at 16 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 26

SAMPLING TRAINS DATA SHEET

Client: Ryo Hage Project #: 5416265 Sample Location: B Stack Operators: JW/Jm

Run #: H9-MP-B Traverse #: 2 Traverse Direction: IN Start Time: 14:51 Finish Time: 15:57

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.45	0.90	516.474	516.50	343	235	229	36		85	81	3.0
8	42		0.48	0.90	*518.054	518.09	342	236	250	36		85	81	3.0
8	45		0.55	0.96	519.701	519.75	342	237	247	35		85	81	3.0
9	48		0.55	0.96	*521.474	521.47	342	239	248	35		85	81	3.0
9	51		0.58	1.0	523.194	523.17	341	238	242	34		85	81	3.0
10	54		0.45	0.90	*524.941	524.91	342	238	242	34		85	81	3.0
10	57		0.48	0.90	526.469	526.50	338	239	250	34		85	81	3.0
10	60				528.111	528.120								

Pre test leak check: Rate (cfm) .015 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .012 at 10 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 951126 TEST 719-MP-B

Client: Rio Algom Location: B Stack Operator: JW

Sample Type: M5 Metals Reference Method: EPA M29

Modifications:

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	↔	
Static positive or negative	↔	neg.
Average Temperature	↔	
Estimate % H_2O	↔	
How estimated?	↔	
Estimate Gas Composition	↔	O_2% ____ CO_2(%) ____ CO(ppm) ____
How Estimated?	↔	
Proper nozzle selected?	✓	
K factor	↔	
Number of sampling points per traverse	↔	10
Probe markings correct?	✓	
Time per point	↔	6
Number of readings per point	↔	2
Barometric Pressure Measured?	✓	
Mercury		
Aneroid		
Other		watch
PROBE NOZZLE:		
Nickel plated stainless steel or		
Stainless Steel or		
Glass or		
Quartz	✓	
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or		
Quartz or	✓	
Other		
Cleaned according to protocol	✓	
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 951126 TEST TIG-MP-B

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	----	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	
FILTER TYPE		
Glass Fibre		
Quartz	✓	
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	✓	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass		
Cleaned according to protocol		
Thermocouple attached to trap		
XAD-2 Trap covered with foil at all times		

PROJECT # 5416265 DATE: 951126 TEST TIG-MP-B

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers	→ 7	
Contents #1	→	
#2	→	
#3	→	
#4	→	
#5	→	
#6	→	
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly		
Modifications	→	
Grease used on joints	✓	
Silica gel type	→	
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate	→	.01 cfm@ 16 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	NA	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel	→	good
Leak checks at port changes Before	→	.012 cfm@ 15 "Hg
After	→	.015 cfm@ 15 "Hg
Final leak race acceptable	→	cfm@ "Hg
General comments on sampling technique	→	
Sample recovery performed on-site?	✓	
Sample recovery performed by	→	JA
Clean-up area - General Environment	→	
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 951126 TEST TIG-MP-B

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	⟷	teflon
Leak free	✓	
Petri Dishes: borosilicate glass		
plastic	✓	
Balance Type	⟷	digital top loader
Calibrated or QC checked	⟷	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour		good - pink/blue.
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		
Colour of Filter		
Foil Wrapped?		
Probe Rinses		
Acetone	✓	
Other	✓	HNO_3
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents		
Solvents		
Resin		
Blank Train		
Samples labelled and stored properly		
Liquid levels marked		
Samples delivered to lab		

METHOD 26
HCl SAMPLING DATA FORM

Company Name	[illegible]	Plant Location	[illegible]	Source Name	Stack B
Test Date	[illegible]	Test Number	[illegible]	Job Number	5416265
Sampling for	HCl	Meter Box	[illegible]	B.P. mm/inHg	852 mbar

ABSORBING SOL'N	15 ml 0.1 N H_2SO_4	15 ml 0.1 N H_2SO_4	15 ml 0.1 N NaOH	15 ml 0.1 N NaOH	Silica Gel	GAS	1	2	3	4
WEIGHTS	IMP 1	IMP 2	IMP 3	IMP 4	IMP 5	READINGS				
EMPTY						O2				
FILLED FINAL						CO2				
FILLED INITIAL						CO				
DIFFERENCE						TIME				

OPERATOR	[illegible]	Sample Rate (Lpm)	~ 2	H20 Condensed	
Lk.Chk, (Init.)	0 cc/min	Lk. Chk. (Final)	cc/min	Probe Purged	(Yes) No)

Sample Time	Clock Time	Volume m³ Desired	Volume m³ Actual	Vacuum in.Hg	Meter Temp. °C/°F	Probe Temp. °C/°F	Box Temp. °C/°F	Impinger Temp. °C/°F
0	0		2324.4	2.5	47.5	253	227	
10	5		2341.1	2.5	48	271	237	
20	10		2352	2.5	48.5	250	242	
30	15		2362.75	2.5	48.5	241	245	
40	20		2373.1	2	50	307	250	
50	25		2384.0	2	49.5	229	252	
60	30		2394.2	2	49.5	248	253	
70	35		2404.65	2	49.5	238	253	
80	40		2415.15	2	49.5	252	255	
90	45		2425.65	2	49.5	238	255	
100	50		2435.95	2	50.5	303	257	
110	55		2446.25	2	49.5	243	256	
120	60		2456.9	2	50	301	260	
		AVG/TOT	127.5	2.15	49.5	259	249	

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Time on 1:23

BOVAR-CONCORD Environmental

MOISTURE ANALYSIS DATA SHEET

Project #:	541-6265	Client:	R&R
Date:	95-11-26	Test:	T19-HCl-A
Sample Location:	Stack B	Filter I.D.:	—
Pre Weights by:	JB	Post Weights by:	

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	96.8	80.0	16.8
2	0.1N H_2SO_4	99.5	96.1	3.4
3	0.1N H_2SO_4	105.6	105.6	—
4	Blank	71.0	71.0	—
5	0.1 NaOH	99.1	99.0	0.1
6	0.1 NaOH	97.5	97.5	—
7	S.G.	118.0	117.0	1.0
8				
XAD Trap				
			Total (g)	15.3

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights	~~147.5~~ 147.5	147.6	✓	JA
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments:

Signature: [signature]

Date: 95.11.26

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BOVAR-CONCORD Environmental

EPA METHOD 29
METALS / PARTICULATE (MP) SAMPLING TRAIN
RECOVERY DATA FORM

T19-MP-B

LOCATION: Stack B TEST #: 95.11.26 DATE: 95.11.26 PROJECT NO.: 5916265

Probe Liner, Nozzle Front Half Filter Housing	Probe Liner, Nozzle Front Half Filter Housing	Filter	Impingers 1, 2, 3	Back Half Filter Holder Filter Support	Impinger 4	Impinger 5, 6	Impinger 5, 6	Impinger 7
Brush and rinse with 100 mL acetone	Rinse with 100 mL 0.1 N HNO3	Carefully remove filter from support with Teflon-coated tweezers and place in petri dish	Weigh impingers empty contents into container	Rinse back half filter holder filter support and rinse empty impingers with 100 mL 0.1 N HNO3	weigh impinger empty contents into container 5A	Weigh impingers empty contents into container 5B	Rinse with 25 mL 8 N HCL	Weigh impinger and discard or recycle silica gel
Check visually to see if particulate is removed if not repeat step above	Container TS3 Front Half 0.1 N HNO3 Rinse Final Wt.: 652.2 Initial Wt.: 433.5 Gain: Comments:	Brush loose particulate onto filter	Container TS4-1 Impinger 4 Contents Final Wt.: 887.4 Initial Wt.: 432.2 Gain:	Container TS4-2 0.1 N HNO3 Back Half Impinger Rinse Final Wt.: 621.2 Initial Wt.: 431.3 Gain: Colour:	Rinse with 100 mL 0.1 N HNO3	Rinse 3x with 100 mL Acidified KMnO4	Place rinsing in Container 5C which contains 200 mL of water	
Container TS2 Front Half Acetone Rinse Final Wt.: 521.4 Initial Wt.: 431.1 Gain: Comments:		Filter TS2 Seal petri dish with tape Colour: Filter #:			Container TSA Impinger 4 Contents Final Wt.: 632 Initial Wt.: 431.5 Gain:	Rinse with 100 mL water	Container 5C HCL Rinse Final Wt.: 688.1 Initial Wt.: 436.7 Gain: Colour:	
						Container 5B Impinger 5 & 6 KMnO4 Content and Rinses Final Wt.: 873.6 Initial Wt.: 433.0 Gain: Colour:		

ZENON 102520

Train Identification	Blanks	
Train No.:		
HNO3 / H2O2 Batch No.:	Container 9	200 mLs
DI Water Batch No.:	Container 8B	100 mLs
Acetone Batch No.:	Container 7	100 mLs
0.1 N HNO3 Batch No.:	Container 8A	300 mLs
Acidified KMnO4 Batch No.:	Container 10	100 mLs
8 N HCl / Batch No.: DI Water	Container 11	25 mL / 200 mL
Filter Number:	Container 12	* _____

Mark Liquid Level on Containers
Seal and Label Containers
Reagent Blanks Submitted? Yes ✓ No ____
Prepare Fresh Acidified KMnO4 Daily ✓

M29REC.DRW-May 95

BOVAR-CONCORD Environmental

NOVEMBER 27, 1995

METHOD 26
HCl SAMPLING DATA FORM

Company Name	DAVIS COUNTY	Plant Location	LAYTON UTAH	Source Name	STACK B
Test Date	Nov 27/95	Test Number	T21-HCl-A	Job Number	5416265
Sampling for	HCl	Meter Box	V1 11.001	B.P. mm/inHg	861 mbar

ABSORBING SOL'N	15 ml 0.1 N H_2SO_4	15 ml 0.1 N H_2SO_4	15 ml 0.1 N NaOH	15 ml 0.1 N NaOH	Silica Gel	GAS	1	2	3	4
WEIGHTS	IMP 1	IMP 2	IMP 3	IMP 4	IMP 5	READINGS				
EMPTY						O2				
FILLED FINAL						CO2				
FILLED INITIAL						CO				
DIFFERENCE						TIME				

OPERATOR	MM	Sample Rate (Lpm)	~2	H20 Condensed	
Lk.Chk, (Init.)	0 cc/min	Lk. Chk. (Final)	0.0 cc/min	Probe Purged	(Yes) No)

Sample Time	Clock Time	Volume m³ L Desired	Actual	Vacuum in.Hg	Meter Temp. °C/°F	Probe Temp. °C/°F	Box Temp. °C/°F	Impinger Temp. °C/°F
0	0		2611.65	1	62	267	228	
10	5		2622.65	1	58	300	234	
20	10		2633.1	1	56.5	266	237	
30	15		2643.1	1	55	288	236	
40	20		2653.2	1	54.5	276	235	
50	25		2663.25	1	53	283	243	
60	30		2673.35	1	52	273	251	
70	35		2683.1	1	53.5	310	258	
80	40		2693.2	1	52.5	268	261	
90	45		2703.4	1	53.5	324	265	
100	50		2713.6	1	52	279	265	
110	55		2723.4	1	52.5	285	270	
120	60		2733.15	1	52	277	273	
		AVG/TOT	121.5	1	54	285	250	

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TIME O/U: 11:35

BOVAR-CONCORD Environmental

MOISTURE ANALYSIS DATA SHEET

Project #:	5916265	Client:	R&R
Date:	95-11-27	Test:	TBL-HCl-M
Sample Location:	B	Filter I.D.:	
Pre Weights by:	JA	Post Weights by:	

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	~~0.1N H_2SO_4~~ Blank	117.3	85.9	
2	0.1N H_2SO_4	91.5	95.0	
3	0.1N H_2SO_4	95.4	106.6	
4	Blank	96.7	99.1	
5	0.1N NaOH	86.6	70.9	
6	0.1N NaOH	84.1	97.2	
7	S.G.	119.4	118.7	
8				
XAD Trap				
			Total (g)	

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights	147.5	147.7	✓	JA
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments:

Signature: 95-11-27

Date:

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BOVAR-CONCORD Environmental

HCl METHOD 26 SAMPLING TRAIN
RECOVERY DATA FORM

PROJECT NO.: 5416265

LOCATION: B Stack TEST #: T21-HCl-A DATE: 95-11-29

Impingers 1 and 2	Impingers 3 and 4
Weigh impingers Empty contents into container and rinse with DI water	Weigh impingers Empty contents into container and rinse with DI water

Container TS1 Impingers 1 and 2 0.1 N H2SO4 Contents and DI Water Rinses	Container TS2 Impingers 3 and 4 0.1 N NaOH Contents and DI Water Rinses
Final Wt.: 133.7	Final Wt.: 133.8
(79.2) Initial Wt.: 33.7	Initial Wt.: 33.8 78.6
Gain: 100.0	Gain: 100.0
Mark Liquid Level ✓	Seal and Label ✓

Train Identification
Train No.:
0.1 N H2SO4 Batch No.:
DI Water Batch No.:
0.1 N NaOH Batch No.:
Train Loaded By: JA
Recovered By: JW
Reagent Blank Submitted: Yes ✓ No _____

SYSTEM CALIBRATION AND DRIFT CALCULATIONS

CLIENT	RIGO+RIGO	DATE	NOV27/95
PROJECT NUMBER	5416265	TIME START	08:25
SAMPLE LOCATION	STACK	TIME FINISH	11:20
	TEST NUMBER	T20CEMA	

INSTRUMENT SPAN VALUES

OXYGEN	25	%	CARBON DIOXIDE	20	%
SULPHUR DIOXIDE	1000	PPM	CARBON MONOXIDE	1000	PPM
NITROGEN OXIDES	1000	PPM	TOTAL HYDROCARBONS	100	PPM

ITEM	CAL.GAS VALUE	ANAL. CAL.	INITIAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	FINAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	DRIFT (% SPAN)
O2 ZERO	0	0.03	0.03	0.0	0.07	0.2	0.2
O2 CAL	9.91	9.96	9.93	-0.1	10.06	0.4	0.5
SO2 ZERO	0	1	2.3	0.1	2.1	0.1	-0.0
SO2 SPAN	149	149	143	-0.6	145	-0.4	0.2
NOX ZERO	0	0.9	2	0.1	1.5	0.1	-0.1
NOX SPAN	302	305	303	-0.2	306	0.1	0.3
CO2 ZERO	0	0	0.03	0.2	0.1	0.5	0.4
CO2 SPAN	7.01	7.04	7.03	-0.0	7.12	0.4	0.4
CO ZERO	0	1	1	0.0	1	0.0	0.0
CO SPAN	100	102	102	0.0	102	0.0	0.0
THC ZERO	0	0.53	0.07	-0.5	0.86	0.3	0.8
THC SPAN	20.1	20.9	22.8	1.9	22.9	2.0	0.1

DRIFT CRITERIA <5% SPAN
BIAS CRITERIA <5% SPAN

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.27
RUN : T20-OC-A
LOC. : STACK B

RUN TIME : 8:48 TO 11:11

ORGANICS CONCENTRATION	0.0 ug/DSm3	0.0000 gr/1000 DScf
	0.0 ug/Am3	0.0000 gr/1000 Acf
ORGANICS EMISSION RATE	0.000 mg/s	0.00 gr/hr
SAMPLE GAS VOLUME	1.7179 DSm3	60.662 DScf
AVERAGE ISOKINETICITY	101.7 %	

FLUE GAS CHARACTERISTICS

MOISTURE	17.44 %	
TEMPERATURE	158.2 deg C	316.8 deg F
FLOW	45635 DSm3/hr	26860 DScfm
	94317 Am3/hr	55513 Acfm
VELOCITY	18.41 m/s	3623.4 fpm

GAS ANALYSIS	O2	10.40 %
	CO2	9.60 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.07 g/gmole D.B.
	MOL. WT.	27.96 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.27
RUN : T20-OC-A
LOC. : STACK B

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	86.0 kPa	25.40 in.Hg
STATIC PRESSURE	-127.0 Pa	-0.51 in.H2O
NOZZLE DIAMETER	5.79 mm	0.2280 in.
PITOT COEFFICIENT	0.796	
METER CORRECTION FACTOR	0.983	

CONDENSATE COLLECTION

RESIN TRAP CONDENSATE	3.2 g
CONDENSATION IN IMPINGER 1	245.9 g
CONDENSATION IN IMPINGER 2	1.9 g
CONDENSATION IN IMPINGER 3	0.2 g
CONDENSATION IN IMPINGER 4	0.6 g
SILICA GEL WEIGHT GAIN	15.1 g
TOTAL MOISTURE GAIN	266.9 g

ORGANICS COLLECTION

FILTER ORGANICS	0.0000 mg
WASHINGS ORGANICS	0.0000 mg
RESIN ORGANICS	0.0000 mg
IMPINGER ORGANICS	0.0000 mg
TOTAL ORGANICS	0.0000 mg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.27
RUN : T20-OC-A
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1													
1	0.0	311	0.550	0.85	89.03	73	245	259	49	35	4.0	1.0	106.5
1	3.0	313	0.550	0.80	90.68	73	244	266	39	33	3.0	1.0	102.0
2	6.0	313	0.550	0.82	92.26	74	244	267	39	32	5.0	2.0	102.6
2	9.0	311	0.550	0.82	93.85	75	245	252	38	32	5.0	2.0	102.2
3	12.0	315	0.520	0.80	95.44	75	245	254	38	32	5.0	3.0	104.7
3	15.0	315	0.520	0.78	97.02	76	245	256	39	32	5.0	3.0	105.9
4	18.0	317	0.550	0.80	98.62	76	245	257	39	32	5.0	4.0	102.4
4	21.0	318	0.550	0.80	100.21	77	246	253	38	32	5.0	4.0	102.3
5	24.0	318	0.580	0.83	101.80	77	246	256	38	32	5.0	5.0	102.1
5	27.0	318	0.580	0.83	103.43	77	246	256	38	32	5.0	5.0	102.1
6	30.0	319	0.900	1.35	105.06	77	245	255	39	32	6.0	6.0	102.8
6	33.0	319	0.920	1.35	107.10	78	246	256	40	32	6.0	6.0	101.4
7	36.0	319	0.900	1.30	109.14	78	247	255	40	32	6.0	7.0	101.0
7	39.0	320	0.900	1.30	111.15	79	247	258	40	33	6.0	7.0	100.4
8	42.0	316	0.820	1.25	113.15	79	248	258	40	33	6.0	8.0	102.3
8	45.0	315	0.820	1.20	115.10	79	246	256	40	34	6.0	8.0	101.2
9	48.0	302	0.570	0.82	117.03	80	246	258	39	34	5.0	9.0	100.7
9	51.0	302	0.570	0.82	118.65	80	246	256	39	34	5.0	9.0	100.7
10	54.0	285	0.500	0.75	120.27	80	246	257	39	34	5.0	10.0	100.4
10	57.0	280	0.500	0.75	121.80	80	246	259	39	34	5.0	10.0	100.7
	60.0				123.34								
TRAVERSE NO. 2													
1	0.0	322	0.770	1.10	23.86	79	245	259	45	36	6.0	1.0	101.6
1	3.0	323	0.770	1.10	25.73	80	247	256	47	35	6.0	1.0	99.4
2	6.0	323	0.750	1.10	27.56	81	247	256	48	34	6.0	2.0	100.0
2	9.0	323	0.750	1.10	29.38	81	248	257	49	34	6.0	2.0	101.5
3	12.0	323	0.840	1.30	31.23	82	247	256	51	35	6.0	3.0	101.0
3	15.0	322	0.840	1.30	33.18	82	247	258	50	36	6.0	3.0	103.1
4	18.0	323	0.880	1.35	35.17	82	246	258	50	37	7.0	4.0	102.7
4	21.0	323	0.880	1.30	37.20	83	247	259	43	37	7.0	4.0	102.1
5	24.0	324	0.910	1.35	39.22	83	247	259	36	39	7.0	5.0	101.5
5	27.0	323	0.910	1.35	41.26	83	248	259	46	39	7.0	5.0	100.4
6	30.0	323	0.880	1.30	43.28	83	247	257	48	40	6.0	6.0	101.1
6	33.0	323	0.880	1.30	45.28	83	247	260	48	42	6.0	6.0	101.1
7	36.0	324	0.880	1.30	47.28	82	247	258	46	42	6.0	7.0	101.2

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.27
RUN : T20-OC-A
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	324	0.880	1.30	49.28	82	246	258	44	41	6.0	7.0	102.4
8	42.0	324	0.850	1.25	51.30	82	245	257	45	40	6.0	8.0	101.6
8	45.0	324	0.850	1.25	53.27	81	247	255	46	40	6.0	8.0	101.6
9	48.0	324	0.800	1.20	55.24	81	246	256	46	40	6.0	9.0	101.0
9	51.0	325	0.800	1.20	57.14	81	245	257	46	40	6.0	9.0	101.6
10	54.0	315	0.620	0.85	59.05	81	245	255	46	40	5.0	10.0	100.2
10	57.0	309	0.550	0.80	60.72	81	245	255	46	40	5.0	10.0	100.9
	60.0				62.31								
		317	0.721	1.08		79	246	257	43	36	5.6		101.7

ISOKINETIC TEST DATA FORM

Sample Type: Organics Reference Method: EPA M23 Page 1 of 5

Client:	Rigo + Rigo	City, Province:	Layton, UTAH
Project Number:	5416265	Test Number:	T20-OCA
Sample Location:	B Stack	Date:	Nov 27/95
Start Time:	8:48	Finish Time:	11:11
Barometric Press. (in Hg):	25.4	Stack Press(in H_2O): + or -:	-0.51
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes No

Sample Box Number:	T1	Gas Meter Factor:	0.983	Calibration Date:	Sept 15/95
Nozzle I.D.:	T1-2	Nozzle Diameter (in.):	0.228	Calibration Date:	Nov 16/95
Probe I.D.:	T2-7	Pitot Coefficient:	0.796	Calibration Date:	Sept/95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 9.6 O_2 (%): 10.4 CO (ppm): ____ Other: ____

Impinger 1 (g)	245.9	Assumed H_2O (%):	16
Impinger 2 (g)	1.9	Filter I.D. #:	—
Impinger 3 (g)	0.2	Net Filter Wt. (g):	—
Impinger 4 (g)	0.6	Net Probe Wash Wt. (g):	—
Impinger 5 (g) S.G.	15.1	Imp. Residue Wt. (g):	—
~~Impinger 6 (g)~~ Condenser	0.6		
XAD-2 Trap (g)	2.6		
Total H_2O Condensed (g)	266.9		

Sampling Comments: Train 07 (reused after T12-OCA) Trap # 21

Process Rate: AG reagent, low AC, minimum temp (≈ 325°F)

Control Equipment Operation:

Process Comments:

Signature: [signature] Date: Nov 27/95

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	Rigo + Rigo
Date:	Nov 27/95	Test:	T20-OCA
Sample Location:	B Stack	Filter I.D.:	—
Pre Weights by:	HWB	Post Weights by:	HWB

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	MT	671.9	426.0	245.9
2	ROOI	615.4	613.5	1.9
3	ROOI	585.6	585.4	0.2
4	MT	483.9	483.3	0.6
5	S.G.	732.9	717.8	15.1
6				
7				
8 Condenser		243.0	242.4	0.6
XAD Trap		336.3	333.7	2.6
			Total (g)	266.9

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: Train 02 (reused after T12-OCA)
Trap #21

Signature: [signature]

Date: Nov 27/95

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BOVAR-CONCORD Environmental

DATE: 11/27/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HWB/DM

Run #: T20-0CA Traverse #: 1 Traverse Direction: North Start Time: 8:48 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.55	0.85	0.535	89.03	311	245	259	35	49	73	72	4
	3		0.55	0.80	0.535	90.68	313	244	266	33	39	74	72	3
2	6		0.55	0.82	0.535	92.26	313	244	267	32	39	75	72	5
	9		0.55	0.82	0.535	93.85	311	245	252	32	38	76	73	5
3	12		0.52	0.80	0.520	95.44	315	245	254	32	38	77	73	5
	15		0.52	0.78	0.520	97.02	315	245	256	32	39	78	73	5
4	18		0.55	0.80	.527	98.62	317	245	257	32	39	78	73	5
	21		0.55	0.80	.527	100.21	318	246	253	32	38	79	74	5
5	24		0.58	0.83	.541	101.80	318	246	256	32	38	79	74	5
	27		0.58	0.83	.541	103.43	318	246	256	32	38	79	74	5
6	30		0.90	1.35	.673	105.06	319	245	255	32	39	80	74	6
	33		0.92	1.35	.681	107.10	319	240	256	32	40	81	75	6

Pre test leak check: Rate (cfm) 0.005 at 15 inches Hg (Vacuum) Leak Volume Start: 88.77 Leak Volume End: 89.03

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: HWB

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BOVAR-CONCORD Environmental

DATE: 11/27/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HVB

Run #: T20-OCA Traverse #: 2 Traverse Direction: North Start Time: _____ Finish Time: 9:48

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.90	1.3	.673	109.14	319	247	255	32	40	81	75	6
	39		0.90	1.3	.673	111.15	320	247	258	33	40	82	76	6
8	42		0.82	1.25	.643	113.15	316	248	258	33	40	82	76	6
	45		0.82	1.2	.643	115.10	315	246	256	34	40	82	76	6
9	48		0.57	0.82	0.544	117.03	302	246	258	34	39	83	77	5
	51		0.57	0.82	.544	118.65	302	246	256	34	39	83	77	5
10	54		0.50	0.75	.510	120.27	285	246	257	34	39	83	77	5
	57		0.50	0.75	.510	121.80	280	246	259	34	39	83	77	5
	60					123.34								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.00 at 15 inches Hg (Vacuum) Leak Volume Start: 123.34 Leak Volume End: 123.575

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/27/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HVB

Run #: T20-ccA Traverse #: 2 Traverse Direction: East Start Time: 10:11 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.77	1.1	.623	23.86	322	245	259	36	45	80	78	6
	3		0.77	1.1	.623	25.73	323	247	256	35	47	81	78	6
2	6		0.75	1.1	.614	27.56	323	247	256	34	48	82	79	6
	9		0.75	1.1	.614	29.38	323	248	257	34	49	83	79	6
3	12		0.84	1.3	.650	31.23	323	247	256	35	51	84	80	6
	15		0.84	1.3	.650	33.18	322	247	258	36	50	84	79	6
4	18		0.88	1.35	.666	35.17	323	246	258	37	50	85	79	7
	21		0.88	1.3	.666	37.20	323	247	259	37	43	85	80	7
5	24		0.91	1.35	.677	39.22	324	247	259	39	46	85	80	7
	27		0.91	1.35	.677	41.26	323	248	259	39	46	85	80	7
6	30		0.88	1.3	.666	43.28	323	242	257	40	48	85	80	6
	33		0.88	1.3	.666	45.28	323	247	260	42	48	85	80	6

Pre test leak check: Rate (cfm) 0.001 at 15 inches Hg (Vacuum) Leak Volume Start: 23.575 Leak Volume End: 23.86

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/27/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T20-OCA Traverse #: 2 Traverse Direction: East Start Time: _____ Finish Time: 11:11

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.88	1.3	.666	47.28	324	247	258	42	46	84	80	6
	39		0.88	1.3	.666	49.29	324	246	258	41	44	84	79	6
8	42		0.85	1.25	.654	51.30	324	245	257	40	45	84	79	6
	45		0.85	1.25	.654	53.27	324	247	255	40	46	83	79	6
9	48		0.80	1.2	.635	55.24	324	246	256	40	46	83	79	6
	51		0.80	1.2	.635	57.14	325	245	257	40	46	83	79	6
10	54		0.62	0.85	.559	59.05	315	245	255	40	46	83	79	5
	57		0.55	0.8	.535	60.72	309	245	255	40	46	83	79	5
	60					62.31								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.005 at 15 inches Hg (Vacuum) Leak Volume Start: 62.31 Leak Volume End: 62.56

K value calculated by: _____ Checked by: _____ Operator Signature: [illegible]

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BOVAR-CONCORD Environmental

QA/QC CHECKLIST

PROJECT # 541 6265 DATE: Nov 27/95 TEST T20-OCA

Client: Rigo + Rigo Layton, UTAH Location: B Stack Operator: HUB

Sample Type: Organics Reference Method: EPA M23

Modifications: Recovery following Env. Can.; train rinse w/ acetone/DCM, train proving w/ toluene

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	⟷	
Static positive or negative	⟷	-ve
Average Temperature	⟷	≈ 300 F
Estimate % H_2O	⟷	16
How estimated?	⟷	previous tests
Estimate Gas Composition	⟷	O_2% 10 CO_2(%) 10 CO(ppm) ___
How Estimated?	⟷	CEM
Proper nozzle selected?	✓	
K factor	⟷	0.721 at 300°F
Number of sampling points per traverse	⟷	10
Probe markings correct?	✓	
Time per point	⟷	6
Number of readings per point	⟷	2
Barometric Pressure Measured?		
Mercury		
Aneroid		
Other	✓	watch
PROBE NOZZLE:		
Nickel plated stainless steel or	✓	
Stainless Steel or		
Glass or		
Quartz		
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	Proving rinse after T19-OCB
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or	✓	
Quartz or		
Other		
Cleaned according to protocol	✓	(New liner)
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 5416265 DATE: Nov. 27/95 TEST T20-OCA

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	↔	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	Proving of Train 07 after T12-OCA)
FILTER TYPE		
Glass Fibre	✓	
Quartz		
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	X	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	✓	
Cleaned according to protocol	✓	Proving of Train 07 after T12-OCA
Thermocouple attached to trap	✓	
XAD-2 Trap covered with foil at all times	✓	

PROJECT # 541/6265 DATE: Nov 27/95 TEST T20-OCA

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	Proving of Train 07 after T12-OCA
IMPINGERS		
No. of Impingers	↔	5
Contents #1	↔	MT
#2	↔	RODI
#3	↔	RODI
#4	↔	MT
#5	↔	S.G.
#6	↔	
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly	✓	
Modifications	↔	
Grease used on joints	X	
Silica gel type	↔	
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate	↔	0.005 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	✓	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel	↔	Good
Leak checks at port changes Before	↔	0.008 cfm@ 15 "Hg
After	↔	0.004 cfm@ 15 "Hg
Final leak race acceptable	↔	0.005 cfm@ 15 "Hg
General comments on sampling technique	↔	Blocked U-tube detected after test
Sample recovery performed on-site?	✓	
Sample recovery performed by	↔	RB
Clean-up area - General Environment	↔	
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

PROJECT # 5416265 DATE: Nov 27/95 TEST T20-OCA

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	++	Teflon
Leak free	✓	
Petri Dishes: borosilicate glass		filters in cleaned foil in plastic bag
plastic		
Balance Type	++	top loader
Calibrated or QC checked	++	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour	✓	20% spent
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		Good
Colour of Filter		White
Foil Wrapped?		Yes
Probe Rinses		
Acetone DCM	✓	
Other Toluene	✓	
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents	✓	
Solvents	✓	
Resin	✓	
Blank Train	✓	
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

#23

EPS 1/RM/2
SEMI-VOLATILE ORGANIC (SVOC) SAMPLING TRAIN RECOVERY DATA FORM

LOCATION: B- STACK TEST #: T20-OC-A DATE: Nov 27/95 PROJECT NO.: 541-6265

Nozzle, Probe Liner Front Half Filter Holder All Equipment	Filter	Back Half Filter Holder and Condenser Coil	XAD Resin	Impingers & ~~HPLC~~ Rinse RODJ	Back Half Rinse
Wash and brush 3x each with ~~hexane~~ DCM and acetone. Rinse 3x with with ~~hexane~~ and and acetone. DCM	Remove and place on pre-cleaned foil fold in half and place in ~~petri dish~~. Ziploc bag	**Weigh Coil & Record Weight** ~~Soak 5 minutes each with hexane and acetone. Rinse 3x with hexane and acetone.~~ Toluene Rinse	**Weigh XAD Trap & Record Weight** Cap ends and wrap in foil.	Weigh impingers and record wts. Empty contents of #1, #2 and #3 into container. ~~Rinse 3x with HPLC water.~~	Rinse back half filter holder, condenser and impingers 1, 2 and 3 3x with hexane and acetone.

Container TS1 Front Half Acetone Hexane Rinse	Container TS2 Filter	Container TS3 Back Half Filter and Condenser Coil	Container TS4 XAD Resin	Container TS5 Impinger Contents	Container TS6 Back Half Rinse
Final Wt.: 630.2	Filter ID: T20-OC	Final Wt.: 651.5	Wrap in Foil	Final Wt.: 925.0	Final Wt.:
Initial Wt.: 434.5	Colour: Clear	Initial Wt.: 432.7	XAD: 046637	Initial Wt.: 431.8	Initial Wt.:
Gain: 195.7		Gain: 218.8	Colour: white	Gain: 483.2	Gain:
		Colour: Clear	Trap #21	Colour: Clear	Colour:

Mark Fluid Levels Seal and Label

Train & Proofing Identification	
Train No.:	17
RODJ ~~HPLC~~ Batch No.:	Zenon 95/10/26
Acetone Batch No.:	Caledon 14123
DCM ~~Hexane~~ Batch No.:	Caledon 16700
Filter Batch No.: Zenon 95/10/26	XAD No.:
Train Assembled By:	HVB
Train Recovered By:	PR

Reagent Blanks Collected?	Yes
Combined Acetone/~~Hexane~~ DCM	Yes
~~Combined Glycol~~/Water	Yes
Blank Train Collected?	Yes.
Comments:	

EPSREC.DRW-May 95

BOVAR-CONCORD Environmental

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO	DATE : 95 11 27
JOBSITE : LAYTON UTAH	RUN : T20-MET-A
REF.No. : 5416265	LOC. : B STACK

RUN TIME : 08:47 TO 11:11

METALS CONCENTRATION	493.8 ug/DSm3	0.2158 gr/1000 DScf
	229.5 ug/Am3	0.1003 gr/1000 Acf
@ 12% CO2	617.2 ug/DSm3	0.2698 gr/1000 DScf
METALS EMISSION RATE	6.298 mg/s	349.88 gr/hr
SAMPLE GAS VOLUME	2.0254 DSm3	71.520 DScf
AVERAGE ISOKINETICITY	104.1 %	

FLUE GAS CHARACTERISTICS

MOISTURE	20.62 %	
TEMPERATURE	158.5 deg C	317.3 deg F
FLOW	45907 DSm3/hr	27020 DScfm
	98755 Am3/hr	58125 Acfm
VELOCITY	19.27 m/s	3793.9 fpm

GAS ANALYSIS	O2	10.42 %
	CO2	9.60 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.07 g/gmole D.B.
	MOL. WT.	27.58 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 27
RUN : T20-MET-A
LOC. : B STACK

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	86.0 kPa	25.40 in.Hg
STATIC PRESSURE	-127.0 Pa	-0.51 in.H2O
NOZZLE DIAMETER	6.20 mm	0.2440 in.
PITOT COEFFICIENT	0.798	
METER CORRECTION FACTOR	1.006	

CONDENSATE COLLECTION

CONDENSATION IN IMPINGER 1	114.1 g
CONDENSATION IN IMPINGER 2	124.2 g
CONDENSATION IN IMPINGER 3	46.1 g
CONDENSATION IN IMPINGER 4	86.9 g
CONDENSATION IN IMPINGER 5	2.8 g
CONDENSATION IN IMPINGER 6	0.9 g
SILICA GEL WEIGHT GAIN	12.0 g
TOTAL MOISTURE GAIN	387.0 g

METALS COLLECTION

FILTER METALS	1.0000 mg
WASHINGS METALS	0.0000 mg
IMPINGER METALS	0.0000 mg
TOTAL METALS	1.0000 mg

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 27
RUN : T20-MET-A
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1												
1	0.0	315	0.870	1.75	528.68	74	237	246	34	2.0	1.0	106.7
1	3.0	316	0.860	1.70	530.93	75	238	247	37	2.0	1.0	104.8
2	6.0	317	0.860	1.70	533.13	75	239	248	37	2.0	2.0	107.1
2	9.0	317	0.840	1.65	535.38	76	239	250	36	2.0	2.0	105.3
3	12.0	316	0.770	1.55	537.57	77	239	248	37	2.0	3.0	109.3
3	15.0	316	0.820	1.60	539.75	77	239	250	38	2.0	3.0	105.3
4	18.0	316	0.920	1.75	541.92	77	240	250	38	2.0	4.0	103.6
4	21.0	317	0.950	1.85	544.18	78	241	251	39	2.0	4.0	104.1
5	24.0	318	0.920	1.85	546.49	78	241	250	39	2.0	5.0	104.9
5	27.0	318	0.930	1.85	548.78	79	241	250	41	2.0	5.0	105.1
6	30.0	318	0.910	1.85	551.09	79	241	250	42	2.0	6.0	105.8
6	33.0	318	0.910	1.90	553.39	80	242	252	43	2.0	6.0	107.5
7	36.0	318	0.910	1.80	555.73	80	241	250	44	2.0	7.0	106.9
7	39.0	319	0.900	1.75	558.06	80	249	249	45	2.0	7.0	104.3
8	42.0	320	0.870	1.70	560.32	81	248	248	45	2.0	8.0	105.1
8	45.0	320	0.880	1.70	562.56	81	249	249	45	2.0	8.0	104.1
9	48.0	321	0.800	1.60	564.79	81	250	250	46	2.0	9.0	106.7
9	51.0	321	0.800	1.50	566.97	82	249	249	46	2.0	9.0	102.1
10	54.0	320	0.780	1.50	569.06	82	249	249	46	2.0	10.0	104.3
10	57.0	320	0.730	1.40	571.17	82	248	248	46	2.0	10.0	103.2
	60.0				573.19							
TRAVERSE NO. 2												
1	0.0	302	0.630	1.30	573.87	80	243	252	41	2.0	1.0	106.3
1	3.0	303	0.610	1.20	575.82	81	243	253	41	2.0	1.0	103.4
2	6.0	302	0.570	1.15	577.69	82	244	252	40	2.0	2.0	105.0
2	9.0	302	0.610	1.20	579.53	83	244	250	39	2.0	2.0	102.5
3	12.0	314	0.870	1.70	581.39	83	244	250	39	2.0	3.0	102.5
3	15.0	316	0.870	1.70	583.59	83	243	249	39	2.0	3.0	103.0
4	18.0	321	0.950	2.00	585.80	83	243	250	40	2.0	4.0	106.1
4	21.0	322	0.950	1.95	588.17	84	243	249	42	2.0	4.0	104.2
5	24.0	322	0.960	1.90	590.50	84	243	250	43	2.0	5.0	103.2
5	27.0	322	0.950	1.80	592.82	84	244	253	44	2.0	5.0	105.0
6	30.0	322	0.930	1.70	595.17	85	244	250	46	2.0	6.0	102.4
6	33.0	322	0.650	1.20	597.44	85	245	250	46	2.0	6.0	101.3
7	36.0	323	0.580	1.10	599.32	84	244	253	48	2.0	7.0	102.8

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 27
RUN : T20-MET-A
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	316	0.580	1.10	601.12	84	245	252	46	2.0	7.0	102.9
8	42.0	322	0.600	1.10	602.93	84	245	252	46	2.0	8.0	101.6
8	45.0	322	0.600	1.10	604.74	84	244	253	46	2.0	8.0	102.7
9	48.0	320	0.630	1.15	606.57	84	254	256	47	2.0	9.0	100.7
9	51.0	321	0.630	1.20	608.41	84	249	254	47	2.0	9.0	99.7
10	54.0	320	0.450	0.90	610.23	84	241	253	47	2.0	10.0	106.1
10	57.0	318	0.480	0.90	611.87	84	240	253	46	2.0	10.0	92.0
	60.0				613.34							
		317	0.776	1.53		81	244	250	42	2.0		104.1

ISOKINETIC TEST DATA FORM

Sample Type: M5-Metals Reference Method: EPA M29 Page 1 of 5

Client:	Rigo+Rigo	City, Province:	Layton, Utah
Project Number:	5116265	Test Number:	T20-MP-A
Sample Location:	B Stack	Date:	95 11 27
Start Time:	8:47	Finish Time:	11:11
Barometric Press. (in Hg):	25.4	Stack Press(in H_2O): + or -:	-.51
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes ___ No ✓

Sample Box Number:	T3	Gas Meter Factor:	1.006	Calibration Date:	Sept 95
Nozzle I.D.:	Q2	Nozzle Diameter (in.):	.244	Calibration Date:	Nov 95
Probe I.D.:	7/-7'	Pitot Coefficient:	.798	Calibration Date:	Sept 95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 9.6 O_2 (%): 10.42 CO (ppm): 0 Other: 0

Impinger 1 (g)	114.1	Assumed H_2O (%):	16
Impinger 2 (g)	124.2	Filter I.D. #:	
Impinger 3 (g)	46.1	Net Filter Wt. (g):	
Impinger 4 (g)	86.9	Net Probe Wash Wt. (g):	
Impinger 5 (g)	2.8	Imp. Residue Wt. (g):	
Impinger 6 (g)	0.9		
~~XAD-2~~ Silica Gel Trap (g)	12.0		
Total H_2O Condensed (g)	387.0		

Sampling Comments:

Process Rate: Ab Reagent, Low AC, Minimum Temperature

Control Equipment Operation: ESP.

Process Comments:

Signature: [signature] Date: 95 11 27

MOISTURE ANALYSIS DATA SHEET

Project #:	341-6265	Client:	R & R
Date:	95-11-27	Test:	T20-mp-A
Sample Location:	Stack B	Filter I.D.:	2H - 110601
Pre Weights by:	RB	Post Weights by:	JA

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	583.2	469.1	114.1
2	5% HNO_3 10% H_2O_2	709.6	585.4	124.2
3	5% HNO_3 10% H_2O_2	656.2	610.1	46.1
4	Blank	501.8	493.0	8.8
5	$KMnO_4$	586.9	584.1 ~~585.8~~	2.8
6	$KMnO_4$	601.7	600.8	0.9
7	Silica Gel	846.6	834.6	12
8				
XAD Trap				
			Total (g)	387.

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: [signature]

Date: 95. 11. 25

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 27

SAMPLING TRAINS DATA SHEET

Client: Rgo+Rigo Project #: 5416265 Sample Location: B Stack Operators: JW/Jm

Run #: T20-MP-A Traverse #: 1 Traverse Direction: IN Start Time: 8:47 Finish Time: 9:47

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		.87	1.85		528.680	315	237	246	34	NA	74	73	2.0
1	3		0.86	1.80	530.918	530.93	316	238	247	37		77	72	2.0
2	6		0.86	1.7	*533.155	533.13	317	239	248	37		78	72	2.0
2	9		0.84	1.65	535.335	535.38	317	239	250	36		79	73	2.0
3	12		0.77	1.55	*537.579	537.57	316	239	248	37		79	74	2.0
3	15		0.82	1.6	539.676	539.75	316	239	250	38		80	74	2.0
4	18		0.92	1.75	*541.923	541.92	316	240	250	38		80	74	2.0
4	21		0.95	1.85	544.222	544.18	317	241	251	39		81	75	2.0
5	24		0.92	1.85	*546.519	546.49	318	241	250	39		81	75	2.0
5	27		0.93	1.85	548.792	548.78	318	241	250	41		82	76	2.0
6	30		0.91	1.85	*551.094	551.09	318	241	250	42		82	76	2.0
6	33		0.91	1.90	553.379	553.39	318	242	252	43		82	77	2.0
7	36		0.91	1.80	*555.642	555.73	318	241	250	44		83	77	2.0

Pre test leak check: Rate (cfm) .01 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .008 at 20 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: JW

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 27

SAMPLING TRAINS DATA SHEET

Client: Rigo+Rigo Project #: 5416265 Sample Location: B Stack Operators: JW/JM

Run #: T20 MP-A Traverse #: 1 Traverse Direction: IN Start Time: 847 Finish Time: 9:47

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.90	1.75	557.982	558.06	319	241	249	45		83	77	2.0
8	42		0.87	1.7	*560.30	560.32	320	241	248	45		83	78	2.0
8	45		0.88	1.7	562.522	562.56	320	241	249	45		83	78	2.0
9	48		0.80	1.6	*564.775	564.79	321	241	250	46		84	78	2.0
9	51		0.80	1.5	566.902	566.97	321	241	249	46		84	79	2.0
10	54		0.78	1.5	*569.082	569.06	320	241	249	46		84	79	2.0
10	57		0.73	1.4	571.145	571.17	320	241	248	46		84	79	2.0
10	60				573.187	573.190								

Pre test leak check: Rate (cfm) .01 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .008 at 20 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 5/11/27

SAMPLING TRAINS DATA SHEET

Client: Rizothizo Project #: 5416265 Sample Location: B Stack Operators: JW/JM

Run #: T20-MP-A Traverse #: 2 Traverse Direction: IN Start Time: 10:11 Finish Time: 11:11

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.63	1.3		573.868	302	243	252	41	NA	80	80	2.0
1	3		0.61	1.2	575.773	576.82	303	243	253	41		83	79	2.0
2	6		0.57	1.15	*577.694	577.69	302	244	252	40		84	80	2.0
2	9		0.61	1.2	579.502	579.53	302	244	250	39		85	80	2.0
3	12		0.87	1.7	*581.404	581.39	314	244	250	39		85	80	2.0
3	15		0.87	1.7	583.628	583.59	316	243	249	39		86	80	2.0
4	18		0.95	2.0	*585.828	585.80	321	243	250	40		86	80	2.0
4	21		0.95	1.95	588.139	588.17	322	243	249	42		87	81	2.0
5	24		0.96	1.9	*590.471	590.50	322	243	250	43		87	81	2.0
5	27		0.95	1.8	592.813	592.82	322	244	253	44		87	81	2.0
6	30		0.93	1.7	*595.121	595.17	322	244	250	46		87	82	2.0
6	33		0.65	1.2	597.447	597.44	322	245	250	46		87	82	2.0
7	36		0.58	1.1	*599.344	599.32	323	244	253	48		86	82	2.0

Pre test leak check: Rate (cfm) 0.006 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .008 at 19 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 9/11/27

SAMPLING TRAINS DATA SHEET

Client: Rigo+Rigo Project #: 5416265 Sample Location: B Stack Operators: JW/JM

Run #: TO-MP-A Traverse #: 2 Traverse Direction: IN Start Time: 10:11 Finish Time: 11:11

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.58	1.1	601.118	601.12	316	245	252	46		86	82	2.0
8	42		0.6	1.1	*602.918	602.93	322	245	252	46		86	82	2.0
8	45		0.60	1.1	604.759	604.74	322	244	253	46		86	82	2.0
9	48		0.63	1.15	*606.569	606.57	320	254	256	47		86	82	2.0
9	51		0.63	1.20	608.444	608.41	321	249	254	47		86	82	2.0
10	54		0.45	0.90	*610.284	610.23	320	241	253	47		86	82	2.0
10	57		0.48	0.90	611.814	611.87	318	240	253	46		86	82	2.0
10	60				613.336	613.341								

Pre test leak check: Rate (cfm) .006 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .008 at 18 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 9/1/27 TEST TLO-MP-A

Client: Rigo + Rigo Location: B Stack Operator: JW

Sample Type: MS Reference Method: EPA M29

Modifications:

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	++++	
Static positive or negative	++++	neg.
Average Temperature	++++	
Estimate % H_2O	++++	16
How estimated?	++++	MS
Estimate Gas Composition	++++	O_2% ___ CO_2(%) ___ CO(ppm) ___
How Estimated?	++++	
Proper nozzle selected?	✓	
K factor	++++	
Number of sampling points per traverse	++++	10
Probe markings correct?	✓	
Time per point	++++	6
Number of readings per point	++++	2
Barometric Pressure Measured?	✓	
Mercury		
Aneroid		
Other	✓	Watch
PROBE NOZZLE:		
Nickel plated stainless steel or		
Stainless Steel or		
Glass or		
Quartz	✓	
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or		
Quartz or	✓	
Other		
Cleaned according to protocol	✓	
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 5416265 DATE: 5-11-27 TEST T20-MP-A

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	----	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	
FILTER TYPE		
Glass Fibre		
Quartz	✓	
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	✓	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass		
Cleaned according to protocol	MA	
Thermocouple attached to trap		
XAD-2 Trap covered with foil at all times		

PROJECT # 54/6265 DATE: 951127 TEST T20MP-A

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers	7	
Contents #1		
#2		
#3		
#4		
#5		
#6		
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly		
Modifications		
Grease used on joints	✓	
Silica gel type		
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate		0.01 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	NA	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel		good
Leak checks at port changes Before		.006 cfm@ 20 "Hg
After		.006 cfm@ 15 "Hg
Final leak race acceptable		cfm@ "Hg
General comments on sampling technique		
Sample recovery performed on-site?	✓	
Sample recovery performed by	✓	JA
Clean-up area - General Environment		
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

QA/QC CHECKLIST

PROJECT # 541626 DATE: 97/12/7 TEST T20-MP-A

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	→	teflon
Leak free	✓	
Petri Dishes: borosilicate glass		
plastic	✓	
Balance Type	→	digital top loader
Calibrated or QC checked	→	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour		good - pink/blue.
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		
Colour of Filter		
Foil Wrapped?		
Probe Rinses		
Acetone	✓	
Other	✓	HNO_3
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents		
Solvents		
Resin		
Blank Train		
Samples labelled and stored properly		
Liquid levels marked		
Samples delivered to lab		

METHOD 26
HCl SAMPLING DATA FORM

Company Name	DAVIS COUNTY	Plant Location	CLINTON UTAH	Source Name	STACK B
Test Date	NOV 27 1995	Test Number	5416265 K	Job Number	T22-HCl-B
Sampling for	HCl	Meter Box	[illegible]	B.P. mm/inHg	857 mm

ABSORBING SOL'N	15 ml 0.1 N H_2SO_4	15 ml 0.1 N H_2SO_4	15 ml 0.1 N NaOH	15 ml 0.1 N NaOH	Silica Gel	GAS	1	2	3	4
WEIGHTS	IMP 1	IMP 2	IMP 3	IMP 4	IMP 5	READINGS				
EMPTY						O2				
FILLED FINAL						C02				
FILLED INITIAL						CO				
DIFFERENCE						TIME				

OPERATOR	JN	Sample Rate (Lpm)	~ 2	H20 Condensed	
Lk.Chk, (Init.)	0 cc/min	Lk. Chk. (Final)	0 cc/min	Probe Purged	(Yes) No)

Sample Time	Clock Time	Volume m³ Desired	Volume m³ Actual	Vacuum in.Hg	Meter Temp. °C/°F	Probe Temp. °C/°F	Box Temp. °C/°F	Impinger Temp. °C/°F
0	0		2743.05	1	39	320	260	
10	5		2755.0	1	37.5	231	269	
20	10		2765.5	1	39	295	273	
30	15		2776.05	1	38	298	279	
40	20		2786.2	1	38	241	285	
50	25		2796.5	1	39.5	303	283	
60	30		2806.5	1	38.5	224	274	
70	35		2816.5	1	40	299	270	
80	40		2826.5	1	39	234	272	
90	45		2836.5	1	41	300	269	
100	50		2846.5	1	40.5	239	266	
110	55		2856.4	1	42.5	294	264	
120	60		2866.5	1	41.5	234	264	
		AVG/TOT	122.65	1	39.5	262	271	

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Time on 16:38

BOVAR-CONCORD Environmental

MOISTURE ANALYSIS DATA SHEET

Project #:	5916265	Client:	R & R
Date:	95-11-27	Test:	T22 - HCl - B
Sample Location:	Stack B	Filter I.D.:	—
Pre Weights by:	GA	Post Weights by:	

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	98.7	86.1	12.6
2	0.1N H_2SO_4	101.3	96.6	4.7
3	0.1N H_2SO_4	107.3	107.2	.1
4	Blank	71.1	71.0	.1
5	0.1N NaOH	99.4	99.3	.1
6	0.1N NaOH	97.8	97.8	0
7	S.G.	119.5	119.3	.6
8				
XAD Trap				
			Total (g)	18.2

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: _____ Date: 95-11-27

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BOVAR-CONCORD Environmental

HCl METHOD 26 SAMPLING TRAIN
RECOVERY DATA FORM

PROJECT NO.: 5416265

LOCATION: B TEST #: T22-HCl DATE: 95.11.27

Impingers 1 and 2	Impingers 3 and 4
Weigh impingers Empty contents into container and rinse with DI water	Weigh impingers Empty contents into container and rinse with DI water

Container TS1 Impingers 1 and 2 0.1 N H2SO4 Contents and DI Water Rinses		Container TS2 Impingers 3 and 4 0.1 N NaOH Contents and DI Water Rinses	
Final Wt.: 134.1	83.3	Final Wt.: 133.4	69.1
Initial Wt.: 34.1		Initial Wt.: 33.4	
Gain: 100.0		Gain: 100.0	
Mark Liquid Level		Seal and Label	

Train Identification
Train No.:
0.1 N H2SO4 Batch No.:
DI Water Batch No.:
0.1 N NaOH Batch No.:
Train Loaded By: JD
Recovered By: JD
Reagent Blank Submitted: Yes ✓ No _____

SYSTEM CALIBRATION AND DRIFT CALCULATIONS

CLIENT	RIGO+RIGO	DATE	NOV27/95
PROJECT NUMBER	5416265	TIME START	12:05
SAMPLE LOCATION	STACK	TIME FINISH	16:20
	TEST NUMBER	T21CEMB	

INSTRUMENT SPAN VALUES

OXYGEN	25	%	CARBON DIOXIDE	20	%
SULPHUR DIOXIDE	1000	PPM	CARBON MONOXIDE	1000	PPM
NITROGEN OXIDES	1000	PPM	TOTAL HYDROCARBONS	100	PPM

ITEM	CAL.GAS VALUE	ANAL. CAL.	INITIAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	FINAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	DRIFT (% SPAN)
O2 ZERO	0	0.07	0.07	0.0	0.03	-0.2	-0.2
O2 CAL	9.91	10.09	10.06	-0.1	9.95	-0.6	-0.4
SO2 ZERO	0	1	2.1	0.1	2.4	0.1	0.0
SO2 SPAN	149	148	145	-0.3	146	-0.2	0.1
NOX ZERO	0	1.2	1.5	0.0	1.9	0.1	0.0
NOX SPAN	302	305	306	0.1	303	-0.2	-0.3
CO2 ZERO	0	0.07	0.1	0.2	0.11	0.2	0.1
CO2 SPAN	7.01	7.14	7.12	-0.1	7.05	-0.4	-0.3
CO ZERO	0	1	1	0.0	0.8	-0.0	-0.0
CO SPAN	100	102	102	0.0	102	0.0	0.0
THC ZERO	0	0.9	0.86	-0.0	0.6	-0.3	-0.3
THC SPAN	20.1	22.3	22.9	0.6	23.1	0.8	0.2

DRIFT CRITERIA <5% SPAN
BIAS CRITERIA <5% SPAN

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.27
RUN : T21-OC-B
LOC. : STACK B

RUN TIME : 12:56 TO 16:15

ORGANICS CONCENTRATION	0.0 ug/DSm3	0.0000 gr/1000 DScf
	0.0 ug/Am3	0.0000 gr/1000 Acf
ORGANICS EMISSION RATE	0.000 mg/s	0.00 gr/hr
SAMPLE GAS VOLUME	1.6607 DSm3	58.641 DScf
AVERAGE ISOKINETICITY	100.9 %	

FLUE GAS CHARACTERISTICS

MOISTURE	16.93 %	
TEMPERATURE	156.6 deg C	313.9 deg F
FLOW	44469 DSm3/hr	26174 DScfm
	91007 Am3/hr	53565 Acfm
VELOCITY	17.76 m/s	3496.2 fpm

GAS ANALYSIS	O2	10.57 %
	CO2	9.47 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.05 g/gmole D.B.
	MOL. WT.	28.01 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.27
RUN : T21-OC-B
LOC. : STACK B

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	86.0 kPa	25.40 in.Hg
STATIC PRESSURE	-124.5 Pa	-0.50 in.H2O
NOZZLE DIAMETER	5.79 mm	0.2280 in.
PITOT COEFFICIENT	0.796	
METER CORRECTION FACTOR	0.983	

CONDENSATE COLLECTION

RESIN TRAP CONDENSATE	0.9 g
CONDENSATION IN IMPINGER 1	225.6 g
CONDENSATION IN IMPINGER 2	14.1 g
CONDENSATION IN IMPINGER 3	0.1 g
CONDENSATION IN IMPINGER 4	1.3 g
SILICA GEL WEIGHT GAIN	7.0 g
TOTAL MOISTURE GAIN	249.0 g

ORGANICS COLLECTION

FILTER ORGANICS	0.0000 mg
WASHINGS ORGANICS	0.0000 mg
RESIN ORGANICS	0.0000 mg
IMPINGER ORGANICS	0.0000 mg
TOTAL ORGANICS	0.0000 mg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.27
RUN : T21-OC-B
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1													
1	0.0	322	0.450	0.70	64.11	76	242	244	43	40	4.0	1.0	105.2
1	3.0	322	0.450	0.65	65.59	76	244	252	47	43	5.0	1.0	102.3
2	6.0	323	0.630	0.85	67.03	75	244	253	47	43	6.0	2.0	99.9
2	9.0	322	0.630	0.87	68.69	77	244	255	49	41	6.0	2.0	100.8
3	12.0	325	0.600	0.85	70.37	77	244	253	43	38	6.0	3.0	101.0
3	15.0	325	0.600	0.86	72.01	77	245	254	40	37	6.0	3.0	102.2
4	18.0	324	0.550	0.80	73.67	76	245	254	39	36	6.0	4.0	103.6
4	21.0	321	0.550	0.80	75.28	77	246	254	39	35	6.0	4.0	103.2
5	24.0	316	0.760	1.10	76.89	77	246	253	39	35	7.0	5.0	95.2
5	27.0	320	0.900	1.35	78.64	75	259	265	41	42	8.0	5.0	100.1
6	30.0	322	0.880	1.35	80.63	76	257	263	51	42	8.0	6.0	101.7
6	33.0	323	0.880	1.35	82.63	77	259	266	52	39	8.0	6.0	101.7
7	36.0	320	0.810	1.25	84.63	77	260	265	55	40	8.0	7.0	100.9
7	39.0	318	0.800	1.25	86.54	78	260	263	55	39	8.0	7.0	102.4
8	42.0	306	0.550	0.80	88.47	78	260	264	55	39	6.0	8.0	101.4
8	45.0	305	0.550	0.80	90.07	79	258	264	55	39	6.0	8.0	98.7
9	48.0	290	0.450	0.65	91.63	79	258	250	56	39	6.0	9.0	103.8
9	51.0	285	0.470	0.68	93.13	79	257	254	56	38	6.0	9.0	99.9
10	54.0	280	0.450	0.65	94.61	79	258	257	58	38	6.0	10.0	98.3
10	57.0	280	0.450	0.65	96.04	79	258	252	58	38	6.0	10.0	100.3
	60.0				97.50								
TRAVERSE NO. 2													
1	0.0	320	0.750	1.05	98.27	76	256	248	62	58	6.0	1.0	101.7
1	3.0	321	0.700	0.98	100.12	77	257	249	62	36	7.0	1.0	99.4
2	6.0	319	0.640	0.92	101.87	78	256	250	60	37	6.0	2.0	100.2
2	9.0	317	0.640	0.95	103.56	78	258	251	55	37	6.0	2.0	101.8
3	12.0	318	0.760	1.10	105.28	78	257	256	54	37	7.0	3.0	101.1
3	15.0	319	0.850	1.30	107.14	79	257	257	52	37	7.0	3.0	101.8
4	18.0	320	0.850	1.30	109.12	79	258	258	52	37	7.0	4.0	99.8
4	21.0	320	0.850	1.30	111.06	79	259	256	55	38	7.0	4.0	101.3
5	24.0	319	0.770	1.00	113.03	79	258	253	53	38	7.0	5.0	100.9
5	27.0	317	0.770	1.00	114.90	79	259	249	53	38	7.0	5.0	97.0
6	30.0	319	0.830	1.30	116.70	79	259	255	53	38	7.0	6.0	99.4
6	33.0	319	0.830	1.25	118.61	79	259	255	55	38	7.0	6.0	101.4
7	36.0	319	0.850	1.30	120.56	79	257	254	56	38	7.0	7.0	101.3

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.27
RUN : T21-OC-B
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	318	0.850	1.30	122.53	79	257	255	57	38	7.0	7.0	101.7
8	42.0	317	0.820	1.25	124.51	78	257	250	55	38	7.0	8.0	101.0
8	45.0	317	0.820	1.25	126.44	78	256	240	55	38	7.0	8.0	101.1
9	48.0	315	0.550	0.80	128.37	78	256	241	56	37	6.0	9.0	102.0
9	51.0	310	0.600	0.85	129.97	77	255	240	56	37	6.0	9.0	101.8
10	54.0	292	0.600	0.85	131.64	77	256	235	57	37	6.0	10.0	98.8
10	57.0	290	0.600	0.88	133.28	77	256	234	57	37	6.0	10.0	102.9
	60.0				134.99								
		314	0.675	1.00		77	255	253	52	39	6.5		100.9

ISOKINETIC TEST DATA FORM

Sample Type: Organics Reference Method: EPA M23 Page 1 of 5

Client:	Rigo + Rigo	City, Province:	Layton, UTAH
Project Number:	5416265	Test Number:	T21-OCB
Sample Location:	B Stack	Date:	Nov 27/95
Start Time:	12:56	Finish Time:	18:15
Barometric Press. (in Hg):	25.4	Stack Press(in H_2O): + or -:	-0.5
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes (No)

Sample Box Number:	T1	Gas Meter Factor:	0.983	Calibration Date:	Sept 19/95
Nozzle I.D.:	T1-2	Nozzle Diameter (in.):	0.228	Calibration Date:	Nov 16/95
Probe I.D.:	T2-7	Pitot Coefficient:	0.796	Calibration Date:	Sept/95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 9.47 O_2 (%): 10.57 CO (ppm): ____ Other: ____

Impinger 1 (g)	225.6	Assumed H_2O (%):	
Impinger 2 (g)	14.1	Filter I.D. #:	
Impinger 3 (g)	0.1	Net Filter Wt. (g):	
Impinger 4 (g)	1.3	Net Probe Wash Wt. (g):	
Impinger 5 (g) S.G.	7.0	Imp. Residue Wt. (g):	
~~Impinger 6~~ (g) Condenser	0.9		
XAD-2 Trap (g)	0.0		
Total H_2O Condensed (g)	249.0		

Sampling Comments: Train 05 (reused after T13-OCB) Trap #6

Process Rate:

Control Equipment Operation:

Process Comments:

Signature: [signature] Date: Nov 27/95

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	Rigo & Rigo
Date:	Nov 27/95	Test:	T21-OCB
Sample Location:	B Stack	Filter I.D.:	—
Pre Weights by:	HVB	Post Weights by:	HVB

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	MT	647.1	421.5	225.6
2	RODI	612.4	598.3	14.1
3	RODI	638.8	638.7	0.1
4	MT	495.5	494.2	1.3
5	S.G.	739.9	732.9	7.0
6				
7				
8	Condenser	250.5	249.6	0.9
XAD Trap		339.4	339.4	0.0
			Total (g)	249.0

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: Train OS (reused after T13-OCB)
Trap #6

Signature: [signature]

Date: Nov 27/95

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BOVAR-CONCORD Environmental

DATE: 11/27/95

SAMPLING TRAINS DATA SHEET

Client: Rugo + Rugo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T21-OCB Traverse #: 1 Traverse Direction: North Start Time: 12:56 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
		Corrected Actual (ft^3)												
1	0	64.11	0.45	0.7	.476	63.12	322	242	244	40	43	76	75	4
	3	65.59	0.45	0.65	.476	64.60	322	248	252	43	47	76	75	5
2	6	67.03	0.63	0.85	.563	66.04	323	244	253	43	47	76	74	6
	9	68.64	0.63	0.87	.563	67.70	322	244	255	41	49	78	75	6
3	12	70.37	0.60	0.85	.550	69.38	325	244	253	38	43	78	75	6
	15	72.01	0.60	0.86	.550	71.02	325	245	254	37	40	78	75	6
4	18	73.67	0.55	0.80	.527	72.68	324	245	254	36	39	78	74	6
	21	75.29	0.55	0.80	.527	74.29	321	246	254	35	39	79	75	6
5	24	76.99	0.76	1.10	.619	75.90	316	246	253	35	39	79	75	7
	27*		0.90	1.35	.673	77.64	320	259	265	42	41	76	74	8
6	30		0.88	1.35	.666	80.63	322	257	263	42	51	77	75	8
	33		0.88	1.35	.666	82.63	323	259	266	39	52	78	75	8

Pre test leak check: Rate (cfm) 0.012 at 15 inches Hg (Vacuum) Leak Volume Start: 62.95 Leak Volume End: 63.12

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

- * off at 24 min mark (13:23) (CEMs indicate 18% O_2), also train vacuum increased rapidly volume 77.65 ft^3, ice found in stem of impinger #2 (impaction stem)
- leak check performed, final volume at end of leak check = 78.64 ft^3
- leak check volume 78.64 - 77.65 = 0.99 ft^3 to be added to readings up to 24 min mark
- leak check 0.01 at 15" Hg (14:12)

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BOVAR-CONCORD Environmental

DATE: 11/27/95

SAMPLING TRAINS DATA SHEET

Client: Regal Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T21-OCB Traverse #: 1 Traverse Direction: North Start Time: _____ Finish Time: 14:46

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.81	1.25	.639	84.63	320	260	265	40	55	79	75	8
	39		0.80	1.25	.635	86.54	318	260	263	39	55	80	75	8
8	42		0.55	0.80	.535	88.47	306	260	264	39	55	80	75	6
	45		0.55	0.80	.535	90.07	305	258	264	39	55	81	76	6
9	48		0.45	0.65	.484	91.67	290	258	250	39	56	81	76	6
	51		0.47	0.68	.494	93.13	285	257	254	38	56	81	76	6
10	54		0.45	0.65	.484	94.61	280	258	257	38	58	81	76	6
	57		0.45	0.65	.484	96.04	280	258	252	38	58	81	76	6
	60					97.50								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.015 at 15 inches Hg (Vacuum) Leak Volume Start: 97.50 Leak Volume End: 97.73

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/27/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T21-OCB Traverse #: 2 Traverse Direction: East Start Time: 15:15 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.75	1.05	.624	98.27	320	256	248	38	62	77	75	6
	3		0.70	0.98	.594	100.12	321	257	249	36	62	78	76	7
2	6		0.64	0.92	.568	101.87	319	256	250	37	60	79	76	6
	9		0.64	0.95	.568	103.56	317	258	251	37	55	80	76	6
3	12		0.76	1.1	.619	105.28	318	257	256	37	54	80	76	7
	15		0.85	1.3	.654	107.14	319	257	257	37	52	81	76	7
4	18		0.85	1.3	.654	109.12	320	258	258	37	52	81	76	7
	21		0.85	1.3	.654	111.06	320	259	256	38	55	81	76	7
5	24		0.77	1.0	.623	113.03	319	258	253	38	53	81	76	7
	27		0.77	1.0	.623	114.90	317	259	249	38	53	81	76	7
6	30		0.83	1.3	.646	116.70	319	259	255	38	53	81	76	7
	33		0.83	1.25	.646	118.61	319	259	255	38	55	81	76	7

Pre test leak check: Rate (cfm) 0.014 at 15 inches Hg (Vacuum) Leak Volume Start: 97.73 Leak Volume End: 98.27

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [illegible]

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BOVAR-CONCORD Environmental

DATE: 11/22/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T21-OCB Traverse #: 2 Traverse Direction: East Start Time: _____ Finish Time: 16:15

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.85	1.3	.654	120.56	319	257	254	38	56	81	76	7
	39		0.85	1.3	.654	122.53	318	257	255	38	57	81	76	7
8	42		0.82	1.25	.643	124.51	317	257	250	38	55	80	76	7
	45		0.82	1.25	.643	126.44	317	256	240	38	55	80	75	7
9	48		0.55	0.80	.527	128.37	315	256	241	37	56	80	75	6
	51		0.60	0.85	.559	129.97	310	255	240	37	56	79	74	6
10	54		0.60	0.85	.559	131.64	292	256	235	37	57	79	74	6
	57		0.60	0.88	.559	133.28	290	256	234	37	57	79	74	6
	60					134.99								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.015 at 15 inches Hg (Vacuum) Leak Volume Start: 134.99 Leak Volume End: 135.19

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

QA/QC CHECKLIST

PROJECT # 541/6265 DATE: Nov 27/95 TEST T21-OCB

Client: Rigo + Rigo Location: B Stack Operator: HUB
Laytons wash

Sample Type: Organics Reference Method: EPA M23

Modifications: Recovery following Env. Canc. train rinse w/ acetone / DCM + train prerinsing w/ toluene

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	→	
Static positive or negative	→	-ve
Average Temperature	→	300°F
Estimate % H_2O	→	16
How estimated?	→	previous tests
Estimate Gas Composition	→	O_2% 10 CO_2(%) 10 CO(ppm) ___
How Estimated?	→	CEM
Proper nozzle selected?	✓	
K factor	→	
Number of sampling points per traverse	→	10
Probe markings correct?	✓	
Time per point	→	6
Number of readings per point	→	2
Barometric Pressure Measured?		
Mercury		
Aneroid		
Other	✓	Watch
PROBE NOZZLE:		
Nickel plated stainless steel or	✓	
Stainless Steel or		
Glass or		
Quartz		
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	Proving rinse after T20-OCA
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or	✓	
Quartz or		
Other		
Cleaned according to protocol	✓	Proving rinse after T20-OCA
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 5416265 DATE: Nov 27/95 TEST T21-OCB

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	++++	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	Proving of Train 05 after T13-OCB
FILTER TYPE		
Glass Fibre	✓	
Quartz		
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	X	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	✓	
Cleaned according to protocol	✓	Proving of Train 05 after T13-OCB
Thermocouple attached to trap	✓	
XAD-2 Trap covered with foil at all times	✓	

PROJECT # 541626.5 DATE: Nov 27/95 TEST T21-OCB

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	Proving A Train OS after T13-OCB
IMPINGERS		
No. of Impingers	→	5
Contents #1	→	MT
#2	→	RODI
#3	→	RODI
#4	→	MT
#5	→	S.G.
~~#6~~	→	
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly	✓	
Modifications	→	
Grease used on joints	X	
Silica gel type	→	
New?		
Used?	✓	
Pre Test Leak Check		
Performed	✓	
Rate	→	0.012 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	✓	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel	→	20% spent
Leak checks at port changes Before	→	0.015 cfm@ 15 "Hg
After	→	0.014 cfm@ 15 "Hg
Final leak race acceptable	→	0.015 cfm@ 15 "Hg
General comments on sampling technique	→ *	Mid traverse leak check (0.99 ft3)
Sample recovery performed on-site?	✓	
Sample recovery performed by	→	RB
Clean-up area - General Environment	→	Clean
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

* see note on pg 2 of 5 of data sheet

PROJECT # 541626.5 DATE: Nov 27/95 TEST T21-OCB

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	↔	Teflon
Leak free	✓	
Petri Dishes: borosilicate glass		Filter in cleaned foil in
plastic		plastic bag
Balance Type	↔	top loader
Calibrated or QC checked	↔	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour	✓	50% spent
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?	✓	Good
Colour of Filter		Grey
Foil Wrapped?		Yes
Probe Rinses		
Acetone/DCM	✓	
Other Toluene	✓	
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents	✓	
Solvents	✓	
Resin	✓	
Blank Train	✓	
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

#24

EPS 1/RM/2
SEMI-VOLATILE ORGANIC (SVOC) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: B-STACK TEST #: T21-OC-B DATE: NOV 27/95 PROJECT NO.: 541-6265

Nozzle, Probe Liner Front Half Filter Holder All Equipment	Filter	Back Half Filter Holder and Condenser Coil All Equipment	XAD Resin	Impingers & ~~HPLC~~ Rinse RODJ	~~Back Half Rinse~~
Wash and brush 3x each with ~~hexane~~ DCM and acetone. Rinse 3x with with ~~hexane~~ DCM and and acetone.	Remove and place on pre-cleaned foil fold in half and place in ~~petri dish~~. Ziplock bag	**Weigh Coil & Record Weight** ~~Soak 5 minutes each with hexane and acetone. Rinse 3x with hexane and acetone.~~ Toluene Rins	**Weigh XAD Trap & Record Weight** Cap ends and wrap in foil.	Weigh impingers and record wts. Empty contents of #1, #2 and #3 into container. ~~Rinse 3x with HPLC water.~~	Rinse back half filter holder, condenser and impingers 1, 2 and 3 3x with hexane and acetone.

Container ~~TS1~~ TS2 Front Half Acetone Hexane Rinse	Container ~~TS2~~ TS1 Filter	Container TS3 Back Half Filter and Condenser Coil	Container TS4 XAD Resin	Container TS5 Impinger Contents	~~Container TS6 Back Half Rinse~~
Final Wt.: 515.4	Filter ID: 21-OC	Final Wt.: 556.4	Wrap in Foil	Final Wt.: 933.7	~~Final Wt.:~~
Initial Wt.: 431.6	Colour: Grey	Initial Wt.: 431.6	XAD: 46622	Initial Wt.: 431.6	~~Initial Wt.:~~
Gain: 183.8		Gain: 154.8	Colour: White	Gain: 502.1	~~Gain:~~
		Colour: Clear	Train 6	Colour: Clear	~~Colour:~~

Mark Fluid Levels Seal and Label

Train & Proofing Identification	
Train No.:	05
RODJ ~~HPLC~~ Batch No.:	ZENON 95/10/26
Acetone Batch No.:	CALEDON 14123
DCM ~~Hexane~~ Batch No.:	CALEDON 16700
Filter Batch No.: ZENON 95/10/26	XAD No.: Train 6
Train Assembled By:	HUB
Train Recovered By:	

Reagent Blanks Collected?	Yes
Combined Acetone/~~Hexane~~ DCM	Yes
~~Combined Glycol~~/Water	Yes
Blank Train Collected?	Yes
Comments:	

EPSREC.DRW-May 95

BOVAR-CONCORD Environmental

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 27
RUN : T21-MET-B
LOC. : B STACK

RUN TIME : 12:56 TO 16:14

METALS CONCENTRATION	0.0 ug/DSm3	0.0000 gr/1000 DScf
	0.0 ug/Am3	0.0000 gr/1000 Acf
METALS EMISSION RATE	0.000 mg/s	0.00 gr/hr
SAMPLE GAS VOLUME	1.9765 DSm3	69.791 DScf
AVERAGE ISOKINETICITY	99.0 %	

FLUE GAS CHARACTERISTICS

MOISTURE	15.99 %	
TEMPERATURE	159.5 deg C	319.1 deg F
FLOW	47080 DSm3/hr	27711 DScfm
	95920 Am3/hr	56457 Acfm
VELOCITY	18.72 m/s	3685.0 fpm

GAS ANALYSIS	O2	10.57 %
	CO2	9.47 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.05 g/gmole D.B.
	MOL. WT.	28.12 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO	DATE : 95 11 27
JOBSITE : LAYTON UTAH	RUN : T21-MET-B
REF.No. : 5416265	LOC. : B STACK

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	86.0 kPa	25.40 in.Hg
STATIC PRESSURE	-137.0 Pa	-0.55 in.H2O
NOZZLE DIAMETER	6.20 mm	0.2440 in.
PITOT COEFFICIENT	0.798	
METER CORRECTION FACTOR	1.006	

CONDENSATE COLLECTION

CONDENSATION IN IMPINGER 1	131.1 g
CONDENSATION IN IMPINGER 2	91.2 g
CONDENSATION IN IMPINGER 3	33.3 g
CONDENSATION IN IMPINGER 4	5.2 g
CONDENSATION IN IMPINGER 5	2.4 g
CONDENSATION IN IMPINGER 6	0.9 g
SILICA GEL WEIGHT GAIN	12.6 g
TOTAL MOISTURE GAIN	276.7 g

METALS COLLECTION

FILTER METALS	0.0000 mg
WASHINGS METALS	0.0000 mg
IMPINGER METALS	0.0000 mg
TOTAL METALS	0.0000 mg

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 27
RUN : T21-MET-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1												
1	0.0	316	0.670	1.25	614.18	76	228	244	42	2.5	1.0	98.5
1	3.0	316	0.700	1.35	616.10	76	226	258	44	2.5	1.0	98.8
2	6.0	318	0.810	1.55	618.07	77	229	261	46	3.0	2.0	98.5
2	9.0	325	0.830	1.55	620.18	77	227	262	47	3.0	2.0	98.6
3	12.0	325	0.890	1.65	622.31	78	239	259	42	3.0	3.0	97.7
3	15.0	326	0.890	1.70	624.50	78	242	265	38	3.5	3.0	98.7
4	18.0	323	0.890	1.70	626.71	79	243	266	37	3.5	4.0	98.9
4	21.0	320	0.880	1.70	628.93	79	243	266	35	4.0	4.0	100.6
5	24.0	316	0.930	1.75	631.18	79	243	264	35	4.0	5.0	98.8
5	27.0	322	0.930	1.75	633.46	76	242	262	39	4.0	5.0	97.2
6	30.0	322	0.900	1.70	635.68	78	242	264	35	4.0	6.0	97.1
6	33.0	323	0.900	1.70	637.87	79	242	264	35	4.0	6.0	97.9
7	36.0	324	0.880	1.70	640.08	79	243	263	35	4.0	7.0	99.4
7	39.0	324	0.850	1.65	642.30	80	243	264	34	4.0	7.0	100.6
8	42.0	323	0.780	1.55	644.51	80	242	262	34	4.0	8.0	101.0
8	45.0	322	0.750	1.45	646.64	80	241	264	35	4.0	8.0	100.5
9	48.0	322	0.800	1.60	648.72	81	242	263	36	4.0	9.0	99.1
9	51.0	323	0.800	1.60	650.84	81	242	262	35	4.0	9.0	100.1
10	54.0	323	0.730	1.45	652.98	81	242	260	36	4.0	10.0	98.8
10	57.0	323	0.680	1.40	655.00	81	242	249	35	4.0	10.0	98.8
	60.0				656.95							
TRAVERSE NO. 2												
1	0.0	320	0.550	0.98	657.44	78	241	253	37	3.0	1.0	97.7
1	3.0	319	0.550	0.98	659.17	80	241	254	35	3.0	1.0	96.3
2	6.0	315	0.580	1.00	660.88	80	242	254	35	3.0	2.0	96.1
2	9.0	309	0.550	0.98	662.64	80	242	254	35	3.0	2.0	97.2
3	12.0	311	0.850	1.65	664.38	81	243	254	35	3.0	3.0	96.3
3	15.0	314	0.890	1.70	666.52	82	244	254	35	3.0	3.0	97.8
4	18.0	317	0.920	1.70	668.74	82	244	252	35	3.5	4.0	93.7
4	21.0	320	0.900	1.70	670.90	82	244	254	36	3.5	4.0	101.1
5	24.0	318	0.830	1.60	673.20	82	243	257	36	3.5	5.0	98.7
5	27.0	316	0.820	1.55	675.36	82	242	247	35	3.5	5.0	98.3
6	30.0	317	0.690	1.35	677.50	82	242	249	35	3.5	6.0	101.0
6	33.0	318	0.710	1.35	679.52	82	241	250	36	3.5	6.0	99.2
7	36.0	318	0.550	0.98	681.53	82	241	250	35	3.5	7.0	129.9

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95 11 27
RUN : T21-MET-B
LOC. : B STACK

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	316	0.580	1.05	683.85	82	241	250	35	3.5	7.0	96.9
8	42.0	317	0.720	1.40	685.63	82	239	248	35	3.5	8.0	98.4
8	45.0	317	0.720	1.40	687.64	82	239	248	35	3.0	8.0	97.4
9	48.0	313	0.480	0.95	689.63	82	238	250	35	3.0	9.0	96.8
9	51.0	314	0.550	0.98	691.25	82	239	250	35	3.0	9.0	97.7
10	54.0	318	0.550	0.98	693.00	82	239	249	34	3.0	10.0	97.0
10	57.0	319	0.560	0.99	694.73	82	239	249	35	3.0	10.0	97.8
	60.0				696.49							
		319	0.744	1.43		80	240	256	36	3.4		99.0

NOV27B

ISOKINETIC TEST DATA FORM

Sample Type: M5-metals Reference Method: EPA M29 Page 1 of 5

Client:	Rio Algom	City, Province:	Layton, Utah
Project Number:	5416265	Test Number:	T21-MP-B
Sample Location:	B S stack	Date:	95/11/27
Start Time:	12:56	Finish Time:	16:14
Barometric Press. (in Hg):	25.4	Stack Press(in H_2O): + or -:	-.55
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes ___ No ✓

Sample Box Number:	T3	Gas Meter Factor:	1.006	Calibration Date:	Sept 95
Nozzle I.D.:	Q2	Nozzle Diameter (in.):	.244	Calibration Date:	Nov 95
Probe I.D.:	T1-7'	Pitot Coefficient:	.798	Calibration Date:	Sept 95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 9.47 O_2 (%): 10.57 CO (ppm): ___ Other: ___

Impinger 1 (g)		Assumed H_2O (%):	16
Impinger 2 (g)		Filter I.D. #:	
Impinger 3 (g)		Net Filter Wt. (g):	
Impinger 4 (g)		Net Probe Wash Wt. (g):	
Impinger 5 (g)		Imp. Residue Wt. (g):	
Impinger 6 (g)			
XAD-2 Trap (g)			
Total H_2O Condensed (g)			

unit off Tech

Sampling Comments:

Process Rate: AG Reagent, Low AC, Min. Temp.

Control Equipment Operation: ESP

Process Comments: —

Signature: [signature] Date: 95/11/27

MOISTURE ANALYSIS DATA SHEET

Project #:	541265	Client:	R & R
Date:	95.11.27	Test:	TDI - MP - R
Sample Location:	Stack B	Filter I.D.:	44 ZENON
Pre Weights by:	JD	Post Weights by:	JA

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	631.2	500.1	131.1
2	5% HNO_3 - 10% H_2O_2	678.8	569.6	91.2
3	5% HNO_3 - 10% H_2O_2	649.7	616.4	33.3
4	Blank	496.1	490.9	5.2
5	$KMnO_4$	596.5	594.5	2.4
6	$KMnO_4$	603.0	602.1	0.9
7	Sg.	811.1	798.5	12.6
8				
XAD Trap				
			Total (g)	276.7

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: _____ Date: 95.11.28

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 27

SAMPLING TRAINS DATA SHEET

Client: Rig. Mgio Project #: 5416125 Sample Location: B Stack Operators: JW/JM

Run #: T21-MPB Traverse #: 1 Traverse Direction: IN Start Time: 12:50 Finish Time: 14:46

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		.67	1.25		614.181	316	228	244	42	NA	76	75	2.5
1	3		0.70	1.35	616.114	616.10	316	226	258	44		77	75	2.5
2	6		0.81	1.55	618.075	618.07	318	229	261	46		78	75	3.0
2	9		0.83	1.55	620.195	620.18	325	227	262	47		79	75	3.0
3	12		0.89	1.65	622.331	622.31	325	239	259	42		80	76	3.0
3	15		0.89	1.7	624.538	624.50	326	242	265	38		80	76	3.5
4	18		0.89	1.70	626.728	626.71	323	243	266	37		81	76	3.5
4	21		0.88	1.70	628.938	628.93	320	243	266	35		81	76	4.0
5	24		0.93	1.75	631.145	631.18	316	243	264	35		81	77	4.0
5	27		0.93	1.75	633.457	633.457	322	242	262	39		76	75	4.0
6	30		0.90	1.70	635.734	635.68	322	242	264	35		80	75	4.0
6	33		0.90	1.7	637.92	637.87	323	242	264	35		81	76	4.0
7	36		.88	1.7	640.11	640.08	324	243	263	35		82	76	4.0

Pre test leak check: Rate (cfm) .012 at 18 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

13:22 - stopped sampling, appears Hg lost + boiler, CFM values very off.
14:12 - restarted sampling. - also Org. stem frozen.

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BOVAR-CONCORD Environmental

DATE: 95/11/27

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 54116265 Sample Location: B Stack Operators: JW/JM

Run #: T21-MP-B Traverse #: 1 Traverse Direction: 1N Start Time: 12:56 Finish Time: 14:46

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) MA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		.85	1.65	642.295	642.30	324	241	264	34		82	77	4.0
8	42		0.78	1.55	*644.477	644.51	323	242	262	34		83	77	4.0
8	45		0.75	1.45	646.595	646.64	322	241	264	35		83	77	4.0
9	48		0.80	1.6	*648.685	648.72	322	242	263	36		83	78	4.0
9	51		0.80	1.6	650.832	650.84	323	242	262	35		83	78	4.0
10	54		0.73	1.45	*652.952	652.98	323	242	260	36		84	78	4.0
10	57		0.68	1.4	654.997	655.00	323	242	249	35		84	78	4.0
10	60				656.947	656.945								

Pre test leak check: Rate (cfm) .012 at 18 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .002 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 27

SAMPLING TRAINS DATA SHEET

Client: Rigo Rio Project #: 5416265 Sample Location: B Stack Operators: JW/Jim

Run #: T21-MP8 Traverse #: 2 Traverse Direction: IN Start Time: 15:14 Finish Time: 16:14

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.55	0.98		657.435	320	241	253	37	NA	78	78	3.0
1	3		0.55	0.98	659.186	659.17	319	241	254	35		81	78	3.0
2	6		0.58	1.0	660.921	660.88	315	242	254	35		82	78	3.0
2	9		0.55	0.98	662.679	662.64	309	242	254	35		82	78	3.0
3	12		0.85	1.05	664.391	664.38	311	243	254	35		83	79	3.0
3	15		0.89	1.7	666.557	666.52	314	244	254	35		84	79	3.0
4	18		0.92	1.7	668.748	668.74	317	244	252	35		84	79	3.5
4	21		0.90	1.7	671.005	670.90	320	244	254	36		84	79	3.5
5	24		0.83	1.6	673.14	673.20	318	243	257	36		84	79	3.5
5	27		0.82	1.55	675.357	675.36	316	242	247	35		84	79	3.5
6	30		0.69	1.35	677.464	677.50	317	242	249	35		84	80	3.5
6	33		0.71	1.35	679.461	679.52	318	241	250	36		84	80	3.5
7	36		0.55	.98	681.57	681.53	318	241	250	35		84	80	

Pre test leak check: Rate (cfm) 0.000 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .012 at 16 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95/11/27

SAMPLING TRAINS DATA SHEET

Client: Rio Tinto Project #: 5416265 Sample Location: B Stack Operators: SU/Jm

Run #: T2-MP-B Traverse #: 2 Traverse Direction: 1/0 Start Time: 15:14 Finish Time: 18:14

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.58	1.05	683.862	683.85	316	241	250	35		84	80	3.5
8	42		0.72	1.4	*685.643	685.63	317	239	248	35		84	80	3.5
8	45		0.72	1.4	687.633	687.64	317	239	248	35		84	80	3.5
9	48		0.48	0.95	*689.643	689.63	313	238	250	35		84	80	3.0
9	51		0.55	0.98	691.266	691.25	314	239	250	35		84	80	3.0
10	54		0.55	0.98	*693.001	693.00	318	239	249	34		83	80	3.0
10	57		0.56	0.99	694.751	694.73	319	239	249	35		83	80	3.0
10	60				696.497	696.491								

Pre test leak check: Rate (cfm) .008 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.012 at 16 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

PROJECT # 5416265 DATE: 951127 TEST T21-MP-B

Client: Rigo1Rigo Location: BStack Operator: JW

Sample Type: MS-Metals Reference Method: EPA M29

Modifications:

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	⟷	
Static positive or negative	⟷	neg.
Average Temperature	⟷	
Estimate % H_2O	⟷	16
How estimated?	⟷	MS
Estimate Gas Composition	⟷	O_2% ____ CO_2(%) ____ CO(ppm) ____
How Estimated?	⟷	
Proper nozzle selected?	✓	
K factor	⟷	
Number of sampling points per traverse	⟷	10
Probe markings correct?	✓	
Time per point	⟷	6
Number of readings per point	⟷	2
Barometric Pressure Measured?	✓	
Mercury		
Aneroid		
Other		watch
PROBE NOZZLE:		
Nickel plated stainless steel or		
Stainless Steel or		
Glass or		
Quartz	✓	
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or		
Quartz or	✓	
Other		
Cleaned according to protocol	✓	
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 5416265 DATE: 951126 TEST T21 MPB

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	↔	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	
FILTER TYPE		
Glass Fibre		
Quartz	✓	
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	✓	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	NA	
Cleaned according to protocol		
Thermocouple attached to trap		
XAD-2 Trap covered with foil at all times		

PROJECT # 5416265 DATE: 951126 TEST 721-MP-B

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers	7	
Contents #1		
#2		
#3		
#4		
#5		
#6		
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly		
Modifications		
Grease used on joints	✓	
Silica gel type		
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate		.012 cfm@ 18 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	NA	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel		
Leak checks at port changes Before		.002 cfm@ 15 "Hg
After		.008 cfm@ 15 "Hg
Final leak race acceptable		.012 cfm@ 16 "Hg
General comments on sampling technique		
Sample recovery performed on-site?	✓	
Sample recovery performed by		JA/JW
Clean-up area - General Environment		
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

QA/QC CHECKLIST

PROJECT # 5416265 DATE: _____ TEST _____

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	⟶	teflon
Leak free	✓	
Petri Dishes: borosilicate glass		
plastic	✓	
Balance Type	⟶	digital toploader
Calibrated or QC checked	⟶	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour		good - pink/blue
Weighed	✓	
Filter Handling	✓	
Tweezers used?	✓	
Condition?		
Colour of Filter		
Foil Wrapped?		
Probe Rinses		
Acetone	✓	
Other		HNO_3
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents		
Solvents		
Resin		
Blank Train		
Samples labelled and stored properly		
Liquid levels marked		
Samples delivered to lab		

EPA METHOD 29
METALS / PARTICULATE (MP) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: B TEST #: T-21-MP-A DATE: 95.11.27 PROJECT NO.: 5416265

Probe Liner, Nozzle Front Half Filter Housing	Probe Liner, Nozzle Front Half Filter Housing	Filter	Impingers 1, 2, 3	Back Half Filter Holder Filter Support	Impinger 4	Impinger 5, 6	Impinger 5, 6	Impinger 7
Brush and rinse with 100 mL acetone	Rinse with 100 mL 0.1 N HNO3	Carefully remove filter from support with Teflon-coated tweezers and place in petri dish	Weigh impingers empty contents into container	Rinse back half filter holder filter support and rinse empty impingers with 100 mL 0.1 N HNO3	weigh impinger empty contents into container 5A	Weigh impingers empty contents into container 5B	Rinse with 25 mL 8 N HCL	Weigh impinger and discard or recycle silica gel
Check visually to see if particulate is removed if not repeat step above	**Container TS3 Front Half 0.1 N HNO3 Rinse** Final Wt.: 679.6 Initial Wt.: 431.5 Gain: 243.1 Comments:	Brush loose particulate onto filter	**Container TS4-1 Impinger 4 Contents** Final Wt.: 926.9 Initial Wt.: 434.9 Gain: 492	**Container TS4-2 0.1 N HNO3 Back Half Impinger Rinse** Final Wt.: 677.2 Initial Wt.: 434.1 Gain: 243.1 Colour: CLEAR	Rinse with 100 mL 0.1 N HNO3	Rinse 3x with 100 mL Acidified KMnO4	Place rinsing in Container 5C which contains 200 mL of water	
Container TS2 Front Half Acetone Rinse Final Wt.: 532.5 Initial Wt.: 433.5 Gain: 99.0 Comments:		**Filter TS2** Seal petri dish with tape Colour: GREEN/GREY LIGHT Filter #: 2H			**Container TSA Impinger 4 Contents** Final Wt.: 555.1 Initial Wt.: 434.4 Gain: 120.7	Rinse with 100 mL water	**Container 5C HCL Rinse** Final Wt.: 686.4 Initial Wt.: 433.9 Gain: 252.5 Colour: CLEAR	
						Container 5B Impinger 5 & 6 KMnO4 Content and Rinses Final Wt.: 885.9 Initial Wt.: 433.7 Gain: 452.2 Colour: PURPLE		

LOST 20 mls Sample

FILTER PORTION IN PROBE WASH

Train Identification	Blanks	
Train No.:		
HNO3 / H2O2 Batch No.:	Container 9	200 mLs
DI Water Batch No.:	Container 8B	100 mLs
Acetone Batch No.:	Container 7	100 mLs
0.1 N HNO3 Batch No.:	Container 8A	300 mLs
Acidified KMnO4 Batch No.:	Container 10	100 mLs
8 N HCl / Batch No.: DI Water	Container 11	25 mL / 200 mL
Filter Number:	Container 12	* _____

Mark Liquid Level on Containers
Seal and Label Containers
Reagent Blanks Submitted? Yes ✓ ____ No ____
Prepare Fresh Acidified KMnO4 Daily _____

M29REC.DRW-May 95

BOVAR-CONCORD Environmental

NOVEMBER 28, 1995

Time on 13:17

METHOD 26
HCl SAMPLING DATA FORM

Company Name	DAVIS COUNTY	Plant Location	CLINTON UTAH	Source Name	STACK B
Test Date	Nov 28/95	Test Number	T23-HCl-A	Job Number	5416265
Sampling for	HCl	Meter Box	V1 / 1.001	B.P. mm/inHg	856 mbar

ABSORBING SOL'N	15 ml 0.1 N H_2SO_4	15 ml 0.1 N H_2SO_4	15 ml 0.1 N NaOH	15 ml 0.1 N NaOH	Silica Gel	GAS	1	2	3	4
WEIGHTS	IMP 1	IMP 2	IMP 3	IMP 4	IMP 5	READINGS				
EMPTY						O2				
FILLED FINAL						CO2				
FILLED INITIAL						CO				
DIFFERENCE						TIME				

OPERATOR	JM	Sample Rate (Lpm)	~2	H20 Condensed		
Lk.Chk, (Init.)	0 cc/min	Lk. Chk. (Final)	.03 cc/min	Probe Purged	(Yes	No)

Sample Time	Clock Time	Volume m³ Desired	Volume m³ Actual	Vacuum in.Hg	Meter Temp. °C/°F	Probe Temp. °C/°F	Box Temp. °C/°F	Impinger Temp. °C/°F
0	0		2880.8	1	41.5	305	277	
10	5		2891.25	1	42.5	245	287	
20	10		2901.6	1	44	306	295	
30	15		2911.8	1	44.5	248	298	
40	20		2921.9	1	45.5	285	277	
50	25		2932.1	1	44.5	232	258	
60	30		2942.25	1	46.5	309	248	
70	35		2952.4	1	46	250	246	
80	40		2962.6	1	48.5	291	245	
90	45		2972.8	1	49.5	332	245	
100	50		2982.7	1	48	248	240	
110	55		2992.8	1	48	237	242	
120	60		3003.1	1	48.5	304	254	
		AVG	122.3	1	46	276	262	

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BOVAR-CONCORD Environmental

MOISTURE ANALYSIS DATA SHEET

Project #:	SA16265	Client:	R & R
Date:	95.11.28	Test:	T23-HCl-A
Sample Location:	B	Filter I.D.:	—
Pre Weights by:	JA	Post Weights by:	JA

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	98.6	86.0	12.6
2	0.1N H_2SO_4	99.7	96.1	3.6
3	0.1N H_2SO_4	106.3	106.2	0.1
4	Blank	71.1	71.1	0
5	0.1N NaOH	100.6	100.5	0.1
6	0.1N NaOH	97.7	97.7	0
7	Si	121.4	120.4	1.0
8				
~~XAD Trap~~				
			Total (g)	17.4

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: _____ Date: 95.11.28

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BOVAR-CONCORD Environmental

HCl METHOD 26 SAMPLING TRAIN
RECOVERY DATA FORM

PROJECT NO.: 5416265

LOCATION: B TEST #: T23-HCl DATE: 95-11-20

Impingers 1 and 2	Impingers 3 and 4
Weigh impingers Empty contents into container and rinse with DI water	Weigh impingers Empty contents into container and rinse with DI water

Container TS1 Impingers 1 and 2 0.1 N H2SO4 Contents and DI Water Rinses		Container TS2 Impingers 3 and 4 0.1 N NaOH Contents and DI Water Rinses	
79.6	Final Wt.: 133.2	Final Wt.: 136.4	71.7
	Initial Wt.: 33.2	Initial Wt.: 36.4	
	Gain: 100.0	Gain: 100.0	

Mark Liquid Level	Seal and Label

Train Identification
Train No.:
0.1 N H2SO4 Batch No.:
DI Water Batch No.:
0.1 N NaOH Batch No.:
Train Loaded By: LA
Recovered By: RB
Reagent Blank Submitted: Yes ✓ No _____

BOVAR-CONCORD Environmental

SYSTEM CALIBRATION AND DRIFT CALCULATIONS

CLIENT	RIGO+RIGO	DATE	NOV28/95
PROJECT NUMBER	5416265	TIME START	08:33
SAMPLE LOCATION	STACK	TIME FINISH	12:42
	TEST NUMBER	T22CEMA	

INSTRUMENT SPAN VALUES

OXYGEN	25	%	CARBON DIOXIDE	20	%
SULPHUR DIOXIDE	1000	PPM	CARBON MONOXIDE	1000	PPM
NITROGEN OXIDES	1000	PPM	TOTAL HYDROCARBONS	100	PPM

ITEM	CAL.GAS VALUE	ANAL. CAL.	INITIAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	FINAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	DRIFT (% SPAN)
O2 ZERO	0	0.03	0.03	0.0	0.03	0.0	0.0
O2 CAL	9.91	9.92	9.86	-0.2	9.94	0.1	0.3
SO2 ZERO	0	0.4	2.1	0.2	2.3	0.2	0.0
SO2 SPAN	149	148	145	-0.3	144	-0.4	-0.1
NOX ZERO	0	2	1.5	-0.1	4	0.2	0.3
NOX SPAN	302	304	302	-0.2	306	0.2	0.4
CO2 ZERO	0	0.01	0.03	0.1	0.11	0.5	0.4
CO2 SPAN	7.01	7.04	7.01	-0.1	7.1	0.3	0.4
CO ZERO	0	0.8	0.9	0.0	0.9	0.0	0.0
CO SPAN	100	102	102	0.0	102	0.0	0.0
THC ZERO	0	0.8	0.32	-0.5	0.85	0.1	0.5
THC SPAN	20.1	22.2	20.3	-1.9	22.2	0.0	1.9

DRIFT CRITERIA <5% SPAN
BIAS CRITERIA <5% SPAN

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T22-OC-A
LOC. : STACK B

RUN TIME : 9:02 TO 12:36

ORGANICS CONCENTRATION	0.0 ug/DSm3	0.0000 gr/1000 DScf
	0.0 ug/Am3	0.0000 gr/1000 Acf
ORGANICS EMISSION RATE	0.000 mg/s	0.00 gr/hr
SAMPLE GAS VOLUME	1.6567 DSm3	58.500 DScf
AVERAGE ISOKINETICITY	102.7 %	

FLUE GAS CHARACTERISTICS

MOISTURE	18.32 %	
TEMPERATURE	162.3 deg C	324.1 deg F
FLOW	43561 DSm3/hr	25639 DScfm
	92253 Am3/hr	54298 Acfm
VELOCITY	18.00 m/s	3544.1 fpm

GAS ANALYSIS	O2	11.00 %
	CO2	9.10 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.01 g/gmole D.B.
	MOL. WT.	27.81 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T22-OC-A
LOC. : STACK B

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	85.7 kPa	25.30 in.Hg
STATIC PRESSURE	-144.4 Pa	-0.58 in.H2O
NOZZLE DIAMETER	5.79 mm	0.2280 in.
PITOT COEFFICIENT	0.796	
METER CORRECTION FACTOR	0.983	

CONDENSATE COLLECTION

RESIN TRAP CONDENSATE	2.1 g
CONDENSATION IN IMPINGER 1	255.2 g
CONDENSATION IN IMPINGER 2	1.3 g
CONDENSATION IN IMPINGER 3	0.1 g
CONDENSATION IN IMPINGER 4	0.1 g
SILICA GEL WEIGHT GAIN	14.6 g
TOTAL MOISTURE GAIN	273.4 g

ORGANICS COLLECTION

FILTER ORGANICS	0.0000 mg
WASHINGS ORGANICS	0.0000 mg
RESIN ORGANICS	0.0000 mg
IMPINGER ORGANICS	0.0000 mg
TOTAL ORGANICS	0.0000 mg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T22-OC-A
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1													
1	0.0	316	0.500	0.75	38.52	74	255	244	47	38	5.0	1.0	105.7
1	3.0	314	0.450	0.68	40.07	74	258	254	44	40	6.0	1.0	103.3
2	6.0	316	0.500	0.70	41.51	76	257	251	42	37	6.0	2.0	103.9
2	9.0	317	0.520	0.70	43.04	76	258	258	40	36	6.0	2.0	101.3
3	12.0	315	0.500	0.68	44.56	76	258	258	39	34	5.0	3.0	100.5
3	15.0	317	0.500	0.70	46.04	76	258	260	38	33	6.0	3.0	101.9
4	18.0	319	0.550	0.80	47.54	77	258	252	39	33	6.0	4.0	103.7
4	21.0	320	0.550	0.78	49.14	77	257	259	39	33	6.0	4.0	103.1
5	24.0	321	0.600	0.82	50.73	77	258	258	39	33	6.0	5.0	101.2
5	27.0	321	0.600	0.84	52.36	77	259	263	38	33	6.0	5.0	101.8
6	30.0	323	0.600	0.84	54.00	78	259	262	38	33	6.0	6.0	101.8
6	33.0	324	0.850	1.35	55.64	78	258	259	40	34	8.0	6.0	103.4
7	36.0	324	0.860	1.35	57.62	78	258	260	40	34	8.0	7.0	102.8
7	39.0	325	0.860	1.30	59.60	78	258	259	40	34	8.0	7.0	103.9
8	42.0	325	0.860	1.25	61.60	79	258	260	41	35	8.0	8.0	102.2
8	45.0	315	0.640	0.88	63.57	79	258	260	41	36	6.0	8.0	100.3
9	48.0	306	0.580	0.84	65.25	79	257	259	41	36	6.0	9.0	100.4
9	51.0	304	0.550	0.88	66.86	79	259	256	41	37	6.0	9.0	104.9
10	54.0	296	0.500	0.75	68.50	79	257	257	41	37	6.0	10.0	103.4
10	57.0	296	0.500	0.72	70.05	79	258	259	41	37	6.0	10.0	103.3
	60.0				71.60								
TRAVERSE NO. 2													
1	0.0	334	0.700	0.95	72.02	74	256	260	48	39	7.0	1.0	102.1
1	3.0	335	0.700	0.98	73.77	74	254	256	53	37	7.0	1.0	102.2
2	6.0	335	0.750	1.05	75.52	75	256	259	55	37	8.0	2.0	104.7
2	9.0	335	0.750	1.05	77.38	76	256	264	51	37	7.0	2.0	101.6
3	12.0	334	0.750	1.10	79.19	76	256	264	51	37	7.0	3.0	102.1
3	15.0	335	0.810	1.25	81.01	76	256	256	50	38	8.0	3.0	103.2
4	18.0	334	0.820	1.30	82.92	77	256	251	42	39	8.0	4.0	105.1
4	21.0	334	0.820	1.25	84.88	77	256	256	41	40	8.0	4.0	105.1
5	24.0	333	0.840	1.30	86.84	78	257	258	41	40	8.0	5.0	103.6
5	27.0	333	0.840	1.30	88.80	78	256	257	41	41	8.0	5.0	104.2
6	30.0	333	0.840	1.25	90.77	77	257	256	41	41	8.0	6.0	103.7
6	33.0	333	0.840	1.25	92.73	78	256	252	41	40	8.0	6.0	103.0
7	36.0	332	0.740	1.05	94.68	78	258	259	41	41	7.0	7.0	102.9

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T22-OC-A
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	332	0.790	1.10	96.51	78	258	260	41	41	7.0	7.0	101.2
8	42.0	332	0.790	1.20	98.37	78	257	259	41	41	7.0	8.0	102.3
8	45.0	331	0.780	1.20	100.25	79	257	256	41	41	7.0	8.0	102.8
9	48.0	330	0.730	1.05	102.13	78	257	261	42	41	7.0	9.0	101.2
9	51.0	330	0.730	1.10	103.92	80	256	262	42	42	7.0	9.0	103.7
10	54.0	328	0.630	0.88	105.76	79	257	258	42	42	7.0	10.0	101.3
10	57.0	328	0.630	0.88	107.43	79	257	259	42	42	7.0	10.0	101.9
	60.0				109.11								
		324	0.677	1.00		77	257	258	42	38	6.9		102.7

ISOKINETIC TEST DATA FORM

Sample Type: Organics Reference Method: EPA M23 Page 1 of 5

Client:	Rigo & Rigo	City, Province:	Layton, UTAH
Project Number:	5416265	Test Number:	T22-OCA
Sample Location:	B Stack	Date:	Nov 29/95
Start Time:	9:02	Finish Time:	12:36
Barometric Press. (in Hg):	25.3	Stack Press(in H_2O): + or -:	-0.58
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes (No)

Sample Box Number:	T1	Gas Meter Factor:	0.953	Calibration Date:	Sept 19/95
Nozzle I.D.:	T1-2	Nozzle Diameter (in.):	0.224	Calibration Date:	Nov 16/95
Probe I.D.:	T2-7	Pitot Coefficient:	0.796	Calibration Date:	Sept/95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): ____ O_2 (%): ____ CO (ppm): ____ Other: ____

Impinger 1 (g)	255.2	Assumed H_2O (%):	16
Impinger 2 (g)	1.3	Filter I.D. #:	—
Impinger 3 (g)	0.1	Net Filter Wt. (g):	—
Impinger 4 (g)	0.1	Net Probe Wash Wt. (g):	—
Impinger 5 (g) S.G.	14.6	Imp. Residue Wt. (g):	—
Impinger 6 (g) Condenser	0.0		
XAD-2 Trap (g)	2.1		
Total H_2O Condensed (g)	273.4		

Sampling Comments: AG Reagent, High AC, min temp.

Process Rate:

Control Equipment Operation:

Process Comments: After 1st traverse, compressor problems resulting in higher temp. (≈ 15°F higher) during traverse 2.

Signature: [signature] Date: Nov 29/95

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	Rige + Rige
Date:	Nov 29/95	Test:	T22-OCA
Sample Location:	B Stack	Filter I.D.:	—
Pre Weights by:	HWB	Post Weights by:	HWB

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	MT	680.9	425.7	255.2
2	ROOI	614.0	612.7	1.3
3	ROOI	610.2	610.1	0.1
4	MT	475.7	475.6	0.1
5	S.G.	725.8	711.2	14.6
6				
7				
8	Condenser	243.1	243.1	0.0
XAD Trap		249.5	247.4	2.1
			Total (g)	273.4

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: Train 07 (reused after T20-OCA)
Trap #10
U-Tube from train 06 used in train to replace broken U-tube (Train 06 had not been used to date)

Signature: HWB

Date: Nov 29/95

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BOVAR-CONCORD Environmental

DATE: 11/28/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T22-OCA Traverse #: 1 Traverse Direction: North Start Time: 9:02 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.50	0.75	.502	38.52	316	255	244	38	47	74	73	5
	3		0.45	0.68	.476	40.07	314	258	254	40	44	75	73	6
2	6		0.50	0.70	.502	41.51	316	257	251	37	42	77	74	6
	9		0.52	0.70	.512	43.04	317	258	258	36	40	77	74	6
3	12		0.50	0.68	.502	44.56	315	258	258	34	39	77	74	5
	15		0.50	0.70	.502	46.04	317	258	260	33	38	78	74	6
4	18		0.55	0.80	.527	47.54	319	258	252	33	39	79	74	6
	21		0.55	0.78	.527	49.14	320	257	259	33	39	79	74	6
5	24		0.60	0.82	.550	50.73	321	258	258	33	39	79	74	6
	27		0.60	0.84	.550	52.36	321	259	263	33	38	79	75	6
6	30		0.60	0.84	.550	54.00	323	259	262	33	38	80	75	6
	33		0.85	1.35	.654	55.64	324	258	259	34	40	81	75	8

Pre test leak check: Rate (cfm) 0.014 at 16 inches Hg (Vacuum) Leak Volume Start: 36.60 Leak Volume End: 38.52

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/28/95

SAMPLING TRAINS DATA SHEET

Client: Rigo & Rigo Project #: 5416265 Sample Location: R Stack Operators: HWB

Run #: T22-CC7 Traverse #: 1 Traverse Direction: North Start Time: _____ Finish Time: 10:02

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.86	1.35	.658	57.62	324	258	260	34	40	81	75	8
	39		0.86	1.30	.658	59.60	325	258	259	34	40	81	75	8
8	42		0.86	1.25	.658	61.60	325	258	260	35	41	81	76	8
	45		0.64	0.88	.568	63.57	315	258	260	36	41	81	76	6
9	48		0.58	0.84	.549	65.25	306	257	259	36	41	81	76	6
	51		0.55	0.88	.535	66.86	304	259	256	37	41	81	76	6
10	54		0.50	0.75	.510	68.50	296	257	257	37	41	81	76	6
	57		0.50	0.72	.510	70.05	296	258	259	37	41	81	76	6
	60					71.60								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.08 at 16 inches Hg (Vacuum) Leak Volume Start: 71.60 Leak Volume End: 71.77

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/28/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HWB

Run #: T22-OCA Traverse #: 2 Traverse Direction: East Start Time: 11:36 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.70	0.95	.594	72.02	334	256	260	39	48	74	73	7
	3		0.70	0.98	.594	73.77	335	254	256	37	53	75	72	7
2	6		0.75	1.05	.614	75.52	335	256	259	37	55	76	73	8
	9		0.75	1.05	.614	77.38	335	256	264	37	51	78	74	8
3	12		0.75	1.10	.614	79.19	334	256	264	37	51	78	74	8
	15		0.81	1.25	.639	81.01	335	256	256	38	50	78	74	8
4	18		0.82	1.3	.643	82.92	334	256	251	39	42	79	74	8
	21		0.82	1.25	.643	84.88	334	256	256	40	41	79	74	8
5	24		0.84	1.3	.650	86.84	333	257	258	40	41	80	75	8
	27		0.84	1.3	.650	88.80	333	256	257	41	41	80	75	8
6	30		0.84	1.25	.650	90.77	333	257	256	41	41	80	74	8
	33		0.84	1.25	.650	92.73	333	256	252	40	41	81	75	8

Pre test leak check: Rate (cfm) 0.015 at 14 inches Hg (Vacuum) Leak Volume Start: 71.77 Leak Volume End: 72.02

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: HWC Bell

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BOVAR-CONCORD Environmental

DATE: 11/28/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T22-OCA Traverse #: 2 Traverse Direction: East Start Time: _____ Finish Time: 12:36

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.74	1.05	.610	94.68	332	258	259	41	41	81	75	7
	39		0.79	1.1	.631	96.51	332	258	260	41	41	81	75	7
8	42		0.79	1.2	.631	98.37	332	257	259	41	41	81	75	7
	45		0.78	1.2	.627	100.25	331	257	256	41	41	81	76	7
9	48		0.73	1.05	.606	102.13	330	257	261	41	42	81	75	7
	51		0.73	1.1	.606	103.92	330	256	262	42	42	82	77	7
10	54		0.63	0.88	.563	105.76	328	257	258	42	42	81	76	7
	57		0.63	0.88	.563	107.43	328	257	259	42	42	81	76	7
	60					109.11								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.015 at 14 inches Hg (Vacuum) Leak Volume Start: 109.11 Leak Volume End: 109.31

K value calculated by: _____ Checked by: _____ Operator Signature: [illegible]

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BOVAR-CONCORD Environmental

QA/QC CHECKLIST

PROJECT # 5416265 DATE: Nov 29/95 TEST T22-OCA

Client: Rig + Rig Layton, UT 84014 Location: B Stack Operator: WB

Sample Type: Organics Reference Method: EPA M23

Modifications: Recovery following Envir. Conc. procedure, train rinse with acetone/DCM, train proving w/ toluene.

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	⟷	
Static positive or negative	⟷	-ve
Average Temperature	⟷	± 300°F
Estimate % H_2O	⟷	16
How estimated?	⟷	Previous tests
Estimate Gas Composition	⟷	O_2% 10 CO_2(%) 10 CO(ppm) ___
How Estimated?	⟷	CEMs
Proper nozzle selected?	✓	
K factor	⟷	
Number of sampling points per traverse	⟷	16
Probe markings correct?	✓	
Time per point	⟷	6
Number of readings per point	⟷	5
Barometric Pressure Measured?		
Mercury		
Aneroid		
Other	✓	Watch
PROBE NOZZLE:		
Nickel plated stainless steel or	✓	
Stainless Steel or		
Glass or		
Quartz		
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	Proving rinse after T21-OCB
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or	✓	
Quartz or		
Other		
Cleaned according to protocol	✓	Proving rinse after T21-OCB
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 541265 DATE: Nov 28/95 TEST T22-OCA

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	↔	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	Pruning of Train 07 after T20-OCA
FILTER TYPE		
Glass Fibre	✓	
Quartz		
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	X	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	✓	
Cleaned according to protocol	✓	Pruning of Train 07 after T20-OCA
Thermocouple attached to trap	✓	
XAD-2 Trap covered with foil at all times	✓	

PROJECT # 5410265 DATE: Nov 30/95 TEST T22-00A

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	Pre-run of Train 07 after T20-00A
IMPINGERS		
No. of Impingers	→	5
Contents #1	→	MT
#2	→	RO01
#3	→	RO01
#4	→	MT
#5	→	S.G.
~~#6~~	→	
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly	✓	
Modifications	→	
Grease used on joints	X	
Silica gel type	→	
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate	→	0.014 cfm@ 16 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	✓	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel	→	Good
Leak checks at port changes Before	→	0.018 cfm@ 16 "Hg
After	→	0.015 cfm@ 14 "Hg
Final leak race acceptable	→	0.015 cfm@ 14 "Hg
General comments on sampling technique	→	
Sample recovery performed on-site?	✓	
Sample recovery performed by	→	RB
Clean-up area - General Environment	→	Clean
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

PROJECT # 541265 DATE: Nov 29/97 TEST T22-OCN

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	⟷	Teflon
Leak free	✓	
Petri Dishes: borosilicate glass		Filters in clean foil in plastic bag
plastic		
Balance Type	⟷	top loader
Calibrated or QC checked	⟷	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour	✓	20% spent
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		Good
Colour of Filter		Grayish
Foil Wrapped?		Yes
Probe Rinses		
Acetone DCM	✓	
Other Toluene	✓	
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents	✓	
Solvents	✓	
Resin	✓	
Blank Train	✓	
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

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EPS 1/RM/2
SEMI-VOLATILE ORGANIC (SVOC) SAMPLING TRAIN RECOVERY DATA FORM

LOCATION: B- Stack TEST #: T22-OC-A DATE: Nov 28/95 PROJECT NO.: 541-6265

Nozzle, Probe Liner Front Half Filter Holder All Equipment	Filter	Back Half Filter Holder and Condenser Coil All Equipment	XAD Resin	Impingers & ~~HPLC~~ Rinse DCM	Back Half Rinse
DCM Wash and brush 3x each with ~~hexane~~ and acetone. Rinse 3x with with ~~hexane~~ and and acetone. DCM	Remove and place on pre-cleaned foil fold in half and place in ~~petri dish~~. Zip Loc bag	Weigh Coil & Record Weight ~~Soak 5 minutes each with hexane and acetone. Rinse 3x with hexane and acetone.~~ Toluene purge	Weigh XAD Trap & Record Weight Cap ends and wrap in foil.	Weigh impingers and record wts. Empty contents of #1, #2 and #3 into container. ~~Rinse 3x with HPLC Water.~~	Rinse back half filter holder, condenser and impingers 1, 2 and 3 3x with hexane and acetone.

Container ~~TS1~~ TS2 Front Half Acetone Hexane Rinse	
Final Wt:	593.4
Initial Wt:	434.7
Gain:	158.7

Container ~~TS2~~ TS1 Filter	
Filter ID:	T22-OC
Colour:	Greyish

Container TS3 Back Half Filter and Condenser Coil	
Final Wt:	579.9
Initial Wt:	432.6
Gain:	147.3
Colour:	

Container TS4 XAD Resin	
Wrap in Foil	
XAD:	096626
Colour:	White

Train ID

Container TS5 Impinger Contents	
Final Wt:	932.5
Initial Wt:	431.9
Gain:	500.6
Colour:	Clear

Container TS6 Back Half Rinse	
Final Wt.:	
Initial Wt.:	
Gain:	
Colour:	

Mark Fluid Levels Seal and Label

Train & Proofing Identification	
Train No.:	#07
~~HPLC~~ Batch No.:	Fisher 95/10/26
Acetone Batch No.:	Caledon 14123
Hexane Batch No.:	Caledon 16700
Filter Batch No.:	Zenon 95/10/26 XAD No.: Train ID
Train Assembled By:	HUB
Train Recovered By:	AB

Reagent Blanks Collected?	Yes
Combined Acetone/~~Hexane~~ DCM	Yes
~~Combined Glycol/Water~~	Yes
Blank Train Collected?	Yes
Comments:	

EPSREC.DRW-May 95

BOVAR-CONCORD Environmental

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T22-MP-A
LOC. : STACK B

RUN TIME : 9:02 TO 12:36

METALS CONCENTRATION	0.0 ug/DSm3	0.0000 gr/1000 DScf
	0.0 ug/Am3	0.0000 gr/1000 Acf
METALS EMISSION RATE	0.000 mg/s	0.00 gr/hr
SAMPLE GAS VOLUME	1.9589 DSm3	69.171 DScf
AVERAGE ISOKINETICITY	105.9 %	

FLUE GAS CHARACTERISTICS

MOISTURE	22.70 %	
TEMPERATURE	161.8 deg C	323.2 deg F
FLOW	43652 DSm3/hr	25693 DScfm
	97571 Am3/hr	57429 Acfm
VELOCITY	19.04 m/s	3748.4 fpm

GAS ANALYSIS	O2	11.00 %
	CO2	9.10 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.01 g/gmole D.B.
	MOL. WT.	27.28 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T22-MP-A
LOC. : STACK 8

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	85.7 kPa	25.30 in.Hg
STATIC PRESSURE	-144.4 Pa	-0.58 in.H2O
NOZZLE DIAMETER	6.20 mm	0.2440 in.
PITOT COEFFICIENT	0.798	
METER CORRECTION FACTOR	1.006	

CONDENSATE COLLECTION

CONDENSATION IN IMPINGER 1	161.1 g
CONDENSATION IN IMPINGER 2	115.6 g
CONDENSATION IN IMPINGER 3	27.0 g
CONDENSATION IN IMPINGER 4	103.9 g
CONDENSATION IN IMPINGER 5	0.3 g
CONDENSATION IN IMPINGER 6	0.0 g
SILICA GEL WEIGHT GAIN	15.4 g
TOTAL MOISTURE GAIN	423.3 g

METALS COLLECTION

FILTER METALS	0.0000 mg
WASHINGS METALS	0.0000 mg
IMPINGER METALS	0.0000 mg
TOTAL METALS	0.0000 mg

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T22-MP-A
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1												
1	0.0	319	0.800	1.55	696.99	75	230	236	33	2.0	1.0	108.4
1	3.0	317	0.680	1.30	699.14	76	232	233	35	2.0	1.0	105.6
2	6.0	318	0.780	1.50	701.08	77	233	230	34	2.0	2.0	105.1
2	9.0	319	0.770	1.50	703.15	78	232	226	33	2.0	2.0	105.8
3	12.0	319	0.710	1.40	705.22	78	232	234	32	2.0	3.0	107.4
3	15.0	317	0.750	1.45	707.24	79	232	225	32	2.0	3.0	105.8
4	18.0	319	0.870	1.70	709.29	79	233	233	32	2.0	4.0	106.0
4	21.0	319	0.890	1.70	711.50	80	233	239	33	2.0	4.0	106.0
5	24.0	320	0.890	1.70	713.74	80	232	235	33	2.0	5.0	105.6
5	27.0	320	0.900	1.70	715.97	81	231	233	34	2.0	5.0	104.5
6	30.0	322	0.870	1.70	718.19	81	232	226	34	2.0	6.0	106.3
6	33.0	322	0.880	1.70	720.41	81	233	235	34	2.0	6.0	105.2
7	36.0	323	0.890	1.70	722.62	81	232	236	34	2.0	7.0	105.6
7	39.0	323	0.870	1.70	724.85	83	233	239	35	2.0	7.0	104.6
8	42.0	323	0.850	1.65	727.04	82	233	233	35	2.0	8.0	103.5
8	45.0	321	0.700	1.35	729.18	82	234	237	35	2.0	8.0	106.9
9	48.0	322	0.810	1.65	731.19	82	233	239	35	2.0	9.0	107.5
9	51.0	322	0.780	1.60	733.36	83	234	242	36	2.0	9.0	109.8
10	54.0	322	0.760	1.50	735.54	83	235	243	35	2.0	10.0	105.6
10	57.0	322	0.740	1.45	737.61	83	235	231	35	2.0	10.0	105.4
	60.0				739.65							
TRAVERSE NO. 2												
1	0.0	310	0.620	1.25	740.20	77	237	263	35	2.0	1.0	108.2
1	3.0	317	0.600	1.10	742.11	78	244	261	35	2.0	1.0	104.4
2	6.0	317	0.630	1.10	743.92	78	238	260	35	2.0	2.0	103.0
2	9.0	317	0.650	1.20	745.75	79	238	260	36	2.0	2.0	105.8
3	12.0	318	0.630	1.15	747.66	79	238	259	35	2.0	3.0	104.0
3	15.0	329	0.840	1.65	749.51	80	239	259	36	2.0	3.0	105.5
4	18.0	330	0.920	1.70	751.66	80	239	265	37	2.0	4.0	105.1
4	21.0	333	0.900	1.70	753.90	81	239	262	38	2.0	4.0	106.8
5	24.0	333	0.920	1.70	756.15	81	239	250	39	2.0	5.0	104.2
5	27.0	332	0.930	1.80	758.37	81	239	252	40	2.0	5.0	107.7
6	30.0	332	0.750	1.45	760.68	81	239	249	40	2.0	6.0	106.3
6	33.0	330	0.680	1.35	762.73	82	239	246	41	2.0	6.0	107.6
7	36.0	329	0.550	1.00	764.71	82	239	251	41	2.0	7.0	106.7

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T22-MP-A
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	330	0.620	1.10	766.48	81	239	253	41	2.0	7.0	104.1
8	42.0	330	0.600	1.10	768.31	82	240	253	42	2.0	8.0	105.2
8	45.0	330	0.630	1.15	770.13	82	241	251	42	2.0	8.0	104.3
9	48.0	329	0.610	1.15	771.98	82	240	253	42	2.0	9.0	104.3
9	51.0	326	0.620	1.20	773.80	82	240	253	43	2.0	9.0	106.0
10	54.0	323	0.450	0.95	775.67	82	238	255	43	2.0	10.0	109.5
10	57.0	324	0.500	0.95	777.32	82	240	255	43	2.0	10.0	105.8
	60.0				779.00							
		323	0.740	1.43		80	236	245	37	2.0		105.9

ISOKINETIC TEST DATA FORM

Sample Type: M5 - metals Reference Method: EPA M29 Page 1 of 5

Client:	Rige + Rigo	City, Province:	Layton, Utah
Project Number:	5916265	Test Number:	T22-MP-A
Sample Location:	B Stack	Date:	951128
Start Time:	9:02	Finish Time:	12:36
Barometric Press. (in Hg):	25.3	Stack Press(in H_2O): + or -:	-.58
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	110	Cyclonic Flow:	Yes ___ No ✓

Sample Box Number:	T3	Gas Meter Factor:	1.0006	Calibration Date:	Sept 95
Nozzle I.D.:	Q2	Nozzle Diameter (in.):	.244	Calibration Date:	Nov 95
Probe I.D.:	T1-7'	Pitot Coefficient:	.799	Calibration Date:	Sept 95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 9.1 O_2 (%): 11 CO (ppm): ___ Other: ___

Impinger 1 (g)		Assumed H_2O (%):	16
Impinger 2 (g)		Filter I.D. #:	
Impinger 3 (g)		Net Filter Wt. (g):	
Impinger 4 (g)		Net Probe Wash Wt. (g):	
Impinger 5 (g)		Imp. Residue Wt. (g):	
Impinger 6 (g)			
~~XAD-2 Trap~~ (g) S.G.			
Total H_2O Condensed (g)			

Sampling Comments:

Process Rate: AG Reagent, High AC - min. temp.

Control Equipment Operation: ESP.

Process Comments:

Signature: [signature] Date: 951128

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	R & R
Date:	95-11-28	Test:	T22-MP-A
Sample Location:	B	Filter I.D.:	714
Pre Weights by:	DV	Post Weights by:	JR

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	631.0	469.9	161.1
2	5% HNO_3 10% H_2O_2	701.3	585.7	115.6
3	5% HNO_3 10% H_2O_2	637.1	610.1	27
4	Blank	597.2	493.3	103.9
5	$KMnO_4$	590.4	590.1	.3
6	$KMnO_4$	528.7	528.7	0
7	Si	862.0	846.6	15.4
8				
XAD Trap				
			Total (g)	423.3

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: _____

Signature: _____ Date: 95-11-28

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 28

SAMPLING TRAINS DATA SHEET

Client: Rig-Rig Project #: 5414265 Sample Location: B Stack Operators: Sw/Sm

Run #: T22-MP-A Traverse #: 1 Traverse Direction: IN Start Time: 9:02 Finish Time: 10:02

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		.80	1.55		696.985	319	230	236	33	NA	76	73	2.0
1	3		0.68	1.3	699.097	699.14	317	232	233	35		79	73	2.0
2	6		0.78	1.5	701.087	701.08	318	233	230	34		80	74	2.0
2	9		0.77	1.5	703.165	703.15	319	232	226	33		81	74	2.0
3	12		0.71	1.4	705.222	705.22	319	232	234	32		81	75	2.0
3	15		0.75	1.45	707.210	707.24	317	232	225	32		82	75	2.0
4	18		0.87	1.7	709.285	709.29	319	233	233	32		82	76	2.0
4	21		0.89	1.7	711.492	711.50	319	233	239	33		83	77	2.0
5	24		0.89	1.7	713.728	713.74	320	232	235	33		83	77	2.0
5	27		0.90	1.7	715.968	715.97	320	231	233	34		84	77	2.0
6	30		0.87	1.7	718.21	718.19	322	232	226	34		84	78	2.0
6	33		0.88	1.7	720.392	720.41	322	233	235	34		84	78	2.0
7	36		0.89	1.7	722.625	722.62	323	232	230	34		84	78	2.0

Pre test leak check: Rate (cfm) .005 at 17 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .010 at 19 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 28

SAMPLING TRAINS DATA SHEET

Client: [illegible] Project #: 5911U265 Sample Location: B Stack Operators: JW/SM

Run #: Temp-A Traverse #: 1 Traverse Direction: IN Start Time: 9:02 Finish Time: 10:02

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
											NA			
7	39		0.87	1.7	724.845	724.85	323	233	239	35		85	80	2.0
8	42		0.85	1.65	727.052	727.04	323	233	233	35		85	~~79~~	2.0
8	45		0.70	1.35	729.217	729.18	321	234	237	35		85	79	2.0
9	48		0.81	1.65	731.155	731.19	322	233	239	35		85	79	2.0
9	51		0.78	1.6	733.315	733.36	322	234	242	36		86	~~80~~	2.0
10	54		0.76	1.5	735.445	735.54	322	235	243	35		86	80	2.0
10	57		0.74	1.45	737.599	737.61	322	235	231	35		86	80	2.0
10	60				739.641	739.649								

Pre test leak check: Rate (cfm) .005 at 17 inches Hg (Vacuum) Leak Volume Start: ~~[illegible]~~ Leak Volume End: ~~[illegible]~~

Post test leak check: Rate (cfm) .010 at 19 inches Hg (Vacuum) Leak Volume Start: ~~[illegible]~~ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [illegible]

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 28

SAMPLING TRAINS DATA SHEET

Client: R+R Project #: 541626T Sample Location: B Stack Operators: JW/Sm

Run #: T22mp-A Traverse #: 2 Traverse Direction: IN Start Time: 11:36 Finish Time: 12:36

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.62	1.25	~~0.762~~	740.196	310	237	263	35	NA	77	76	2.0
1	3		0.60	1.1	742.085	742.11	317	244	261	35		80	76	2.0
2	6		0.63	1.18	743.939	743.92	317	238	260	35		80	76	2.0
2	9		0.65	1.2	745.794	745.75	317	238	260	36		81	76	2.0
3	12		0.63	1.15	747.654	747.66	318	238	259	35		82	76	2.0
3	15		0.84	1.65	749.534	749.57	329	239	259	36		82	77	2.0
4	18		0.92	1.7	751.674	751.66	330	239	265	37		82	77	2.0
4	21		0.90	1.7	753.525	753.90	333	239	262	38		83	78	2.0
5	24		0.92	1.7	756.14	756.15	333	239	250	39		83	78	2.0
5	27		0.93	1.8	758.415	758.37	332	239	252	40		84	78	2.0
6	30		0.75	1.45	760.647	760.68	332	239	249	40		84	78	2.0
6	33		0.68	1.35	762.725	762.73	330	239	246	41		84	79	2.0
7	36		0.55	1.0	764.677	764.71	329	239	251	41		84	79	2.0

Pre test leak check: Rate (cfm) .003 at 17 inches Hg (Vacuum) Leak Volume Start: 740.08 Leak Volume End: 740.196

Post test leak check: Rate (cfm) .008 at 16.5 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 28

SAMPLING TRAINS DATA SHEET

Client: R+R Project #: 5416261 Sample Location: B Stack Operators: JW/JM

Run #: T22-mPA Traverse #: 2 Traverse Direction: IN Start Time: 11:36 Finish Time: 12:36

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.62	1.10	766.461	766.48	330	239	253	41		83	79	2.0
8	42		0.60	1.10	768.339	768.31	330	240	253	42		84	79	2.0
8	45		0.63	1.15	770.139	770.13	330	241	257	42		84	79	2.0
9	48		0.61	1.15	772.004	771.98	329	240	253	42		84	79	2.0
9	51		0.62	1.2	773.824	773.80	326	240	253	43		84	80	2.0
10	54		0.45	0.95	775.659	775.67	323	238	255	43		84	80	2.0
10	57		0.50	0.95	777.254	777.32	324	240	255	43		84	80	2.0
10	60				778.989	778.999								

Pre test leak check: Rate (cfm) .003 at 17 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .008 at 16.5 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

PROJECT # 5416265 DATE: 951128 TEST T22-MP-A

Client: Rigo + Rigo Location: B Stack Operator: JW

Sample Type: M5 metals Reference Method: EPA M29

Modifications:

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	↔	
Static positive or negative	↔	neg.
Average Temperature	↔	
Estimate % H_2O	↔	16
How estimated?	↔	M5
Estimate Gas Composition	↔	O_2% ____ CO_2(%) ____ CO(ppm) ____
How Estimated?	↔	
Proper nozzle selected?		
K factor	↔	
Number of sampling points per traverse	↔	10
Probe markings correct?	✓	
Time per point	↔	6
Number of readings per point	↔	2
Barometric Pressure Measured?	✓	
Mercury		
Aneroid		
Other		watch
PROBE NOZZLE:		
Nickel plated stainless steel or		
Stainless Steel or		
Glass or		
Quartz	✓	
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or		
Quartz or	✓	
Other		
Cleaned according to protocol	✓	
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 541026.5 DATE: 951128 TEST T22-MP-A

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	----	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	
FILTER TYPE		
Glass Fibre		
Quartz	✓	
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	✓	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	NA	
Cleaned according to protocol		
Thermocouple attached to trap		
XAD-2 Trap covered with foil at all times		

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 951128 TEST T22 MP-A

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers	7	
Contents #1		
#2		
#3		
#4		
#5		
#6		
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly		
Modifications		
Grease used on joints	✓	
Silica gel type		
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate		.005 cfm@ 17 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	NA	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel		good
Leak checks at port changes Before		.010 cfm@ 19 "Hg
After		.003 cfm@ 17 "Hg
Final leak race acceptable		.008 cfm@ 10.5 "Hg
General comments on sampling technique		
Sample recovery performed on-site?	✓	
Sample recovery performed by		JA/JW
Clean-up area - General Environment	✓	
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

QA/QC CHECKLIST

PROJECT # 541/6265 DATE: 951128 TEST T22-MP-A

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	++++	teflon
Leak free	✓	
Petri Dishes: borosilicate glass		
plastic	✓	
Balance Type	++++	digital top loader
Calibrated or QC checked	++++	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour		good - pink/blue.
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		
Colour of Filter		
Foil Wrapped?		
Probe Rinses		
Acetone	✓	
Other		HNO_3
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents		
Solvents		
Resin		
Blank Train		
Samples labelled and stored properly		
Liquid levels marked		
Samples delivered to lab		

EPA METHOD 29
METALS / PARTICULATE (MP) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: B- Stack TEST #: T22 - MP - A DATE: Nov 28/95 PROJECT NO.: 541 - 6265

Probe Liner, Nozzle Front Half Filter Housing	Probe Liner, Nozzle Front Half Filter Housing	Filter	Impingers 1, 2, 3	Back Half Filter Holder Filter Support	Impinger 4	Impinger 5, 6	Impinger 5, 6	Impinger 7
Brush and rinse with 100 mL acetone	Rinse with 100 mL 0.1 N HNO3	Carefully remove filter from support with Teflon-coated tweezers and place in petri dish	Weigh impingers empty contents into container	Rinse back half filter holder filter support and rinse empty impingers with 100 mL 0.1 N HNO3	weigh impinger empty contents into container 5A	Weigh impingers empty contents into container 5B	Rinse with 25 mL 8 N HCL	Weigh impinger and discard or recycle silica gel
Check visually to see if particulate is removed if not repeat step above	**Container TS3 Front Half 0.1 N HNO3 Rinse** Final Wt.: 576.7 Initial Wt.: 435.2 Gain: Comments:	Brush loose particulate onto filter	**Container TS4-1 Impinger 4 Contents** Final Wt.: Initial Wt.: 436.1 Gain:	**Container TS4-2 0.1 N HNO3 Back Half Impinger Rinse** Final Wt.: Initial Wt.: 433.0 Gain: Colour:	Rinse with 100 mL 0.1 N HNO3	Rinse 3x with 100 mL Acidified KMnO4	Place rinsing in Container 5C which contains 200 mL of water	
Container TS2 Front Half Acetone Rinse Final Wt.: 594.3 Initial Wt.: 432.9 Gain: Comments:		**Filter TS2** Seal petri dish with tape Colour: Filter #:			**Container TSA Impinger 4 Contents** Final Wt.: Initial Wt.: 433.1 Gain:	Rinse with 100 mL water **Container 5B Impinger 5 & 6 KMnO4 Content and Rinses** Final Wt.: Initial Wt.: 436.9 Gain: Colour:	**Container 5C HCL Rinse** Final Wt.: Initial Wt.: 433.0 Gain: Colour:	

Train Identification	Blanks	
Train No.:		
HNO3 / H2O2 Batch No.:	Container 9	200 mLs
DI Water Batch No.:	Container 8B	100 mLs
Acetone Batch No.:	Container 7	100 mLs
0.1 N HNO3 Batch No.:	Container 8A	300 mLs
Acidified KMnO4 Batch No.:	Container 10	100 mLs
8 N HCl / Batch No.: DI Water	Container 11	25 mL / 200 mL
Filter Number:	Container 12	* _____

Mark Liquid Level on Containers
Seal and Label Containers
Reagent Blanks Submitted? Yes ✓ No ____
Prepare Fresh Acidified KMnO4 Daily ✓

M29REC.DRW-May 95

BOVAR-CONCORD Environmental

SYSTEM CALIBRATION AND DRIFT CALCULATIONS

CLIENT	RIGO+RIGO	DATE	NOV28/95
PROJECT NUMBER	5416265	TIME START	14:50
SAMPLE LOCATION	STACK	TIME FINISH	18:55
	TEST NUMBER	T23CEMB	

INSTRUMENT SPAN VALUES

OXYGEN	25	%	CARBON DIOXIDE	20	%
SULPHUR DIOXIDE	1000	PPM	CARBON MONOXIDE	1000	PPM
NITROGEN OXIDES	1000	PPM	TOTAL HYDROCARBONS	100	PPM

ITEM	CAL.GAS VALUE	ANAL. CAL.	INITIAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	FINAL VALUES SYSTEM CAL.	SYSTEM CAL. BIAS (% SPAN)	DRIFT (% SPAN)
O2 ZERO	0	0.03	0.03	0.0	0.07	0.2	0.2
O2 CAL	9.91	9.96	9.94	-0.1	10	0.2	0.2
SO2 ZERO	0	-1	2.3	0.3	1.2	0.2	-0.1
SO2 SPAN	149	150.5	144	-0.7	145	-0.6	0.1
NOX ZERO	0	3.2	4	0.1	2.4	-0.1	-0.2
NOX SPAN	302	304	306	0.2	305	0.1	-0.1
CO2 ZERO	0	0.07	0.11	0.2	0.1	0.2	-0.1
CO2 SPAN	7.01	7.14	7.1	-0.2	7.11	-0.1	0.1
CO ZERO	0	1.04	0.9	-0.0	0.02	-0.1	-0.1
CO SPAN	100	102	102	0.0	102	0.0	0.0
THC ZERO	0	0.83	0.85	0.0	0.9	0.1	0.0
THC SPAN	20.1	21.3	22.2	0.9	22.7	1.4	0.5

DRIFT CRITERIA <5% SPAN
BIAS CRITERIA <5% SPAN

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T23-OC-B
LOC. : STACK B

RUN TIME : 15:17 TO 18:50

ORGANICS CONCENTRATION	0.0 ug/DSm3	0.0000 gr/1000 DScf
	0.0 ug/Am3	0.0000 gr/1000 Acf
ORGANICS EMISSION RATE	0.000 mg/s	0.00 gr/hr
SAMPLE GAS VOLUME	1.6054 DSm3	56.688 DScf
AVERAGE ISOKINETICITY	101.7 %	

FLUE GAS CHARACTERISTICS

MOISTURE	17.92 %	
TEMPERATURE	165.0 deg C	329.1 deg F
FLOW	42644 DSm3/hr	25099 DScfm
	90408 Am3/hr	53213 Acfm
VELOCITY	17.64 m/s	3473.2 fpm

GAS ANALYSIS	O2	9.90 %
	CO2	10.20 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.14 g/gmole D.B.
	MOL. WT.	27.97 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T23-OC-B
LOC. : STACK B

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	85.7 kPa	25.30 in.Hg
STATIC PRESSURE	-124.5 Pa	-0.50 in.H2O
NOZZLE DIAMETER	5.79 mm	0.2280 in.
PITOT COEFFICIENT	0.796	
METER CORRECTION FACTOR	0.983	

CONDENSATE COLLECTION

RESIN TRAP CONDENSATE	0.9 g
CONDENSATION IN IMPINGER 1	233.7 g
CONDENSATION IN IMPINGER 2	4.2 g
CONDENSATION IN IMPINGER 3	0.6 g
CONDENSATION IN IMPINGER 4	0.2 g
SILICA GEL WEIGHT GAIN	18.2 g
TOTAL MOISTURE GAIN	257.8 g

ORGANICS COLLECTION

FILTER ORGANICS	0.0000 mg
WASHINGS ORGANICS	0.0000 mg
RESIN ORGANICS	0.0000 mg
IMPINGER ORGANICS	0.0000 mg
TOTAL ORGANICS	0.0000 mg

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T23-OC-B
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1													
1	0.0	326	0.500	0.75	12.87	76	259	262	56	45	7.0	1.0	104.4
1	3.0	328	0.500	0.73	14.40	76	258	263	60	43	7.0	1.0	104.4
2	6.0	329	0.530	0.75	15.93	77	258	263	54	40	7.0	2.0	104.0
2	9.0	330	0.530	0.75	17.50	77	257	262	42	37	7.0	2.0	101.4
3	12.0	335	0.530	0.75	19.03	77	258	261	41	37	7.0	3.0	104.3
3	15.0	335	0.530	0.75	20.60	77	257	263	40	36	7.0	3.0	103.0
4	18.0	336	0.530	0.75	22.15	77	257	262	40	35	7.0	4.0	102.4
4	21.0	337	0.500	0.72	23.69	78	259	264	40	35	7.0	4.0	103.9
5	24.0	336	0.530	0.75	25.21	78	260	265	40	35	7.0	5.0	103.5
5	27.0	336	0.530	0.75	26.77	79	260	265	41	35	7.0	5.0	101.5
6	30.0	336	0.810	1.25	28.30	79	258	264	40	35	10.0	6.0	104.2
6	33.0	337	0.810	1.20	30.24	79	259	261	41	35	10.0	6.0	71.5
7	36.0	332	0.800	1.20	31.57	78	259	265	45	44	10.0	7.0	101.4
7	39.0	332	0.800	1.25	33.45	79	260	266	45	42	11.0	7.0	100.7
8	42.0	324	0.680	0.95	35.32	80	260	266	46	40	11.0	8.0	99.1
8	45.0	323	0.680	0.95	37.03	81	260	265	45	40	12.0	8.0	101.9
9	48.0	312	0.500	0.75	38.79	82	259	266	46	42	11.0	9.0	102.3
9	51.0	312	0.500	0.70	40.32	81	259	262	47	43	10.0	9.0	102.4
10	54.0	310	0.450	0.62	41.85	81	260	263	46	44	10.0	10.0	102.8
10	57.0	310	0.450	0.62	43.31	81	260	263	46	44	10.0	10.0	100.7
	60.0				44.74								
TRAVERSE NO. 2													
1	0.0	332	0.740	1.10	47.23	81	258	270	48	47	10.0	1.0	102.6
1	3.0	333	0.740	1.10	49.07	82	258	262	48	45	10.0	1.0	102.0
2	6.0	333	0.740	1.10	50.90	82	259	261	47	45	10.0	2.0	102.6
2	9.0	333	0.740	1.10	52.74	82	258	264	47	45	10.0	2.0	101.4
3	12.0	333	0.800	1.20	54.56	82	259	259	45	46	11.0	3.0	102.9
3	15.0	333	0.790	1.20	56.48	81	262	276	46	47	11.0	3.0	103.2
4	18.0	334	0.800	1.20	58.39	81	262	270	46	48	11.0	4.0	101.5
4	21.0	333	0.800	1.20	60.28	81	262	273	46	49	11.0	4.0	102.0
5	24.0	333	0.800	1.20	62.18	81	263	271	47	50	11.0	5.0	102.6
5	27.0	333	0.800	1.25	64.09	81	264	268	45	49	11.0	5.0	103.1
6	30.0	331	0.770	1.15	66.01	80	262	271	45	49	11.0	6.0	101.3
6	33.0	332	0.770	1.20	67.86	80	263	272	46	50	11.0	6.0	103.0
7	36.0	332	0.800	1.25	69.74	80	263	269	46	50	11.0	7.0	102.8

AIR TESTING SERVICES INC. ORGANICS EMISSION REPORT

CLIENT : RIGO & RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T23-OC-B
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	RES. TMP. F	EXIT TMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	332	0.800	1.25	71.65	79	262	272	44	49	12.0	7.0	103.0
8	42.0	332	0.740	1.15	73.56	79	263	267	45	50	12.0	8.0	103.7
8	45.0	329	0.650	0.95	75.41	79	262	272	46	50	10.0	8.0	103.8
9	48.0	329	0.650	0.93	77.15	79	261	270	46	50	10.0	9.0	103.2
9	51.0	329	0.650	0.92	78.88	79	261	271	46	50	10.0	9.0	102.6
10	54.0	315	0.500	0.75	80.60	78	262	269	46	50	9.0	10.0	103.9
10	57.0	315	0.500	0.72	82.14	78	262	270	45	50	9.0	10.0	101.9
	60.0				83.65								
		329	0.650	0.97		79	260	266	46	44	9.6		101.7

ISOKINETIC TEST DATA FORM

Sample Type: Organics Reference Method: EPA M23 Page 1 of 5

Client:	Rigo + Rigo	City, Province:	Layton, UTAH
Project Number:	5416265	Test Number:	T23-OCB
Sample Location:	B Stack	Date:	Nov 28/95
Start Time:	15:17	Finish Time:	18:50
Barometric Press. (in Hg):	25.3	Stack Press(in H_2O): + or -:	-0.50
Stack Diameter (in.):	53	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes No

Sample Box Number:	T1	Gas Meter Factor:	0.983	Calibration Date:	Sept 19/95
Nozzle I.D.:	T1-2	Nozzle Diameter (in.):	0.228	Calibration Date:	Nov 16/95
Probe I.D.:	T2-7	Pitot Coefficient:	0.796	Calibration Date:	Sept/95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): ____ O_2 (%): ____ CO (ppm): ____ Other: ____

Impinger 1 (g)	233.7	Assumed H_2O (%):	16
Impinger 2 (g)	4.2	Filter I.D. #:	—
Impinger 3 (g)	0.6	Net Filter Wt. (g):	—
Impinger 4 (g)	0.2	Net Probe Wash Wt. (g):	—
Impinger 5 (g) S.G.	18.2	Imp. Residue Wt. (g):	—
Impinger 6 (g) Condenser	0.0		
XAD-2 Trap (g)	0.9		
Total H_2O Condensed (g)	257.8		

Sampling Comments: Train 05 (reused after T21-OCB) Trap #9

Process Rate: AG Reagent, High Ar, min temp. however due to compressor problems the temp was closer to intermediate ≈ 335°F

Control Equipment Operation:

Process Comments:

Signature: [signature] Date: Nov 28/95

Mid traverse leak check due to freezing of impinger, see note on pg 3 of 5.

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	Rigs + Rigs
Date:	Nov 28/95	Test:	T23 - OCB
Sample Location:	B Stack	Filter I.D.:	—
Pre Weights by:	HUB	Post Weights by:	HUB

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	MT	655.8	422.1	233.7
2	ROD1	596.2	592.0	4.2
3	ROD1	610.1	609.5	0.6
4	MT	494.8	494.6	0.2
5	S.G.	744.0	725.8	18.2
6				
7				
8	Condenser	250.4	250.4	0.0
XAD Trap		252.0	250.1	0.9
			Total (g)	257.8

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights				
Post weights				

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments: Train 05 (reused after T21-OCB)
Trap # 9

Signature: [signature]

Date: Nov 28/95

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BOVAR-CONCORD Environmental

DATE: 11/28/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HVB

Run #: T23-OCB Traverse #: 1 Traverse Direction: North Start Time: 15:17 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.50	0.75	.502	12.87	326	259	262	45	56	76	75	7
	3		0.50	0.73	.502	14.40	328	258	263	43	60	77	75	7
2	6		0.53	0.75	.517	15.93	329	258	263	40	54	78	75	7
	9		0.53	0.75	.517	17.50	330	257	262	37	42	79	75	7
3	12		0.53	0.75	.517	19.03	335	258	261	37	41	79	75	7
	15		0.53	0.75	.517	20.60	335	257	263	36	40	79	75	7
4	18		0.53	0.75	.517	22.15	336	257	262	35	40	79	75	7
	21		0.50	0.72	.502	23.69	337	259	264	35	40	80	76	7
5	24		0.53	0.75	.517	25.21	336	260	265	35	40	80	76	7
	27		0.53	0.75	.517	26.77	336	260	265	35	41	81	76	7
6	30		0.81	1.25	.639	28.30	336	258	264	35	40	81	76	10
	33		0.81	1.2	.639	30.24	337	259	261	35	41	81	76	10

Pre test leak check: Rate (cfm) 0.012 at 15 inches Hg (Vacuum) Leak Volume Start: 10.65 Leak Volume End: 12.87

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 11/28/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HWB

Run #: T23-OCB Traverse #: 1 Traverse Direction: North Start Time: _____ Finish Time: 5:20

Pt.	Time (Min.) *	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36	0	0.80	1.2	.635	33.70	332	259	265	44	45	79	77	10
	39	3	0.80	1.25	.635	35.58	332	260	266	42	45	80	78	11
8	42	6	0.68	0.95	.585	37.45	324	260	266	40	46	82	78	11
	45	9	0.68	0.95	.585	39.16	323	260	265	40	45	83	78	12
9	48	12	0.50	0.75	.502	40.92	312	259	266	42	46	84	79	11
	51	15	0.50	0.70	.502	42.45	312	259	262	43	47	83	79	10
10	54	18	0.45	0.62	.484	43.98	310	260	263	44	46	83	79	10
	57	21	0.45	0.62	.484	45.44	310	260	263	44	46	83	79	10
	60	24				46.89								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.015 at 13 inches Hg (Vacuum) Leak Volume Start: 46.89 Leak Volume End: 47.025

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

* off at 35 min mark (15:52) due to high vacuum (ice in impinger stem)
- DGM volume 31.10 ft^3
- DGM volume after leak check 33.23 − 31.10 = 2.13
- on at 4:55
- leak check 0.019 at 15" Hg

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BOVAR-CONCORD Environmental

DATE: 11/28/95

SAMPLING TRAINS DATA SHEET

Client: Rigo & Rigo Project #: 5416265 Sample Location: B Stack Operators: HCB

Run #: T23-CCB Traverse #: 2 Traverse Direction: East Start Time: 1750 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.74	1.1	.610	47.23	332	258	270	47	48	82	80	10
	3		0.74	1.1	.610	49.07	333	258	262	45	48	83	80	10
2	6		0.74	1.1	.610	50.90	333	259	261	45	47	83	80	10
	9		0.74	1.1	.610	52.74	333	258	264	45	47	84	80	10
3	12		0.80	1.2	.635	54.56	333	259	259	46	45	84	80	11
	15		0.79	1.2	.631	56.48	333	262	276	47	46	83	79	11
4	18		0.80	1.2	.635	58.39	334	262	270	48	46	83	79	11
	21		0.80	1.2	.635	60.28	333	262	273	49	46	83	79	11
5	24		0.80	1.2	.635	62.18	333	263	271	50	47	83	79	11
	27		0.80	1.25	.635	64.09	333	264	268	49	45	83	79	11
6	30		0.77	1.15	.623	66.01	331	262	271	49	45	82	78	11
	33		0.77	1.2	.623	67.86	332	263	272	50	46	82	78	11

Pre test leak check: Rate (cfm) .009 at 15 inches Hg (Vacuum) Leak Volume Start: 47.025 Leak Volume End: 47.230

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [illegible]

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BOVAR-CONCORD Environmental

DATE: 11/20/95

SAMPLING TRAINS DATA SHEET

Client: Rigo + Rigo Project #: 5416265 Sample Location: B Stack Operators: HUB

Run #: T23-OCB Traverse #: 2 Traverse Direction: East Start Time: _____ Finish Time: 18:50

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	36		0.80	1.25	.635	69.74	332	263	269	50	46	81	78	11
	39		0.80	1.25	.635	71.65	332	262	272	49	44	80	77	12
8	42		0.74	1.05	.610	73.56	332	263	267	50	45	80	77	12
	45		0.65	0.95	.572	75.41	329	262	272	50	46	80	77	10
9	48		0.65	0.93	.572	77.15	329	261	270	50	46	80	77	10
	51		0.65	0.92	.572	78.88	329	261	271	50	46	80	77	10
10	54		0.50	0.75	.502	80.60	315	262	269	50	46	79	76	9
	57		0.50	0.72	.502	82.14	315	262	270	50	45	79	76	9
	60					83.65								

Pre test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) 0.00 at 15 inches Hg (Vacuum) Leak Volume Start: 83.65 Leak Volume End: 83.85

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

QA/QC CHECKLIST

PROJECT # 541626T DATE: Nov 30 '95 TEST T23-OCB

Client: Rigo + Rigo Location: B Stack Operator: MCB
Layton, 11741
Sample Type: Organics Reference Method: EPA M23
Modifications: Recovery following Env. Can. procedures, train rinse w/ acetone / DCM, train proving w/ toluene.

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	⟷	
Static positive or negative	⟷	-ve
Average Temperature	⟷	≈ 300°F
Estimate % H_2O	⟷	16
How estimated?	⟷	previous tests
Estimate Gas Composition	⟷	O_2% 10 CO_2(%) 10 CO(ppm) ___
How Estimated?	⟷	CEMs
Proper nozzle selected?	✓	
K factor	⟷	
Number of sampling points per traverse	⟷	10
Probe markings correct?	✓	
Time per point	⟷	6
Number of readings per point	⟷	2
Barometric Pressure Measured?		
Mercury		
Aneroid		
Other	✓	Watch
PROBE NOZZLE:		
Nickel plated stainless steel or	✓	
Stainless Steel or		
Glass or		
Quartz		
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	Proving rinse after T22-OCA
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or	✓	
Quartz or		
Other		
Cleaned according to protocol	✓	Proving rinse after T22-OCA
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

PROJECT # 541265 DATE: Nov 29/95 TEST T23-OCB

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	↔	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	Proving of Train 05 after T21-OCB
FILTER TYPE		
Glass Fibre	✓	
Quartz		
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	X	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass	✓	
Cleaned according to protocol	✓	Proving of Train 05 after T21-OCB
Thermocouple attached to trap	✓	
XAD-2 Trap covered with foil at all times	✓	

QA/QC CHECKLIST

PROJECT # 541265 DATE: Nov 29/95 TEST T23-OCB

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	Proving of Train OS after T21-OCB
IMPINGERS		
No. of Impingers	↔	5
Contents #1	↔	MT
#2	↔	RODI
#3	↔	RODI
#4	↔	MT
#5	↔	S.G.
~~#6~~	↔	
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly	✓	
Modifications	↔	
Grease used on joints	X	
Silica gel type	↔	
New?		
Used?	✓	
Pre Test Leak Check		
Performed	✓	
Rate	↔	0.012 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	X	
Sorbent trap kept at ≤68°F	✓	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel	↔	20% Spent
Leak checks at port changes Before	↔	0.015 cfm@ 13 "Hg
After	↔	0.009 cfm@ 15 "Hg
Final leak race acceptable	↔	0.008 cfm@ 15 "Hg
General comments on sampling technique	↔	
Sample recovery performed on-site?	✓	
Sample recovery performed by	↔	RG
Clean-up area - General Environment	↔	Clean
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

QA/QC CHECKLIST

PROJECT # 541/6265 DATE: Nov 28/95 TEST T23-OCB

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:	✓	
Borosilicate glass		
Polyethylene		~~Teflon~~
Cap Material	→	Teflon
Leak free	✓	
Petri Dishes: borosilicate glass		filter in closed foil in plastic bag
plastic		
Balance Type	→	top loader
Calibrated or QC checked	→	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel		
Condition/Colour	✓	50% spent
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		good
Colour of Filter		greyish
Foil Wrapped?		yes
Probe Rinses		
Acetone / DCM	✓	
Other Toluene	✓	
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents	✓	
Solvents	✓	
Resin	✓	
Blank Train	✓	
Samples labelled and stored properly	✓	
Liquid levels marked	✓	
Samples delivered to lab	✓	

#25

EPS 1/RM/2
SEMI-VOLATILE ORGANIC (SVOC) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: B - STACK TEST #: T23 - OC - B DATE: NOV 23 95 PROJECT NO.: 541-6265

Nozzle, Probe Liner Front Half Filter Holder All Equipment	Filter	Back Half Filter Holder and Condenser Coil All Equipment	XAD Resin	Impingers & ~~HPLC~~ Rinse 1200	Back Half Rinse
Wash and brush 3x each with ~~hexane~~ DCM and acetone. Rinse 3x with with ~~hexane~~ and and acetone.	Remove and place on pre-cleaned foil fold in half and place in ~~petri dish~~ Zip Loc bag	**Weigh Coil & Record Weight** ~~Soak 5 minutes each with hexane and acetone. Rinse 3x with hexane and acetone.~~ Toluene Proof	**Weigh XAD Trap & Record Weight** Cap ends and wrap in foil.	Weigh impingers and record wts. Empty contents of #1, #2 and #3 into container. ~~Rinse 3x with HPLC water.~~	Rinse back half filter holder, condenser and impingers 1, 2 and 3 3x with hexane and acetone.
Container ~~TS1~~ TS2 Front Half Acetone Hexane Rinse	**Container ~~TS2~~ TS1 Filter**	**Container TS3 Back Half Filter and Condenser Coil**	**Container TS4 XAD Resin**	**Container TS5 Impinger Contents**	**Container TS6 Back Half Rinse**
Final Wt.: 632.5	Filter ID: T23-OC	Final Wt.: 587.3	**Wrap in Foil**	Final Wt.: 903.3	Final Wt.:
Initial Wt.: 433.9	Colour: Greyish	Initial Wt.: 432.8	XAD: 046625	Initial Wt.: 431.6	Initial Wt.:
Gain: 198.9		Gain: 156.5	Colour: White	Gain: 471.7	Gain:
		Colour: Clear	Train 9	Colour: Clear	Colour:

Mark Fluid Levels Seal and Label

Train & Proofing Identification	
Train No.:	# 05
~~HPLC~~ Batch No.:	Fisher 95/10/26
Acetone Batch No.:	Burdick 14123
Hexane Batch No.:	Burdick 16700
Filter Batch No.:	Fisher 95/10/21 XAD No.: Train 9
Train Assembled By:	HUB
Train Recovered By:	RB

Reagent Blanks Collected?	Yes
Combined Acetone/Hexane	Yes
Combined Glycol/Water	Yes
Blank Train Collected?	Yes
Comments:	

EPSREC.DRW-May 95

BOVAR-CONCORD Environmental

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT	: RIGO AND RIGO	DATE	: 95.11.28
JOBSITE	: LAYTON UTAH	RUN	: T23-MP-B
REF.No.	: 5416265	LOC.	: STACK B

RUN TIME : 15:17 TO 18:50

METALS CONCENTRATION	0.0 ug/DSm3	0.0000 gr/1000 DScf
	0.0 ug/Am3	0.0000 gr/1000 Acf
METALS EMISSION RATE	0.000 mg/s	0.00 gr/hr
SAMPLE GAS VOLUME	1.8956 DSm3	66.935 DScf
AVERAGE ISOKINETICITY	100.1 %	

FLUE GAS CHARACTERISTICS

MOISTURE	17.69 %	
TEMPERATURE	165.2 deg C	329.4 deg F
FLOW	44674 DSm3/hr	26295 DScfm
	94485 Am3/hr	55612 Acfm
VELOCITY	18.44 m/s	3629.9 fpm

GAS ANALYSIS	O2	9.90 %
	CO2	10.20 %
	CO	0.00 %
	SO2	0.00 %
	MOL. WT.	30.14 g/gmole D.B.
	MOL. WT.	27.99 g/gmole W.B.

*STANDARD CONDITIONS : METRIC 25 deg C, 101.3 kPa
: IMPERIAL 77 deg F, 29.92 in.Hg

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T23-MP-B
LOC. : STACK B

STACK HEIGHT	35.4 m	116.0 ft.
STACK DIAMETER	1.35 m	53.0 in.
STACK AREA	1.423 m2	15.32 sq.ft.
BAROMETRIC PRESSURE	85.7 kPa	25.30 in.Hg
STATIC PRESSURE	-124.5 Pa	-0.50 in.H2O
NOZZLE DIAMETER	6.20 mm	0.2440 in.
PITOT COEFFICIENT	0.798	
METER CORRECTION FACTOR	1.006	

CONDENSATE COLLECTION

CONDENSATION IN IMPINGER 1	152.1 g
CONDENSATION IN IMPINGER 2	102.3 g
CONDENSATION IN IMPINGER 3	26.0 g
CONDENSATION IN IMPINGER 4	4.6 g
CONDENSATION IN IMPINGER 5	2.4 g
CONDENSATION IN IMPINGER 6	0.1 g
SILICA GEL WEIGHT GAIN	12.1 g
TOTAL MOISTURE GAIN	299.6 g

METALS COLLECTION

FILTER METALS	0.0000 mg
WASHINGS METALS	0.0000 mg
IMPINGER METALS	0.0000 mg
TOTAL METALS	0.0000 mg

TOTAL SAMPLING TIME 120.0 min.

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T23-MP-B
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
TRAVERSE NO. 1												
1	0.0	332	0.770	1.45	779.58	77	235	246	41	3.0	1.0	99.5
1	3.0	334	0.780	1.50	781.61	79	235	253	44	3.0	1.0	100.1
2	6.0	334	0.770	1.50	783.67	80	237	251	40	3.0	2.0	101.7
2	9.0	334	0.770	1.50	785.75	80	238	252	38	3.0	2.0	102.5
3	12.0	335	0.810	1.55	787.85	81	238	253	38	3.0	3.0	99.9
3	15.0	333	0.830	1.55	789.95	81	238	251	38	3.0	3.0	99.9
4	18.0	335	0.870	1.65	792.08	82	237	250	39	3.0	4.0	99.1
4	21.0	336	0.840	1.60	794.24	82	237	253	39	3.0	4.0	99.8
5	24.0	335	0.800	1.55	796.38	82	237	251	39	3.0	5.0	102.7
5	27.0	335	0.830	1.55	798.53	82	238	252	39	3.0	5.0	99.9
6	30.0	336	0.850	1.55	800.66	83	238	252	39	3.0	6.0	99.1
6	33.0	336	0.830	1.55	802.80	83	238	253	40	3.0	6.0	99.4
7	36.0	335	0.840	1.55	804.92	83	239	253	40	3.0	7.0	99.1
7	39.0	335	0.850	1.55	807.05	84	240	254	40	3.0	7.0	99.4
8	42.0	335	0.800	1.50	809.20	84	239	254	41	3.0	8.0	99.1
8	45.0	335	0.780	1.50	811.28	84	239	253	40	3.0	8.0	98.4
9	48.0	335	0.740	1.40	813.32	84	239	253	40	3.0	9.0	100.4
9	51.0	335	0.760	1.50	815.35	84	240	254	41	3.0	9.0	98.1
10	54.0	335	0.700	1.25	817.36	84	240	253	42	3.0	10.0	99.6
10	57.0	332	0.730	1.30	819.32	84	240	253	42	3.0	10.0	98.9
	60.0				821.31							
TRAVERSE NO. 2												
1	0.0	310	0.550	0.95	822.13	82	241	255	45	2.5	1.0	98.0
1	3.0	310	0.530	0.95	823.86	83	242	254	41	2.5	1.0	98.5
2	6.0	311	0.550	0.97	825.57	83	242	257	41	2.5	2.0	98.4
2	9.0	311	0.550	0.98	827.31	83	242	257	41	2.5	2.0	100.1
3	12.0	318	0.800	1.55	829.08	83	242	246	41	3.0	3.0	99.0
3	15.0	324	0.800	1.55	831.18	84	242	255	42	3.0	3.0	100.2
4	18.0	331	0.880	1.70	833.30	84	242	255	42	3.0	4.0	100.5
4	21.0	333	0.900	1.70	835.52	84	242	255	43	3.5	4.0	100.0
5	24.0	332	0.900	1.70	837.75	84	242	256	44	3.5	5.0	100.4
5	27.0	332	0.900	1.70	839.99	85	242	256	44	3.5	5.0	99.8
6	30.0	331	0.850	1.65	842.22	85	243	256	44	3.5	6.0	101.2
6	33.0	331	0.720	1.35	844.42	85	243	259	46	3.5	6.0	100.3
7	36.0	332	0.600	1.10	846.43	85	243	258	46	3.0	7.0	101.8

AIR TESTING SERVICES INC. METALS EMISSION REPORT

CLIENT : RIGO AND RIGO
JOBSITE : LAYTON UTAH
REF.No. : 5416265

DATE : 95.11.28
RUN : T23-MP-B
LOC. : STACK B

PT. NO.	TIME min.	STACK TEMP. F	VEL. PRES. in.H2O	ORIF. PRES. in.H2O	METER VOL. cu.ft.	MTR. TMP. F	PROB. TEMP. F	OVEN TEMP. F	EXIT TEMP. F	PUMP VAC. in.Hg	WALL DIST. in.	% ISO.
7	39.0	331	0.550	1.00	848.29	85	243	254	45	3.0	7.0	97.7
8	42.0	331	0.450	0.95	850.00	85	243	254	45	3.0	8.0	107.3
8	45.0	328	0.450	0.88	851.70	84	243	254	45	2.5	8.0	104.1
9	48.0	325	0.450	0.88	853.35	84	243	253	45	2.5	9.0	103.3
9	51.0	325	0.450	0.85	854.99	84	242	253	45	2.5	9.0	100.8
10	54.0	320	0.400	0.75	856.59	84	242	257	46	2.5	10.0	100.5
10	57.0	317	0.420	0.75	858.10	83	242	256	45	2.5	10.0	99.3
	60.0				859.63							
		329	0.707	1.35		83	240	254	42	3.0		100.1

ISOKINETIC TEST DATA FORM

Sample Type: MS - METALS Reference Method: EPA M29 Page 1 of 5

Client:	Rigo & Rigo	City, Province:	Layton, Utah
Project Number:	5416245	Test Number:	T23-MP-B
Sample Location:	B Stack	Date:	95/12/28
Start Time:	15:17	Finish Time:	18:50
Barometric Press. (in Hg):	25.3	Stack Press(in H_2O): + or -:	-0.50
Stack Diameter (in.):	63	Length x Width:	— x —
Stack Height (ft):	116	Cyclonic Flow:	Yes No

Sample Box Number:	T3	Gas Meter Factor:	1.0006	Calibration Date:	Sept 95
Nozzle I.D.:	Q2	Nozzle Diameter (in.):	.244	Calibration Date:	Nov 95
Probe I.D.:	T1-7'	Pitot Coefficient:	.799	Calibration Date:	Sept 95

Equipment Comments:

STACK GAS COMPOSITION

CO_2 (%): 10.2 O_2 (%): 9.9 CO (ppm): ____ Other: ____

Impinger 1 (g)		Assumed H_2O (%):	16
Impinger 2 (g)		Filter I.D. #:	
Impinger 3 (g)		Net Filter Wt. (g):	
Impinger 4 (g)		Net Probe Wash Wt. (g):	
Impinger 5 (g)		Imp. Residue Wt. (g):	
Impinger 6 (g)			
~~XAD-2 Trap~~ (g)	5.0		
Total H_2O Condensed (g)			

Sampling Comments:

Process Rate: ~~Low~~ ~~High~~ AG, high AC, min temp.

Control Equipment Operation: ESP

Process Comments:

Signature: [signature] Date: 95/12/28

MOISTURE ANALYSIS DATA SHEET

Project #:	5416265	Client:	R&R
Date:	95.11.28	Test:	T23-MP-B
Sample Location:	B	Filter I.D.:	84
Pre Weights by:	JP	Post Weights by:	JP

Impinger #	Impinger Contents	Final Wt. (g)	Initial Wt. (g)	Net Condensate (g)
1	Blank	652.3	500.2	152.1
2	5% HNO_3 10% H_2O_2	666.5	564.2	102.3
3	5% HNO_3 10% H_2O_2	645.1	619.1	26.0
4	Blank	496.3	491.7	4.6
5	$KMnO_4$	528.0	525.6	2.4
6	$KMnO_4$	544.7	544.6	0.1
7	S.G.	823.2	811.1	12.1 ← ?
8				
XAD Trap				
			Total (g)	299.6

BALANCE QC CHECK

	Actual (g) (A)	Measured (g) (M)	<10%	Initials
Pre weights		19		
Post weights	148.5	147.7	✓	JP

$$\frac{A - M}{A} \times 100 \quad <10\%$$

Comments:

Signature: [signature]

Date: 95.11.28

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DATE: 5/11/28 SAMPLING TRAINS DATA SHEET PAGE 2 OF 5

Client: Rego + Rego Project #: 5916265 Sample Location: B Stack Operators: JW/Sm

Run #: T23-MP-B Traverse #: 1 Traverse Direction: IN Start Time: 15:17 Finish Time: 16:47

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		.77	1.45		779.582	332	235	246	41	NA	79	76	3.0
1	3		.78	1.5	781.654	781.61	334	235	253	44		81	77	3.0
2	6		0.77	1.5	783.645	783.67	334	237	251	40		82	77	3.0
2	9		0.77	1.5	785.742	785.75	334	238	252	38		83	77	3.0
3	12		0.81	1.55	787.822	787.85	335	238	253	38		84	78	3.0
3	15		0.83	1.55	789.975	789.95	333	238	251	38		84	78	3.0
4	18		0.87	1.65	792.161	792.08	335	237	250	39		84	79	3.0
4	21		0.84	1.6	794.248	794.24	336	237	253	39		85	79	3.0
5	24		0.80	1.55	796.370	796.38	335	237	257	39		85	79	3.0
5	27		0.83	1.55	798.459	798.53	335	238	252	39		85	79	3.0
6	30		0.85	1.55	800.648	800.66	336	238	252	39		85	80	3.0
6	33		0.83	1.55	802.803	802.80	336	238	253	40		85	80	3.0
7	36		0.84	1.55	804.918	804.92	335	239	253	40		86	80	3.0

Pre test leak check: Rate (cfm) .008 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .012 at 19 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: [signature]

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BOVAR-CONCORD Environmental

DATE: 95 / 11 / 28

SAMPLING TRAINS DATA SHEET

Client: Rhyothiq Project #: 5416265 Sample Location: B Stack Operators: JW/Jm

Run #: T23-mod Traverse #: 1 Traverse Direction: IH Start Time: 15:17 Finish Time: 16:17

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.85	1.55	809.050	807.05	335	240	254	40		86	81	3.0
8	42		0.80	1.5	*809.193	809.20	335	239	254	41		86	81	3.0
8	45		0.78	1.5	811.279	811.28	335	239	253	40		86	81	3.0
9	48		0.74	1.40	*813.333	813.32	335	239	253	40		86	82	3.
9	51		0.76	1.5	815.32	815.35	335	240	254	41		86	82	3.0
10	54		0.70	1.25	817.346	817.36	335	240	253	42		86	82	3.0
10	57		0.73	1.3	819.305	819.32	332	240	253	42		86	82	3.0
10	60				821.306	821.307								

Pre test leak check: Rate (cfm) .008 at 15 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .012 at 19 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: JW

DATE: 95/11/28

SAMPLING TRAINS DATA SHEET

Client: Rigo tRigo Project #: 5416265 Sample Location: B Stack Operators: JL/JV

Run #: T23MP-B Traverse #: 2 Traverse Direction: IN Start Time: 17:50 Finish Time: _____

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F)	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
1	0		0.55	.95		822.129	310	241	255	45	NA	82	81	2.5
1	3		0.53	.95	823.909	823.86	310	242	254	41		84	81	2.5
2	6		0.55	0.97	825.607	825.57	311	242	257	41		85	81	2.5
2	9		0.55	0.98	827.350	827.31	311	242	257	41		85	81	2.5
3	12		0.80	1.55	829.09	829.08	318	242	246	41		85	81	3.0
3	15		0.80	1.55	831.192	831.18	324	242	255	42		86	82	3.0
4	18		.88	1.7	833.292	833.30	331	242	255	42		86	82	3.0
4	21		0.90	1.7	835.515	835.52	333	242	255	43		86	82	3.5
5	24		0.90	1.70	837.76	837.75	332	242	256	44		86	82	3.5
5	27		0.90	1.70	839.99	839.99	332	242	256	44		87	82	3.5
6	30		0.85	1.65	842.23	842.22	331	243	256	44		87	83	3.5
6	33		0.72	1.35	844.357	844.42	331	243	259	46		87	83	3.5
7	36		0.60	1.1	846.423	846.43	332	243	258	46		86	83	3.0

Pre test leak check: Rate (cfm) .012 at 22 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) _____ at _____ inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

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BOVAR-CONCORD Environmental

DATE: 95 11 L 128

SAMPLING TRAINS DATA SHEET

Client: Ryo Hyo Project #: 5416265 Sample Location: B Stack Operators: JW/JM

Run #: Ryo 723 MAB Traverse #: 2 Traverse Direction: IN Start Time: 17:50 Finish Time: 18:50

Pt.	Time (Min.)	O_2 (%)	Vel. Press. (ΔP)	Orifice Press. (ΔH)	Gas Meter Reading Desired (ft^3)	Gas Meter Reading Actual (ft^3)	Stack Temp. (°F)	Probe Temp. (°F)	Box Temp. (°F)	Imp. Temp. (°F)	XAD Temp. (°F) NA	Meter Inlet (°F)	Meter Outlet (°F)	Vac. in Hg
7	39		0.55	1.0	848.259	848.29	331	243	254	45		86	83	3.0
8	42		0.45	.85	850.041	850.00	331	243	254	45		86	83	3.0
8	45		0.45	.89	851.584	851.70	328	243	254	45		85	82	2.5
9	48		0.45	.89	853.284	853.35	325	243	253	45		85	82	2.5
9	51		0.45	.85	854.934	854.99	325	242	253	45		85	82	2.5
10	54		0.40	.75	856.574	856.59	320	242	257	46		85	82	2.5
10	57		0.42	.75	858.083	858.10	317	242	256	45		84	82	2.5
10	60				859.630	859.630								

Pre test leak check: Rate (cfm) .012 at 22 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

Post test leak check: Rate (cfm) .013 at 25 inches Hg (Vacuum) Leak Volume Start: _____ Leak Volume End: _____

K value calculated by: _____ Checked by: _____ Operator Signature: _____

QA/QC CHECKLIST

PROJECT # 5916265 DATE: 951128 TEST T23-MP13

Client: Rigo + Rigo Location: B Stack Operator: JW/JM

Sample Type: M5-Metals Reference Method: EPA M29

Modifications:

ITEM	✓	COMMENTS
PRELIMINARY DATA		
Was preliminary velocity profile performed?	✓	
Avg. ΔP	++++	
Static positive or negative	++++	neg.
Average Temperature	++++	
Estimate % H_2O	++++	16
How estimated?	++++	
Estimate Gas Composition	++++	O_2% ____ CO_2(%) ____ CO(ppm) ____
How Estimated?	++++	
Proper nozzle selected?	✓	
K factor	++++	
Number of sampling points per traverse	++++ ✓	
Probe markings correct?	✓	
Time per point	++++	6
Number of readings per point	++++	2
Barometric Pressure Measured?	✓	
Mercury		
Aneroid		
Other	✓	watch.
PROBE NOZZLE:		
Nickel plated stainless steel or		
Stainless Steel or		
Glass or		
Quartz	✓	
Button Hook or	✓	
Elbow		
Cleaned according to protocol	✓	
Round ? Undamaged?	✓	
PROBE LINER:		
Borosilicate or		
Quartz or	✓	
Other		
Cleaned according to protocol	✓	
PROBE HEATING SYSTEM:		
Checked	✓	
Temperature 250 ± 25°F	✓	
Stable	✓	

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 9/11/98 TEST T23 MPB

ITEM	✓	COMMENTS
PITOT TUBE/METER BOX		
Type "S" or	✓	
Other		
Properly attached to probe (no interference with nozzle)	✓	
Modifications	+++	
Connected to:		
inclined manometer	✓	
magnehilic gauge		Range: _____ Division: _____
micromanometer		Range: _____
Pitot lines checked for leak	✓	
Pitot pressure gauge zeroed	✓	
Orifice pressure gauge zeroed	✓	
Meter box levelled	✓	
Gas Temperature Sensor	✓	
Thermocouple	✓	
Type		K
Temp. checked against ambient temp	✓	
FILTER HOLDER		
Borosilicate glass	✓	
Other		
FRIT MATERIAL		
Teflon	✓	
Borosilicate glass		
Other		
GASKET MATERIAL		
Silicone	✓	
Other		
Filter assembly cleaned according to Protocol	✓	
FILTER TYPE		
Glass Fibre		
Quartz	✓	
Other		
Filter checked visually for irregularities	✓	
Filter centered properly	✓	
Filter labelled	✓	
Filter heated	✓	
Temperature (250 ± 25°F)	✓	
CONDENSER/XAD-2 TRAP		
Glass		
Cleaned according to protocol	MA	
Thermocouple attached to trap		
XAD-2 Trap covered with foil at all times		

PROJECT # 5416265 DATE: 951128 TEST T23-MAB

ITEM	✓	COMMENTS
GLASSWARE		
Cleaned and proofed according to protocol	✓	
IMPINGERS		
No. of Impingers	7	
Contents #1		
#2		
#3		
#4		
#5		
#6		
Impinger weights recorded	✓	
Impingers properly assembled	✓	
Recirculating pump set up properly		
Modifications		
Grease used on joints	✓	
Silica gel type		
New?	✓	
Used?		
Pre Test Leak Check		
Performed	✓	
Rate		.008 cfm@ 15 "Hg.
All openings of sampling train sealed	✓	
Is nozzle sealed when probe is in stack with pump off	✓	
Is care taken to avoid scraping nipple or stackwall	✓	
Effective seal around probe when in-stack	✓	
Probe moved to traverse point at right time	✓	
Nozzle and pitot tube kept parallel to stack at all times	✓	
Filters changed during run	X	
Any particulate lost during filter change	Y	
Sorbent trap kept at ≤68°F	NA	
Probe temperature 250 ± 25°F	✓	
Filter box temperature 250 ± 25°F	✓	
Data forms completed and data recorded properly	✓	
Ice level checked	✓	
Condition of silica gel		good
Leak checks at port changes Before		.012 cfm@ 19 "Hg
After		.012 cfm@ 22 "Hg
Final leak race acceptable		.013 cfm@ 23 "Hg
General comments on sampling technique		
Sample recovery performed on-site?	✓	
Sample recovery performed by		SA/TW
Clean-up area - General Environment		
Brushes: Nylon bristle	✓	
Other		
Wash Bottles: Glass		

QA/QC CHECKLIST

PROJECT # 5416265 DATE: 971128 TEST T23-MP-8

ITEM	✓	COMMENTS
Teflon	✓	
Polyethylene		
Other		
Storage Containers:		
Borosilicate glass	✓	
Polyethylene		
Cap Material	→	teflon
Leak free	✓	
Petri Dishes: borosilicate glass		
plastic		
Balance Type	→	digital top loader.
Calibrated or QC checked	→	Actual _____ (g) Measured _____ (g)
Probe allowed to cool sufficiently	✓	
Probe and sample train openings covered	✓	
Silica Gel	✓	
Condition/Colour		good - pink/blue.
Weighed	✓	
Filter Handling		
Tweezers used?	✓	
Condition?		
Colour of Filter		
Foil Wrapped?		
Probe Rinses		
Acetone	✓	
Other	✓	HNO_3
Particulate Recovered from		
probe/nozzle	✓	
probe fitting	✓	
probe liner	✓	
front half filter holder	✓	
Impingers		
Recovered according to protocol	✓	
Weighted	✓	
H_2O/Recovery data sheet completed	✓	
Blanks Collected		
Reagents		
Solvents		
Resin		
Blank Train		
Samples labelled and stored properly		
Liquid levels marked		
Samples delivered to lab		

EPA METHOD 29
METALS / PARTICULATE (MP) SAMPLING TRAIN
RECOVERY DATA FORM

LOCATION: B TEST #: T23-MP-B DATE: 95.11.20 PROJECT NO.: _____

Probe Liner, Nozzle Front Half Filter Housing	Probe Liner, Nozzle Front Half Filter Housing	Filter	Impingers 1, 2, 3	Back Half Filter Holder Filter Support	Impinger 4	Impinger 5, 6	Impinger 5, 6	Impinger 7
Brush and rinse with 100 mL acetone	Rinse with 100 mL 0.1 N HNO3	Carefully remove filter from support with Teflon-coated tweezers and place in petri dish	Weigh impingers empty contents into container	Rinse back half filter holder filter support and rinse empty impingers with 100 mL 0.1 N HNO3	weigh impinger empty contents into container 5A	Weigh impingers empty contents into container 5B	Rinse with 25 mL 8 N HCL	Weigh impinger and discard or recycle silica gel
Check visually to see if particulate is removed if not repeat step above	**Container TS3 Front Half 0.1 N HNO3 Rinse** Final Wt.: 576.7 Initial Wt.: 435.2 Gain: Comments:	Brush loose particulate onto filter	**Container TS4-1 Impinger 4 Contents** Final Wt.: 889.8 Initial Wt.: ~~398~~ 310.2 Gain:	**Container TS4-2 0.1 N HNO3 Back Half Impinger Rinse** Final Wt.: 602.7 Initial Wt.: ~~390.0~~ 473.5 Gain: Colour:	Rinse with 100 mL 0.1 N HNO3	Rinse 3x with 100 mL Acidified KMnO4	Place rinsing in Container 5C which contains 200 mL of water	
Container TS2 Front Half Acetone Rinse Final Wt.: 594.3 Initial Wt.: 432.9 Gain: Comments:		**Filter TS2** Seal petri dish with tape Colour: Filter #: 8H			**Container TSA Impinger 4 Contents** Final Wt.: 511.2 Initial Wt.: 397.7 Gain:	Rinse with 100 mL water **Container 5B Impinger 5 & 6 KMnO4 Content and Rinses** Final Wt.: 718.8 Initial Wt.: 398.5 Gain: Colour:	**Container 5C HCL Rinse** Final Wt.: 635.7 Initial Wt.: 347.1 Gain: Colour:	

FILTER PORTIONS IN PROBE WASH

Train Identification	Blanks	
Train No.:		
HNO3 / H2O2 Batch No.:	Container 9	200 mLs
DI Water Batch No.:	Container 8B	100 mLs
Acetone Batch No.:	Container 7	100 mLs
0.1 N HNO3 Batch No.:	Container 8A	300 mLs
Acidified KMnO4 Batch No.:	Container 10	100 mLs
8 N HCl / Batch No.: DI Water	Container 11	25 mL / 200 mL
Filter Number:	Container 12	* _____

Mark Liquid Level on Containers
Seal and Label Containers
Reagent Blanks Submitted? Yes ✓ No ____
Prepare Fresh Acidified KMnO4 Daily ✓

M29REC.DRW-May 95

BOVAR-CONCORD Environmental

ANALYTIC LABORATORY REPORT

Method 29 (Metals)
Sampling Train Results

Particulates, Acid Gases and Metals
In Stack Emissions for Rigo & Rigo Associates, Inc.

A report by

ZENON ENVIRONMENTAL LABORATORIES
5555 North Service Rd.
Burlington, Ontario
L7L 5H7

February 16, 1996

Project No.:	AN951192
Lab No:	051017-3156
Client Project:	Davis County Recovery

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2.0 Analytical Methodology	4
3.0 Analytical Results	7
4.0 QA/QC	8
5.0 Appendices	9

1.0 INTRODUCTION

Samples derived from recovered Method 5 trains were submitted to Zenon Environmental Laboratories for the determination of metals via Method 29 and for particulates via EPA Method 5. In addition recovered trains for the sampling of acid gases were submitted for the determination of hydrogen chloride (HCl), hydrogen fluoride (HF) and chlorine (Cl_2) emissions via EPA method 26A.

Following the particulate determination, the submitted M5 train samples were analysed for mercury via cold vapor atomic absorption spectroscopy (cvaa), arsenic, antimony and selenium via graphite furnace atomic absorption spectroscopy (gfaa), lithium via flame atomic absorption spectroscopy (aas) and the balance of the metals via inductively coupled plasma (icp). The acid gases were trapped in appropriate impinger solutions at the time of sampling as their corresponding anions and analysed by ion chromatography (ic).

Section 2 of the following report details the analytical methodology, Section 3 discusses the analytical data, Section 4 outlines QA/QC and Appendix 1 presents the analytical data.

2.0 ANALYTICAL METHODOLOGY:

Particulate/multi-metals trains were analysed for particulate via EPA Method 5 and for metals via EPA Method 29. Arsenic, Selenium and Antimony were analysed by Graphite Furnace AA (gfaa), Lithium via flame atomic absorption spectroscopy (aas), Mercury via Cold Vapor AA (cvaa) and the balance of metals via Inductively Coupled Plasma (icp). It should be noted that EPA Method 29 is validated for a limited number of metals, and data on other metals (i.e. Barium, Cobalt, Molybdenum, Silicon Tellurium, Tin and Vanadium) although included in the reported data, should be considered as estimated only. Method 29 digestion includes a complete digestion of the quartz filter used to collect the solids and therefore the silicon levels reported relate more to the weight of the filter than to the train collected materials. Similarly, one should expect a background of those metals that are associated with the quartz glass in all samples including the field blanks.

2.1 SAMPLE PREPARATION

2.1.1 Particulate Weights:

The filters and particulates were desiccated on arrival and following desiccation for at least 24 hour were weighed to obtain the initial post sampling weigh. The filters/particulates were re-desiccated and, after at least 6 more hours, re-weighed. This process was repeated until constant weight was obtained (i.e. successive weighings within 0.5 mg). The particulate weight were determined by difference relative to the pre-recorded constant weight of the same filters prior to sampling.

The acetone residues are determined with tared beakers. The acetone rinses are transferred quantitatively into the beaker with rinses of acetone. The acetone is removed at ambient temperature over a gentle stream of nitrogen. The beakers are then desiccated and a constant weight is obtained in the same manner as for the filters.

Before each time at the balance station, the balance is checked relative to two certified weights.

2.1.2 Multi-Metals:

The samples were digested in strict accordance with EPA method 29. The volumes of the impinger contents/rinses as received were measured and recorded prior to analysis. These volumes were used for the calculation of the total mercury amounts in the appropriate train portion.

The acetone probe rinse residue, filter and nitric acid probe rinse were combined together, digested with HF digest. One tenth of this front half digestate was removed for mercury digestion/analysis.

One tenth of the combined impinger contents and rinses from impingers 1-3 (HNO_3/H_2O_2) was taken as received for mercury digestion and analysis. The balance was digested and concentrated to approximately 20 mL and added to the balance (i.e. remaining 90% portion) of the front half HF digestate. This combined portion which represents 90% of all train portions for all required metals other than mercury, was diluted to 300mL final volume for a single per train analysis of all metals except, of course, mercury. Final total metals data have been calculated taking into account the 10% mercury portions removed and the digestate final volume.

Mercury is analysed from 5 portions of each method 29 train, (i) the front half digestate (see above), (ii) the impinger 1-3 contents and rinses, (iii) the impinger 4 contents and rinses, (iv) the impinger 5-6 contents and (v) the HCl rinses of impingers 5-6. Each portion is digested as outlined in method 29 prior to analysis via cvaa.

2.1.2 Anions:

Other than measuring sample volume as received, these impinger contents required no preparation prior to instrumental analysis.

2.2 INSTRUMENTAL ANALYSIS:

2.2.1 Mercury

Mercury was analysed on a Milton Roy LDC Mercury Monitor by cold vapor atomic absorption.

2.2.2 Arsenic, Selenium And Antimony

Arsenic, Selenium and Antimony were analysed via Graphite Furnace Atomic Absorbance Spectroscopy on a Perkin Elmer Model 3030 GFAA.

2.2.3 Lithium

Lithium was analysed on a Varian Spectral AA 400 by atomic absorption spectroscopy.

2.2.4 Other Metals

All other metals were analysed direct on a Jobin Yvon sequential Inductively Coupled Plasma.

2.2.5 Fluoride And Chloride

Anions were analysed via Ion Chromatography using Dionex Liquid Chromatography System using detection via conductivity. All samples were analysed in duplicate as per EPA method 26A. Also, as per method 26A, the instrument calibration was via an average of a multi-point pre- and post-run standard analyses.

3.0 ANALYTICAL RESULTS

All M5 train data are presented in Appendix 1.

The analytical data are not corrected for laboratory method blank.

In error, a 10% portion for mercury was not withdrawn from the T12 front half digestate for mercury analysis prior to adding the digested 90% of the nitric/peroxide impinger contents. This impacts the metals data on T12 in the following ways: (i) there is no sample available for separate front half mercury determination (however, the combined front half with the nitric/peroxide portion was analysed as well as the nitric/peroxide portion alone, and these gave approximately the same analytical values for mercury, 120 and 140 ug respectively) and (ii) the non-mercury metals data may have a slight low bias since only 90% of the nitric/peroxide portion was added to 100% of the front half portion (since most of metals are found in the front half portion of the train the data on this sample was calculated assuming the combination of 100 % portions each, therefore volatile metals may have a maximum 10% low bias in the data on this one sample).

4.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

A complete QA/QC program is employed by ZENON. The elements of this program and a brief discussion of each of the elements are presented below:

Sample Custody

Strict chain of custody is maintained for samples analysed in this project. Samples received from the field were signed off upon delivery and immediately entered into ZENON's lab information system. Prior to extraction, samples were stored under refrigeration in a secure area. All technologists working on this project have kept accurate records of all actions taken with the samples. ZENON also has a security system in place that ensures unauthorized entry into the lab area is immediately known and appropriate staff and police are contacted.

Method blanks

A method blank is an analysis incorporating all aspects of the analysis, excluding the sample. Its value is to identify the presence of glassware, reagent or instrumentation induced contamination. In this study, a method blank was processed for each batch of samples. The inorganic data generated are not corrected for lab blank.

Standards

Zenon has a full range of duplicate metals standards from commercial sources. Quantification is via standards supplied by Spex while independent check standards are supplied by Plasma Chem. Check standards are run either daily or on a batch basis. Acceptable run criteria is <10% difference (<15 % for hydride elements) between primary and check standards. All project related analyses passed this reference criteria.

Instrument Calibration

All instruments except the ICP instruments were calibrated with multipoint concentration range of standards prior to sample analysis. The ICP system was calibrated relative to a single standard run. Instrument linearity was assured by analyzing a serial dilution of standards and the linearity was found to be <10 % RSD for all metals analysed. .

Quantitation Calculations

As part of the QA/QC in this project, all calculations were performed by computer. Data files will be maintained for three months beyond the end of the project. Copies of all data reports and correspondence will be maintained in the completed project file for six months.

Data Reports and Verification

Transcriptions of the metals and IC data to the LIMS data computers were performed by one analyst and verified by a second analyst. The calculations were performed on the computer and the calculated data were printed directly from the spreadsheets to the final reports.

APPENDIX 1

ANALYTICAL RESULTS

APPENDIX 1

Analytical Data

Particulates & Multi-Metals:

Combine Front Half and HNO_3/HNO_2 Impingers

Metals Except Mercury

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/30
Date Reported: 95/12/28

Submission No.: 5K0707,5K0781,5L0069
Sample No.: 051699-052938

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS:

Multi-Metals data: Combined Front Half and HNO_3/H_2O_2 Impinger Contents.

Filters were received torn.

"NA" = Matrix spiking levels are not high enough above the native levels to accurately determine recoveries.

Certified by: R.A. McLeod

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			Method	Blank Spike	% Recovery	Blank Spike	% Recovery	T1-MP	T1-MP	T1-MP	T1-MP	T1-MP
Zenon ID:			Blank			Duplicate		051699 95	051699 95	051699 95	051699 95	051699 95
Date Sampled:								95/11/17	95/11/17	95/11/17	95/11/17	95/11/17
Component	**MDL**	**Units**							Duplicate	Matrix Spike	% Recovery	MS Dup
Final volume measured		ml	300	-	-	-	-	300	-	-	-	-
Suspended Particulate												
Acetone Probe Rinse	0.1	mg	0.0	-	-	-	-	4.2	-	-	-	-
Filter Particulates		"	0.0	-	-	-	-	28	-	-	-	-
Arsenic (gfaa)	0.60	ug	<3.3	74	88	70	82	3.8	3.7	76	87	78
Antimony (gfaa)	0.60	"	11	96	100	89	94	83	81	160	90	160
Selenium (gfaa)	0.6	"	<3.3	83	100	81	98	22	21	93	86	96
Lithium (aas)	0.30	"	<	620	93	610	92	1.0	1.7	640	96	660
Aluminum (ICP)	9.0	ug	15	690	100	700	100	210	210	850	97	850
Barium	0.30	"	0.40	310	93	320	95	210	200	780	86	800
Beryllium	0.30	"	<	170	100	160	94	<	<	140	86	150
Cadmium	0.60	"	<	170	100	160	96	28	29	170	87	180
Calcium	60.0	"	<	3400	100	3300	100	390	370	3300	87	3400
Chromium	1.2	"	<	350	110	350	110	4.7	4.5	290	86	330
Cobalt	3.0	"	<	340	100	340	100	<	<	290	86	310
Copper	1.5	"	5.0	340	100	320	95	72	69	360	86	370
Iron	3.0	"	5.2	4000	100	3800	94	170	190	4100	97	4300
Lead	6.0	"	<	370	110	370	110	390	420	760	110	770
Magnesium	15.0	"	<	4100	120	3900	120	68	67	3400	90	3400
Manganese	1.8	"	<	350	110	340	100	9.2	10	310	89	320
Molybdenum	3.0	"	<	140	85	130	79	19	18	150	82	140
Nickel	3.0	"	<	180	110	170	100	4.7	3.3	160	91	150
Phosphorus	18.0	"	<	1700	100	1700	100	52	64	1400	82	1400
Potassium	300	"	<	3700	111	3600	110	3400	3300	6900	106	6600
Silver	3.0	"	<	180	110	160	99	<	<	32	18	36
Sodium	30.0	"	130	4000	120	3800	110	4300	4200	8000	110	7800
Strontium	0.30	"	<	150	92	170	100	2.1	2.2	170	99	170
Thallium	18.0	"	<	320	95	320	94	<	<	290	87	300
Vanadium	1.5	"	2.8	170	100	170	97	<	<	150	91	150
Zinc	1.5	"	3.4	680	100	660	98	1500	1600	2100	88	2200
Boron	3.0	"	<	340	100	340	100	660	730	930	72	970
Silicon	30.0	"	35	360	96	330	90	150000	170000	150000	NA	150000
Tin	15.0	"	<	280	83	250	75	290	290	550	79	520
Titanium	6.0	"	<	270	81	250	75	8.7	8.5	290	83	260

Client:Rigo Rigo Associates, Inc. Project:Davis County RR

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T1-MP	T2-MP	T3-MP	T4-MP	T5-MP	T6-MP	T7-MP	T8-MP	T9-MP
	Zenon ID:		051699 95	051700 95	051701 95	051702 95	051703 95	051704 95	051705 95	051706 95	051707 95
	Date Sampled:		95/11/17	95/11/18	95/11/18	95/11/19	95/11/19	95/11/20	95/11/20	95/11/21	95/11/21
Component	**MDL**	**Units**	% Recovery								
Final volume measured		ml	-	300	300	300	300	300	300	300	300
Suspended Particulate											
Acetone Probe Rinse	0.1	mg	-	5.7	6.8	5.6	3.9	7.5	2.3	0.0	0.0
Filter Particulates		"	-	8.4	11.8	2.9	6.7	2.8	2.3	-3.8	-0.40
Arsenic (gfaa)	0.60	ug	87	88	24	4.5	3.8	<3.3	8.3	<3.3	<3.3
Antimony (gfaa)	0.60	"	90	33	29	25	50	22	29	10	16
Selenium (gfaa)	0.6	"	89	7.2	5.2	<3.3	5.5	<3.3	10	6.8	4.7
Lithium (aas)	0.30	"	98	0.80	0.80	0.70	1.1	0.50	<	<	<
Aluminum (ICP)	9.0	ug	96	150	140	130	140	410	120	120	130
Barium	0.30	"	90	9.9	9.6	8.2	11	8.3	5.0	4.6	6.2
Beryllium	0.30	"	88	<	<	<	<	<	<	<	<
Cadmium	0.60	"	90	18	21	24	26	25	14	6.9	8.9
Calcium	60.0	"	91	300	280	250	270	520	200	220	440
Chromium	1.2	"	97	5.4	3.6	3.5	3.8	11	3.0	3.4	1.8
Cobalt	3.0	"	92	<	<	<	<	<	<	<	<
Copper	1.5	"	89	58	51	38	42	54	20	24	29
Iron	3.0	"	100	130	74	74	90	200	70	420	75
Lead	6.0	"	110	440	730	250	290	260	130	92	220
Magnesium	15.0	"	91	58	26	30	59	46	<	25	33
Manganese	1.8	"	93	7.2	14	4.6	6.7	6.8	2.8	13	2.7
Molybdenum	3.0	"	75	12	14	13	13	16	13	13	16
Nickel	3.0	"	90	7.5	4.5	8.1	7.0	11	5.6	5.9	<
Phosphorus	18.0	"	82	<	34	<	25	<	<	<	<
Potassium	300	"	97	3000	3900	2500	2800	1900	1100	750	1400
Silver	3.0	"	21	<	<	<	<	<	<	<	<
Sodium	30.0	"	110	4000	4300	3300	3700	3500	2300	2000	3000
Strontium	0.30	"	100	1.7	1.9	1.5	1.5	2.7	0.97	0.80	1.3
Thallium	18.0	"	89	<	<	<	<	<	<	<	<
Vanadium	1.5	"	92	<	<	<	<	<	<	<	<
Zinc	1.5	"	100	1200	1300	910	1200	1100	470	330	450
Boron	3.0	"	83	360	340	370	590	440	610	400	260
Silicon	30.0	"	NA	160000	150000	150000	160000	170000	170000	150000	150000
Tin	15.0	"	70	29	42	27	30	39	16	<	26
Titanium	6.0	"	75	<	<	<	<	7.4	<	<	<

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Client ID:			Method	Blank Spike	% Recovery	Blank Spike	% Recovery	T10-MP	T11-MP	T12-MP	T13-MP
Zenon ID:			Blank			Duplicate		052219 95	052220 95	052221 95	052222 95
Date Sampled:								95/11/22	95/11/22	95/11/23	95/11/23
Component	**MDL**	**Units**									
Final volume measured		ml	300	-	-	-	-	300	300	300	300
Suspended Particulate											
Acetone Probe Rinse	0.1	mg	0.0	-	-	-	-	3.6	6.6	2.9	1.4
Filter Particulates		"	0.0	-	-	-	-	-1.3	2.6	0.80	-3.9
Arsenic (gfaa)	0.60	ug	<3.3	74	88	70	82	<3.3	<3.3	<3.3	<3.3
Antimony (gfaa)	0.60	"	11	96	100	89	94	16	16	8.8	12
Selenium (gfaa)	0.6	"	<3.3	83	100	81	98	<3.3	3.5	<3.3	5.0
Lithium (aas)	0.30	"	<	620	93	610	92	<	<	<	<
Aluminum (ICP)	9.0	ug	15	690	100	700	100	100	84	100	87
Barium	0.30	"	0.40	310	93	320	95	4.3	7.2	4.8	5.2
Beryllium	0.30	"	<	170	100	160	94	<	<	<	<
Cadmium	0.60	"	<	170	100	160	96	16	17	10	14
Calcium	60.0	"	<	3400	100	3300	100	330	190	190	190
Chromium	1.2	"	<	350	110	350	110	2.1	2.9	2.3	7.3
Cobalt	3.0	"	<	340	100	340	100	<	<	<	<
Copper	1.5	"	5.0	340	100	320	95	26	28	20	25
Iron	3.0	"	5.2	4000	100	3800	94	350	65	60	55
Lead	6.0	"	<	370	110	370	110	140	150	170	150
Magnesium	15.0	"	<	4100	120	3900	120	<	16	19	51
Manganese	1.8	"	<	350	110	340	100	5.7	3.2	3.1	6.9
Molybdenum	3.0	"	<	140	85	130	79	12	12	15	11
Nickel	3.0	"	<	180	110	170	100	6.1	8.6	<	9.8
Phosphorus	18.0	"	<	1700	100	1700	100	<	<	<	<
Potassium	300	"	<	3700	111	3600	107	1100	1400	950	1300
Silver	3.0	"	<	180	110	160	99	<	<	<	<
Sodium	30.0	"	130	4000	120	3800	110	2700	2300	2200	2300
Strontium	0.30	"	<	150	92	170	100	1.9	0.93	1.5	1.5
Thallium	18.0	"	<	320	95	320	94	<	<	<	<
Vanadium	1.5	"	2.8	170	100	170	97	<	<	<	<
Zinc	1.5	"	3.4	680	100	660	98	1000	530	560	520
Boron	3.0	"	<	340	100	340	100	670	130	480	480
Silicon	30.0	"	35	360	96	330	90	170000	160000	180000	160000
Tin	15.0	"	<	280	83	250	75	22	33	48	26
Titanium	6.0	"	<	270	81	250	75	<	<	<	<

Client:Rigo Rigo Associates, Inc. Project:Davis County RR

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			Method	Blank Spike	% Recovery	Blank Spike	% Recovery	T14-MP	T14-MP	T14-MP	T14-MP	T14-MP
Zenon ID:			Blank			Duplicate		052926 95	052926 95	052926 95	052926 95	052926 95
Date Sampled:								95/11/24	95/11/24	95/11/24	95/11/24	95/11/24
Component	**MDL**	**Units**							Duplicate	Matrix Spike	% Recovery	MS Dup
Final volume measured		ml	300	-	-	-	-	300	-	-	-	-
Suspended Particulate /												
Acetone Probe Rinse	0.1	mg	0.0	-	-	-	-	0.3	-	-	-	-
Filter Particulates		"	0.0	-	-	-	-	-0.50	-	-	-	-
Arsenic (gfaa)	0.60	ug	<3.3	66	79	65	78	<3.3	<3.3	69	82	67
Antimony (gfaa)	0.60	"	6.3	83	92	84	93	20	19	91	86	92
Selenium (gfaa)	0.6	"	<3.3	79	97	80	98	<3.3	<3.3	83	98	54
Lithium (aas)	0.30	"	<	NS	NS	NS	NS	0.40	1.2	620	92	600
Aluminum(ICP)	9.0	ug	<	660	97	670	100	130	140	820	100	790
Barium	0.30	"	<	350	110	360	110	6.4	6.6	370	110	340
Beryllium	0.30	"	<	150	92	160	96	<	<	160	98	160
Cadmium	0.60	"	<	160	96	150	92	11	12	170	93	160
Calcium	60.0	"	<	3300	99	3400	100	380	400	3800	100	3600
Chromium	1.2	"	<	320	96	330	97	2.4	2.7	340	100	330
Cobalt	3.0	"	<	340	100	330	100	<	<	340	100	350
Copper	1.5	"	1.5	320	96	330	98	24	25	360	100	360
Iron	3.0	"	9.6	4200	110	3900	98	97	97	4000	98	4200
Lead	6.0	"	<	340	100	340	100	190	210	540	100	540
Magnesium	15.0	"	17	3500	94	3600	97	56	57	3700	100	3700
Manganese	1.8	"	3.2	330	97	330	98	5.1	5.4	340	99	330
Molybdenum	3.0	"	<	160	95	160	95	12	11	170	94	170
Nickel	3.0	"	4.3	180	100	170	100	6.9	6.6	180	110	180
Phosphorus	18.0	"	<	1600	97	1700	100	<	<	1600	98	1700
Potassium	300	"	<	3300	100	3400	102	1200	1300	4600	100	4600
Silver	3.0	"	<	170	100	160	98	<	<	78	46	85
Sodium	30.0	"	140	4200	120	3400	99	4300	4400	7800	110	7700
Strontium	0.30	"	<	170	100	170	100	2.7	2.9	180	110	170
Thallium	18.0	"	<	340	100	330	100	<	<	360	110	360
Vanadium	1.5	"	<	150	92	160	94	<	<	160	99	160
Zinc	1.5	"	1.6	600	90	640	96	320	340	960	95	960
Boron	3.0	"	<	300	89	320	95	550	550	840	86	860
Silicon	30.0	"	61	380	95	410	100	160000	160000	160000	NA	170000
Tin	15.0	"	<	320	93	320	94	31	29	350	96	360
Titanium	6.0	"	<	320	97	310	94	<	<	340	100	330

Client:Rigo Rigo Associates, Inc. Project:Davis County RR

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T14-MP	T15-MP	T16-MP	T17-MP	T18-MP	T19-MP	T20-MP	T21-MP	T22-MP	T23-MP
Zenon ID:			052926 95	052927 95	052928 95	052929 95	052930 95	052931 95	052932 95	052933 95	052934 95	052935 95
Date Sampled:			95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/26	95/11/27	95/11/27	95/11/28	95/11/28
Component	**MDL**	**Units**	% Recovery									
Final volume measured		ml	-	300	300	300	300	300	300	300	300	300
Suspended Particulate /												
Acetone Probe Rinse	0.1	mg	-	5.3	1.3	3.8	6.6	3.3	2.2	6.4	8.8	29
Filter Particulates		"	-	2.1	0.70	4.5	-12	2.2	0.80	4.5	33	-2.1
Arsenic (gfaa)	0.60	ug	79	4.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	4.2
Antimony (gfaa)	0.60	"	87	15	14	9.3	8.7	15	12	19	9.5	8.0
Selenium (gfaa)	0.6	"	99	5.0	<3.3	17	<3.3	<3.3	4.2	7.0	5.8	<3.3
Lithium (aas)	0.30	"	90	23	0.60	0.47	0.40	<	0.37	<	<	<
Aluminum(ICP)	9.0	ug	98	25000	100	120	140	140	92	120	170	150
Barium	0.30	"	100	78	5.0	7.6	6.5	6.2	6.0	7.6	10	8.4
Beryllium	0.30	"	97	<	<	<	<	<	<	<	<	<
Cadmium	0.60	"	92	13	11	190	8.9	11	87	130	360	24
Calcium	60.0	"	97	45000	320	330	320	400	220	230	330	300
Chromium	1.2	"	99	23	4.2	2.9	3.6	4.1	2.9	110	53	92
Cobalt	3.0	"	100	<	<	<	<	<	<	<	4.1	3.5
Copper	1.5	"	100	32	17	18	24	30	30	41	43	36
Iron	3.0	"	100	800	110	95	81	94	79	280	320	430
Lead	6.0	"	100	180	170	260	150	300	120	160	200	310
Magnesium	15.0	"	98	6000	64	31	54	62	36	55	65	59
Manganese	1.8	"	98	40	9.5	220	6.0	4.8	39	17	12	14
Molybdenum	3.0	"	97	<	11	11	8.4	11	8.4	27	24	26
Nickel	3.0	"	110	11	3.8	5.8	4.3	4.3	3.2	40	43	76
Phosphorus	18.0	"	100	91	<	<	<	<	<	<	20	<
Potassium	300	"	101	1800	1200	1100	1100	1100	1100	1200	1500	1200
Silver	3.0	"	50	<	<	<	<	3.7	<	<	<	<
Sodium	30.0	"	100	5700	3800	3100	3100	2900	2400	3300	3200	3700
Strontium	0.30	"	99	850	1.8	1.3	2.0	1.6	1.2	1.2	1.9	3.1
Thallium	18.0	"	110	<	<	<	<	<	<	<	<	<
Vanadium	1.5	"	94	21	<	<	<	<	<	<	<	<
Zinc	1.5	"	95	780	380	740	880	710	380	530	730	310
Boron	3.0	"	94	8600	480	220	320	570	400	550	790	750
Silicon	30.0	"	NA	93000	180000	180000	180000	180000	100000	140000	180000	160000
Tin	15.0	"	99	39	31	26	25	34	40	28	41	29
Titanium	6.0	"	98	1500	<	<	<	<	<	<	6.3	<

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	Client ID:		Reagent Blank 11/18	Reagent Blank 11/26	Reagent Blank 11/29
	Zenon ID:		052936 95	052937 95	052938 95
	Date Sampled:		95/11/18	95/11/26	95/11/29
Component	**MDL**	**Units**			
Final volume measured		ml	300	300	300
Suspended Particulate /					
Acetone Probe Rinse	0.1	mg	1.0	0.0	1.4
Filter Particulates		"	-0.10	-0.90	-0.80
Arsenic (gfaa)	0.60	ug	<3.3	<3.3	<3.3
Antimony (gfaa)	0.60	"	<3.3	<3.3	<3.3
Selenium (gfaa)	0.6	"	<3.3	<3.3	<3.3
Lithium (aas)	0.30	"	22	<	<
Aluminum(ICP)	9.0	ug	29000	77	83
Barium	0.30	"	81	3.0	3.4
Beryllium	0.30	"	<	<	<
Cadmium	0.60	"	<	<	1.2
Calcium	60.0	"	51000	110	170
Chromium	1.2	"	20	1.5	2.3
Cobalt	3.0	"	<	<	<
Copper	1.5	"	2.3	<	1.6
Iron	3.0	"	680	35	77
Lead	6.0	"	18	<	<
Magnesium	15.0	"	5600	27	36
Manganese	1.8	"	17	<	<
Molybdenum	3.0	"	4.2	9.7	8.9
Nickel	3.0	"	7.8	<	<
Phosphorus	18.0	"	51	<	<
Potassium	300	"	390	<	<
Silver	3.0	"	<	<	<
Sodium	30.0	"	4300	1400	3100
Strontium	0.30	"	940	0.47	2.8
Thallium	18.0	"	<	<	<
Vanadium	1.5	"	20	<	<
Zinc	1.5	"	40	2.7	4.7
Boron	3.0	"	8600	4.5	3.2
Silicon	30.0	"	90000	190000	160000
Tin	15.0	"	<	<	<
Titanium	6.0	"	1200	<	<

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1212ASF1**
Final volume measured etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/12
Preparation Date:	95/12/12
Batch Code:	**1212GBA1**
Suspended Particulate - Acetone Probe Rinse etc.051698	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/12
Preparation Date:	95/12/12
Batch Code:	**1128MSA1**
Filter Particulates etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/06
Preparation Date:	95/11/28
Batch Code:	**1212ASF1**
Arsenic (gfaa) etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/14
Preparation Date:	95/12/12

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1212ASF1**
Antimony (gfaa) etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/15
Preparation Date:	95/12/12

Batch Code:	**1212ASF1**
Selenium (gfaa) etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/13
Preparation Date:	95/12/12

Batch Code:	**1212ASF1**
Aluminum etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/18
Preparation Date:	95/12/12

Batch Code:	**1212ASF1**
Boron etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/18
Preparation Date:	95/12/12

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1212ASF1**
Lithium etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/18
Preparation Date:	95/12/12

Batch Code:	**1212ASF1**
Silicon etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/18
Preparation Date:	95/12/12

Batch Code:	**1212ASF1**
Tin etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/20
Preparation Date:	95/12/12

Batch Code:	**1212ASF1**
Titanium etc.	051698
	051699
	051700
	051701
	051702
	051703
	051704
	051705
	051706
	051707
Analysis Date:	95/12/20
Preparation Date:	95/12/12

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1212ASF1**
Final volume measured etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/12
Preparation Date:	95/12/12
Batch Code:	**1212GBA1**
Suspended Particulate - Acetone Probe Rinse etc.052218	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/12
Preparation Date:	95/12/12
Batch Code:	**1130MSA1**
Filter Particulates etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/06
Preparation Date:	95/11/30
Batch Code:	**1212ASF1**
Arsenic (gfaa) etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/14
Preparation Date:	95/12/12
Batch Code:	**1212ASF1**
Antimony (gfaa) etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/15
Preparation Date:	95/12/12
Batch Code:	**1212ASF1**
Selenium (gfaa) etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/13
Preparation Date:	95/12/12
Batch Code:	**1212ASF1**
Aluminum etc.	052218

	052219
	052220
	052221
	052222
Analysis Date:	95/12/18
Preparation Date:	95/12/12
Batch Code:	**1212ASF1**
Boron etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/18
Preparation Date:	95/12/12
Batch Code:	**1212ASF1**
Lithium etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/18
Preparation Date:	95/12/12
Batch Code:	**1212ASF1**
Silicon etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/18
Preparation Date:	95/12/12
Batch Code:	**1212ASF1**
Tin etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/20
Preparation Date:	95/12/12
Batch Code:	**1212ASF1**
Titanium etc.	052218
	052219
	052220
	052221
	052222
Analysis Date:	95/12/20
Preparation Date:	95/12/12

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1213ASF1**
Final volume measured etc.	052925
	052926
	052927
	052928
	052929
	052930
	052931
	052932
	052933
	052934
	052935
	052936
	052937
	052938
Analysis Date:	95/12/13
Preparation Date:	95/12/13

Batch Code:	**1212GBA1**
Suspended Particulate - Acetone Probe Rinse etc.052925	052925
	052926
	052927
	052928
	052929
	052930
	052931
	052932
	052933
	052934
	052935
	052936
	052937
	052938
Analysis Date:	95/12/12
Preparation Date:	95/12/12

Batch Code:	**1130MSA1**
Filter Particulates etc.	052925
	052926
	052927
	052928
	052929
	052930
	052931
	052932
	052933
	052934
	052935
	052936
	052937
	052938
Analysis Date:	95/12/06
Preparation Date:	95/11/30

Batch Code:	**1213ASF1**	**1212ASF1**
Arsenic (gfaa) etc.	052925	052936

	052926	
	052927	
	052928	
	052929	
	052930	
	052931	
	052932	
	052933	
	052934	
	052935	
	052937	
	052938	
Analysis Date:	95/12/15	95/12/14
Preparation Date:	95/12/13	95/12/12
Batch Code:	**1213ASF1**	**1212ASF1**
Antimony (gfaa) etc.	052925	052936
	052926	
	052927	
	052928	
	052929	
	052930	
	052931	
	052932	
	052933	
	052934	
	052935	
	052937	
	052938	
Analysis Date:	95/12/18	95/12/15
Preparation Date:	95/12/13	95/12/12
Batch Code:	**1213ASF1**	**1212ASF1**
Selenium (gfaa) etc.	052925	052936
	052926	
	052927	
	052928	
	052929	
	052930	
	052931	
	052932	
	052933	
	052934	
	052935	
	052937	
	052938	
Analysis Date:	95/12/18	95/12/13
Preparation Date:	95/12/13	95/12/12
Batch Code:	**1213ASF1**	
Aluminum etc.	052925	
	052926	
	052927	
	052928	
	052929	
	052930	

	052931	
	052932	
	052933	
	052934	
	052935	
	052936	
	052937	
	052938	
Analysis Date:	95/12/19	
Preparation Date:	95/12/13	
Batch Code:	**1213ASF1**	**1212ASF1**
Boron etc.	052925	052936
	052926	
	052927	
	052928	
	052929	
	052930	
	052931	
	052932	
	052933	
	052934	
	052935	
	052937	
	052938	
Analysis Date:	95/12/19	95/12/18
Preparation Date:	95/12/13	95/12/12
Batch Code:	**1213ASF1**	**1212ASF1**
Lithium etc.	052925	052936
	052926	
	052927	
	052928	
	052929	
	052930	
	052931	
	052932	
	052933	
	052934	
	052935	
	052937	
	052938	
Analysis Date:	95/12/19	95/12/18
Preparation Date:	95/12/13	95/12/12
Batch Code:	**1213ASF1**	**1212ASF1**
Silicon etc.	052925	052936
	052926	
	052927	
	052928	
	052929	
	052930	
	052931	
	052932	
	052933	
	052934	

	052935	
	052937	
	052938	
Analysis Date:	95/12/19	95/12/18
Preparation Date:	95/12/13	95/12/12
Batch Code:	**1213ASF1**	**1212ASF1**
Tin etc.	052925	052936
	052926	
	052927	
	052928	
	052929	
	052930	
	052931	
	052932	
	052933	
	052934	
	052935	
	052937	
	052938	
Analysis Date:	95/12/21	95/12/20
Preparation Date:	95/12/13	95/12/12
Batch Code:	**1213ASF1**	**1212ASF1**
Titanium etc.	052925	052936
	052926	
	052927	
	052928	
	052929	
	052930	
	052931	
	052932	
	052933	
	052934	
	052935	
	052937	
	052938	
Analysis Date:	95/12/21	95/12/20
Preparation Date:	95/12/13	95/12/12

Multi-Metals

Mercury Data

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/27
Date Reported: 95/12/20

Submission No.: 5K0707
Sample No.: 051708-051754

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***"-" = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS:

"NA" = Not available, sample spiking too low relative to native mercury concentrations to determine spike recovery values accurately.

Certified by: _____

Zenon Environmental Laboratories - Certificate of Analysis

			Method Blank					T1-MP	T1-MP	T1-MP	T1-MP
	Client ID:		B.H.	Blank		Blank		B.H.	B.H.	B.H.	B.H.
	Zenon ID:		051718 95	Spike #1	% Recoveries	Spike #2	% Recoveries	051719 95	051719 95	051719 95	051719 95
	Date Sampled:		95/11/17					95/11/17	95/11/17	95/11/17	95/11/17
Component	**MDL**	**Units**							Duplicate	M. Spike	MS % Rec.
Final volume measured		ml	-	-	-	-	-	-	-	-	-
Impinger volume measured		"	100	-	-	-	-	660	-	-	-
Mercury	0.010	ug	<	0.11	110	0.11	110	230	240	400	99

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T1-MP B.H.	T1-MP B.H.	T2-MP B.H.	T3-MP B.H.	T4-MP B.H.	T5-MP B.H.	T6-MP B.H.	T7-MP B.H.	T8-MP B.H.	T9-MP B.H.
Zenon ID:			051719 95	051719 95	051720 95	051721 95	051722 95	051723 95	051724 95	051725 95	051726 95	051727 95
Date Sampled:			95/11/17	95/11/17	95/11/18	95/11/18	95/11/19	95/11/19	95/11/20	95/11/20	95/11/21	95/11/21
Component	**MDL**	**Units**	MS Dup	MSD % Rec.								
Final volume measured		ml	-	-	-	-	-	-	-	-	-	-
Impinger volume measured		"	-	-	730	680	670	650	660	710	680	600
Mercury	0.010	ug	400	99	130	340	70	45	220	100	15	26

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T1-MP Imp.4	T1-MP Imp.4	T1-MP Imp.4	T1-MP Imp.4	T1-MP Imp.4	T1-MP Imp.4	T2-MP Imp.4	T3-MP Imp.4	T4-MP Imp.4	T5-MP Imp.4
	Zenon ID:		051728 95	051728 95	051728 95	051728 95	051728 95	051728 95	051729 95	051730 95	051731 95	051732 95
	Date Sampled:		95/11/17	95/11/17	95/11/17	95/11/17	95/11/17	95/11/17	95/11/18	95/11/18	95/11/19	95/11/19
Component	**MDL**	**Units**		Duplicate	M. Spike	MS % Rec.	MS Dup	MSD % Rec.				
Final volume measured		ml	-	-	-	-	-	-	-	-	-	-
Impinger volume measured		"	130	-	-	-	-	-	110	150	120	130
Mercury	0.010	ug	3.1	3.0	3.8	NA	3.5	NA	1.5	2.9	1.9	5.0

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T6-MP Imp.4	T7-MP Imp.4	T8-MP Imp.4	T9-MP Imp.4	T1-MP Imp.5&6	T1-MP Imp.5&6	T1-MP Imp.5&6	T1-MP Imp.5&6	T1-MP Imp.5&6
	Zenon ID:		051733 95	051734 95	051735 95	051736 95	051737 95	051737 95	051737 95	051737 95	051737 95
	Date Sampled:		95/11/20	95/11/20	95/11/21	95/11/21	95/11/17	95/11/17	95/11/17	95/11/17	95/11/17
Component	**MDL**	**Units**						Duplicate	M. Spike	MS % Rec.	MS Dup
Final volume measured		ml	-	-	-	-	-	-	-	-	-
Impinger volume measured		"	130	110	130	100	470	-	-	-	-
Mercury	0.010	ug	0.59	2.2	0.19	1.1	4.6	5.0	5.9	NA	5.7

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T1-MP Imp.5&6	T2-MP Imp.5&6	T3-MP Imp.5&6	T4-MP Imp.5&6	T5-MP Imp.5&6	T6-MP Imp.5&6	T7-MP Imp.5&6	T8-MP Imp.5&6	T9-MP Imp.5&6	T1-MP HCl
Zenon ID:			051737 95	051738 95	051739 95	051740 95	051741 95	051742 95	051743 95	051744 95	051745 95	051746 95
Date Sampled:			95/11/17	95/11/18	95/11/18	95/11/19	95/11/19	95/11/20	95/11/20	95/11/21	95/11/21	95/11/17
Component	**MDL**	**Units**	MSD % Rec.									
Final volume measured		ml	-	-	-	-	-	-	-	-	-	-
Impinger volume measured		"	-	420	410	410	420	430	420	420	430	220
Mercury	0.010	ug	NA	6.0	17	19	15	3.0	6.7	15	9.9	<0.022

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T1-MP HCl	T1-MP HCl	T1-MP HCl	T1-MP HCl	T1-MP HCl	T2-MP HCl	T3-MP HCl	T4-MP HCl	T5-MP HCl	T6-MP HCl
Zenon ID:			051746 95	051746 95	051746 95	051746 95	051746 95	051747 95	051748 95	051749 95	051750 95	051751 95
Date Sampled:			95/11/17	95/11/17	95/11/17	95/11/17	95/11/17	95/11/18	95/11/18	95/11/19	95/11/19	95/11/20
Component	**MDL**	**Units**	Duplicate	M. Spike	MS % Rec.	MS Dup	MSD % Rec.					
Final volume measured		ml	-	-	-	-	-	-	-	-	-	-
Impinger volume measured		"	-	-	-	-	-	230	260	240	240	240
Mercury	0.010	ug	<0.022	0.27	110	0.28	120	<0.023	0.034	0.024	<0.024	<0.024

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T7-MP HCl	T8-MP HCl	T9-MP HCl
	Zenon ID:		051752 95	051753 95	051754 95
	Date Sampled:		95/11/20	95/11/21	95/11/21
Component	**MDL**	**Units**			
Final volume measured		ml	-	-	-
Impinger volume measured		"	230	240	210
Mercury	0.010	ug	<0.022	<0.024	<0.021

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1213ASA1**
Final volume measured etc.	051708
	051709
	051710
	051711
	051712
	051713
	051714
	051715
	051716
	051717
Analysis Date:	95/12/13
Preparation Date:	95/12/13

Batch Code:	**1128ASA1**
Impinger volume measured etc.	051718
	051719
	051720
	051721
	051722
	051723
	051724
	051725
	051726
	051727
	051728
	051729
	051730
	051731
	051732
	051733
	051734
	051735
	051736
	051737
	051738
	051739
	051740
	051741
	051742
	051743
	051744
	051745
	051746
	051747
	051748
	051749
	051750
	051751

ZEL Summary of Analysis Pre. Dates

	051752
	051753
	051754
Analysis Date:	95/11/28
Preparation Date:	95/11/28

Batch Code:	**1213ASA1**
Mercury etc.	051708
	051709
	051710
	051711
	051712
	051713
	051714
	051715
	051716
	051717
Analysis Date:	95/12/13
Preparation Date:	95/12/13

Batch Code:	**1130ASA1**	**1130ASA2**	**1130ASA3**	**1130ASA4**
Mercury etc.	051718	051728	051737	051746
	051719	051729	051738	051747
	051720	051730	051739	051748
	051721	051731	051740	051749
	051722	051732	051741	051750
	051723	051733	051742	051751
	051724	051734	051743	051752
	051725	051735	051744	051753
	051726	051736	051745	051754
	051727			
Analysis Date:	95/11/30	95/11/30	95/12/01	95/11/30
Preparation Date:	95/11/30	95/11/30	95/11/30	95/11/30

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/29
Date Reported: 95/12/21

Submission No.: 5K0781
Sample No.: 052223-052244

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS:

"*" = This value is small relative to the HNO_3/H_2O_2 mercury levels as found in sample 052231 95. In error, a separate portion of this front half T12 sample was not removed for mercury analysis before combining with the HNO_3/H_2O_2 portion. Analysis for mercury of the combined front half with the digested HNO_3/H_2O_2 portion provided essentially the same value (120 ug) as the analysis of the back half portion alone (140 ug).

Certified by: R. A. McLeod

Zenon Environmental Laboratories - Certificate of Analysis

			Method Blank					T10-MP	T10-MP	T10-MP	T10-MP
Client ID:			F.H.					F.H.	F.H.	F.H.	F.H.
Zenon ID:			052223 95	Blank		Blank		052224 95	052224 95	052224 95	052224 95
Date Sampled:			95/11/23	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/22	95/11/22	95/11/22	95/11/22
Component	**MDL**	**Units**							Duplicate	M. Spike	MS % Rec.
Final volume measured		ml	30	-	-	-	-	30	-	-	-
Impinger volume measured		"	-	-	-	-	-	-	-	-	-
Mercury	0.030	"	<	0.33	110	0.35	120	1.7	1.5	3.5	110

Client:Rigo Rigo Associates, Inc. Project:Davis County RR

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T10-MP F.H.	T10-MP F.H.	T11-MP F.H.	T12-MP F.H.	T13-MP F.H.
	Zenon ID:		052224 95	052224 95	052225 95	052226 95	052227 95
	Date Sampled:		95/11/22	95/11/22	95/11/22	95/11/23	95/11/23
Component	**MDL**	**Units**	MS Dup	MSD % Rec.			
Final volume measured		ml	-	-	30	30	30
Impinger volume measured		"	-	-	-	-	-
Mercury	0.030	"	3.3	93	0.71	small*	0.80

00003

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1212ASF1**
Final volume measured etc.	052223
	052224
	052225
	052226
	052227
Analysis Date:	95/12/12
Preparation Date:	95/12/12

Batch Code:	**1130MJB1**
Impinger volume measured etc.	052228
	052229
	052230
	052231
	052232
	052233
	052234
	052235
	052236
	052237
	052238
	052239
	052240
	052241
	052242
	052243
	052244
Analysis Date:	95/11/30
Preparation Date:	95/11/30

Batch Code:	
Analysis Date:	
Preparation Date:	

Batch Code:	**1213ASA1**	**1213ASA2**
Mercury etc.	052223	052224
		052225
		052226
		052227
Analysis Date:	95/12/13	95/12/13
Preparation Date:	95/12/13	95/12/13

Batch Code:	**1207ASA1**	**1207ASA2**
Mercury etc.	052228	052239
	052229	052240
	052230	052241
	052231	052242
	052232	052243
	052233	052244

ZEL Summary of Analysis Pre. Dates

	052234	
	052235	
	052236	
	052237	
	052238	
Analysis Date:	95/12/07	95/12/07
Preparation Date:	95/12/07	95/12/07

Batch Code:
Analysis Date:
Preparation Date:

Batch Code:
Analysis Date:
Preparation Date:

Batch Code:
Analysis Date:
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Preparation Date:

Batch Code:
Analysis Date:
Preparation Date:

Batch Code:
Analysis Date:
Preparation Date:

ZENON Environmental Laboratories
5555 North Service Road Burlington Ontario Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/30
Date Reported: 95/12/21

Submission No.: 5L0069
Sample No.: 052939-052952

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS:

Certified by: R. R. McLeod

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		Method Blank F.H.	Blank Spike #1	% Recoveries	Blank Spike #2	% Recoveries	T14-MP F.H.	T14-MP F.H.	T14-MP F.H.	T14-MP F.H.
	Zenon ID:		052939 95					052940 95	052940 95	052940 95	052940 95
	Date Sampled:		95/11/24					95/11/24	95/11/24	95/11/24	95/11/24
Component	**MDL**	**Units**							Duplicate	M. Spike	MS % Rec.
Final volume measured		ml	30	-	-	-	-	30	-	-	-
Mercury	0.030	ug	<	0.33	110	0.31	100	0.23	0.22	2.2	110

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T14-MP F.H.	T14-MP F.H.	T15-MP F.H.	T16-MP F.H.	T17-MP F.H.	T18-MP F.H.	T19-MP F.H.	T20-MP F.H.	T21-MP F.H.
Zenon ID:			052940 95	052940 95	052941 95	052942 95	052943 95	052944 95	052945 95	052946 95	052947 95
Date Sampled:			95/11/24	95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/26	95/11/27	95/11/27
Component	**MDL**	**Units**	MS Dup	MSD % Rec.							
Final volume measured		ml	-	-	30	30	30	30	30	30	30
Mercury	0.030	ug	2.2	110	0.18	0.075	0.067	0.28	6.9	0.48	<

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1213ASA2**
Final volume measured etc.	052939
	052940
	052941
	052942
	052943
	052944
	052945
	052946
	052947
	052948
	052949
	052950
	052951
	052952
Analysis Date:	95/12/13
Preparation Date:	95/12/13

Batch Code:	**1213ASA2**	**1214ASA1**
Mercury etc.	052939	052940
	052950	052941
		052942
		052943
		052944
		052945
		052946
		052947
		052948
		052949
		052951
		052952
Analysis Date:	95/12/13	95/12/15
Preparation Date:	95/12/13	95/12/14

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T22-MP F.H.	T23-MP F.H.	R.Blank 11/18 F.H.	R.Blank 11/26 F.H.	R.Blank 11/29 F.H.
	Zenon ID:		052948 95	052949 95	052950 95	052951 95	052952 95
	Date Sampled:		95/11/28	95/11/28	95/11/18	95/11/26	95/11/29
Component	**MDL**	**Units**					
Final volume measured		ml	30	30	30	30	30
Mercury	0.030	ug	<	0.17	0.050	<	<

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/30
Date Reported: 95/12/21

Submission No.: 5L0069
Sample No.: 052953-053002

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS:

"NA" = Sample not received from client, no analyses performed

Certified by: _____

Zenon Environmental Laboratories - Certificate of Analysis

			Method Blank					T14-MP	T14-MP	T14-MP	T14-MP
Client ID:			B.H.	Blank		Blank		B.H.	B.H.	B.H.	B.H.
Zenon ID:			052953 95	Spike #1	% Recoveries	Spike #2	% Recoveries	052954 95	052954 95	052954 95	052954 95
Date Sampled:			95/11/24					95/11/24	95/11/24	95/11/24	95/11/24
Component	**MDL**	**Units**							Duplicate	M. Spike	MS % Rec.
Impinger volume measured		ml	100	-	-	-	-	850	-	-	-
Mercury	0.010	ug	<	0.11	110	0.11	110	10	10	15	120

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T14-MP B.H.	T14-MP B.H.	T15-MP B.H.	T16-MP B.H.	T17-MP B.H.	T18-MP B.H.	T19-MP B.H.	T20-MP B.H.	T21-MP B.H.	T22-MP B.H.
Zenon ID:			052954 95	052954 95	052955 95	052956 95	052957 95	052958 95	052959 95	052960 95	052961 95	052962 95
Date Sampled:			95/11/24	95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/26	95/11/27	95/11/27	95/11/28
Component	**MDL**	**Units**	MS Dup	MSD % Rec.								
Impinger volume measured		ml	-	-	770	750	690	630	610	700	670	800
Mercury	0.010	ug	14	91	10	12	22	120	250	11	4.5	1.7

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T23-MP B.H.	R.Blank 11/18 B.H.	R.Blank 11/26 B.H.	R.Blank 11/29 B.H.	T14-MP Imp4	T14-MP Imp4	T14-MP Imp4	T14-MP Imp4	T14-MP Imp4	T14-MP Imp4
Zenon ID:			052963 95	052964 95	052965 95	052966 95	052967 95	052967 95	052967 95	052967 95	052967 95	052967 95
Date Sampled:			95/11/28	95/11/18	95/11/26	95/11/29	95/11/24	95/11/24	95/11/24	95/11/24	95/11/24	95/11/24
Component	**MDL**	**Units**						Duplicate	M. Spike	MS % Rec.	MS Dup	MSD % Rec.
Impinger volume measured		ml	650	340	NA	260	200	-	-	-	-	-
Mercury	0.010	ug	3.3	<0.17	NA	<0.13	0.49	0.52	1.5	99	1.5	110

00040

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Client ID:			T15-MP Imp4	T16-MP Imp4	T17-MP Imp4	T18-MP Imp4	T19-MP Imp4	T20-MP Imp4	T21-MP Imp4	T22-MP Imp4	T23-MP Imp4	T14-MP Imp5&6
Zenon ID:			052968 95	052969 95	052970 95	052971 95	052972 95	052973 95	052974 95	052975 95	052976 95	052977 95
Date Sampled:			95/11/24	95/11/25	95/11/25	95/11/26	95/11/26	95/11/27	95/11/27	95/11/28	95/11/28	95/11/24
Component	**MDL**	**Units**										
Impinger volume measured		ml	160	120	120	96	200	110	88	260	110	410
Mercury	0.010	ug	1.0	1.1	0.75	<0.026	2.7	2.6	0.25	0.19	0.18	23

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T14-MP Imp5&6	T14-MP Imp5&6	T14-MP Imp5&6	T14-MP Imp5&6	T14-MP Imp5&6	T15-MP Imp5&6	T16-MP Imp5&6	T17-MP Imp5&6	T18-MP Imp5&6	T19-MP Imp5&6
Zenon ID:			052977 95	052977 95	052977 95	052977 95	052977 95	052978 95	052979 95	052980 95	052981 95	052982 95
Date Sampled:			95/11/24	95/11/24	95/11/24	95/11/24	95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/26
Component	**MDL**	**Units**	Duplicate	M. Spike	MS % Rec.	MS Dup	MSD % Rec.					
Impinger volume measured		ml	-	-	-	-	-	410	420	400	350	400
Mercury	0.010	ug	21	40	120	38	100	25	17	13	9.1	17

00050

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T20-MP Imp5&6	T21-MP Imp5&6	T22-MP Imp5&6	T23-MP Imp5&6	R.Blank 11/18 KMnO4	R.Blank 11/26 KMnO4	R.Blank 11/29 KMnO4	T14-MP HCl	T14-MP HCl
Zenon ID:			052983 95	052984 95	052985 95	052986 95	052987 95	052988 95	052989 95	052990 95	052990 95
Date Sampled:			95/11/27	95/11/27	95/11/28	95/11/28	95/11/18	95/11/26	95/11/29	95/11/24	95/11/24
Component	**MDL**	**Units**									Duplicate
Impinger volume measured		ml	410	370	350	320	110	110	110	230	-
Mercury	0.010	ug	19	20	22	18	3.5	<0.011	<0.011	0.035	0.034

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T14-MP HCl	T14-MP HCl	T14-MP HCl	T14-MP HCl	T15-MP HCl	T16-MP HCl	T17-MP HCl	T18-MP HCl	T18-MP HCl	T18-MP HCl
Zenon ID:			052990 95	052990 95	052990 95	052990 95	052991 95	052992 95	052993 95	052994 95	052994 95	052994 95
Date Sampled:			95/11/24	95/11/24	95/11/24	95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/26	95/11/26
Component	**MDL**	**Units**	M. Spike	MS % Rec.	MS Dup	MSD % Rec.					Duplicate	M. Spike
Impinger volume measured		ml	-	-	-	-	230	240	240	240	-	-
Mercury	0.010	ug	0.29	110	0.28	110	0.024	<0.024	0.025	<0.024	<0.024	0.28

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T18-MP HCl	T18-MP HCl	T18-MP HCl	T19-MP HCl	T20-MP HCl	T21-MP HCl	T22-MP HCl	T23-MP HCl	R.Blank 11/18 HCl	R.Blank 11/26 HCl
	Zenon ID:		052994 95	052994 95	052994 95	052995 95	052996 95	052997 95	052998 95	052999 95	053000 95	053001 95
	Date Sampled:		95/11/26	95/11/26	95/11/26	95/11/26	95/11/27	95/11/27	95/11/27	95/11/28	95/11/18	95/11/26
Component	**MDL**	**Units**	MS % Rec.	MS Dup	MSD % Rec.							
Impinger volume measured		ml	-	-	-	260	250	230	250	240	230	220
Mercury	0.010	ug	110	0.29	120	<0.022	<0.025	<0.023	0.049	0.034	<0.023	<0.022

00055

			R.Blank
		Client ID:	11/29 HCl
		Zenon ID:	053002 95
		Date Sampled:	95/11/29
Component	**MDL**	**Units**	
Impinger volume measured		ml	360
Mercury	0.010	ug	<0.036

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1206MJC1**	**1205AG01**	**1205MJA1**
Impinger volume measured etc.	052953	052954	052970
	052963	052955	052971
	052964	052956	052972
	052966	052957	052973
	052987	052958	052974
	052988	052959	052975
	052989	052960	052976
	053000	052961	052980
	053001	052962	052981
	053002	052967	052982
		052968	052983
		052969	052984
		052977	052985
		052978	052986
		052979	052992
		052990	052993
		052991	052994
			052995
			052996
			052997
			052998
			052999
Analysis Date:	95/12/06	95/12/05	95/12/05
Preparation Date:	95/12/06	95/12/05	95/12/05

Batch Code:	**1207ASA3**	**1207ASA2**	**1207ASA4**	**1207ASA5**	**1207ASA6**	**1207ASA7**
Mercury etc.	052953	052964	052967	052977	052987	052994
	052954	052966	052968	052978	052988	052995
	052955		052969	052979	052989	052996
	052956		052970	052980	052990	052997
	052957		052971	052981	052991	052998
	052958		052972	052982	052992	052999
	052959		052973	052983	052993	
	052960		052974	052984	053000	
	052961		052975	052985	053001	
	052962		052976	052986	053002	
	052963					
Analysis Date:	95/12/08	95/12/07	95/12/07	95/12/08	95/12/07	95/12/07
Preparation Date:	95/12/07	95/12/07	95/12/07	95/12/07	95/12/07	95/12/07

Multi-Metals

Train Proof Data

ZEL Summary of Analysis Pre. Dates

	052813
	052814
	052815
	052816
	052817
	052818
	052819
	052820
Analysis Date:	95/12/18
Preparation Date:	95/12/18

12/20/95

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1218DHA1**	
Impinger volume measured etc.	052812	
	052813	
	052814	
	052815	
	052816	
	052817	
	052818	
	052819	
	052820	
	052821	
	052822	
	052823	
	052824	
	052825	
	052826	
	052827	
	052828	
Analysis Date:	95/12/18	
Preparation Date:	95/12/18	
Batch Code:	**1213DHA3**	**1218MNA1**
Fluoride etc.	052812	052820
	052813	
	052814	
	052815	
	052816	
	052817	
	052818	
	052819	
Analysis Date:	95/12/13	95/12/18
Preparation Date:	95/12/13	95/12/18
Batch Code:	**1218MNA2**	
Cl2 (as Cl) etc.	052812	
	052820	
	052821	
	052822	
	052823	
	052824	
	052825	
	052826	
	052827	
	052828	
Analysis Date:	95/12/18	
Preparation Date:	95/12/18	
Batch Code:	**1218MNA1**	
HCl (as Cl) etc.	052812	

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T22 NaOH	T22 NaOH	T23 NaOH	T23 NaOH	Reagent Blank NaOH	Reagent Blank NaOH
	Zenon ID:		052826 95	052826 95	052827 95	052827 95	052828 95	052828 95
	Date Sampled:		95/11/27	95/11/27	95/11/28	95/11/28	95/11/28	95/11/28
Component	**MDL**	**Units**		Duplicate		Duplicate		Duplicate
Impinger volume measured		ml	100	-	100	-	180	-
Fluoride	150	ug	-	-	-	-	-	-
Cl2 (as Cl)	0.008	mg	0.064	0.097	0.077	0.081	<0.029	<0.029
HCl (as Cl)	0.008	"	-	-	-	-	-	-

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T17 NaOH	T17 NaOH	T18 NaOH	T18 NaOH	T19 NaOH	T19 NaOH	T20 NaOH	T20 NaOH	T21 NaOH	T21 NaOH
	Zenon ID:		052821 95	052821 95	052822 95	052822 95	052823 95	052823 95	052824 95	052824 95	052825 95	052825 95
	Date Sampled:		95/11/25	95/11/25	95/11/25	95/11/25	95/11/26	95/11/26	95/11/26	95/11/26	95/11/27	95/11/27
Component	**MDL**	**Units**	MS Dup	MSD % Rec.		Duplicate		Duplicate		Duplicate		Duplicate
Impinger volume measured		ml	-	-	100	-	100	-	100	-	99	-
Fluoride	150	ug	-	-	-	-	-	-	-	-	-	-
Cl2 (as Cl)	0.008	mg	2.3	84	<0.016	<0.016	0.025	<0.016	0.088	0.076	0.15	0.13
HCl (as Cl)	0.008	"	-	-	-	-	-	-	-	-	-	-

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T22 H2SO4	T22 H2SO4	T23 H2SO4	T23 H2SO4	Reagent Blank H2SO4	Reagent Blank H2SO4	T17 NaOH	T17 NaOH	T17 NaOH	T17 NaOH
Zenon ID:			052818 95	052818 95	052819 95	052819 95	052820 95	052820 95	052821 95	052821 95	052821 95	052821 95
Date Sampled:			95/11/27	95/11/27	95/11/28	95/11/28	95/11/28	95/11/28	95/11/25	95/11/25	95/11/25	95/11/25
Component	**MDL**	**Units**		Duplicate		Duplicate		Duplicate		Duplicate	M. Spike	MS % Rec.
Impinger volume measured		ml	100	-	100	-	140	-	68	-	-	-
Fluoride	150	ug	<150	170	<150	<150	<200	<200	-	-	-	-
Cl2 (as Cl)	0.008	mg	-	-	-	-	<0.011	<0.011	0.011	0.012	2.3	83
HCl (as Cl)	0.008	"	31	31	28	28	<0.011	<0.011	-	-	-	-

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			T17 H2SO4	T17 H2SO4	T18 H2SO4	T18 H2SO4	T19 H2SO4	T19 H2SO4	T20 H2SO4	T20 H2SO4	T21 H2SO4	T21 H2SO4
Zenon ID:			052813 95	052813 95	052814 95	052814 95	052815 95	052815 95	052816 95	052816 95	052817 95	052817 95
Date Sampled:			95/11/25	95/11/25	95/11/25	95/11/25	95/11/26	95/11/26	95/11/26	95/11/26	95/11/27	95/11/27
Component	**MDL**	**Units**	MS Dup	MSD % Rec.		Duplicate		Duplicate		Duplicate		Duplicate
Impinger volume measured		ml	-	-	100	-	100	-	100	-	100	-
Fluoride	150	ug	-	-	<	<	210	<	690	760	<150	<150
Cl2 (as Cl)	0.008	mg	-	-	-	-	-	-	-	-	-	-
HCl (as Cl)	0.008	"	35	110	16	16	19	19	19	20	20	20

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	Client ID:		Method Blank					T17 H2SO4	T17 H2SO4	T17 H2SO4	T17 H2SO4
	Zenon ID:		052812 95	Blank		Blank		052813 95	052813 95	052813 95	052813 95
	Date Sampled:		95/11/25	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/25	95/11/25	95/11/25	95/11/25
Component	**MDL**	**Units**							Duplicate	M. Spike	MS % Rec.
Impinger volume measured		ml	100	-	-	-	-	68	-	-	-
Fluoride	150	ug	<	210	105	210	105	<	<	-	-
Cl2 (as Cl)	0.008	mg	<	0.36	90	0.35	88	-	-	-	-
HCl (as Cl)	0.008	"	<	0.36	90	0.35	88	20	20	35	110

ZENON
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Laboratories

5555 North Service Road
Burlington Ontario
Canada L7L 5H7

Tel 905 332 8788
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Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/30
Date Reported: 95/12/20

Submission No.: 5L0056
Sample No.: 052812-052828

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

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COMMENTS:

Certified by: _____

	051682
	051683
	051684
	051685
	051686
	051687
	051688
	051689
Analysis Date:	95/12/12
Preparation Date:	95/12/12

Batch Code:	**1218DHA1**
Impinger volume measured etc.	051681
	051682
	051683
	051684
	051685
	051686
	051687
	051688
	051689
	051690
	051691
	051692
	051693
	051694
	051695
	051696
	051697
Analysis Date:	95/12/18
Preparation Date:	95/12/18

Batch Code:	**1213DHA1**
Fluoride etc.	051681
	051682
	051683
	051684
	051685
	051686
	051687
	051688
	051689
Analysis Date:	95/12/13
Preparation Date:	95/12/13

Batch Code:	**1213DHA2**
Cl2 (as Cl) etc.	051681
	051690
	051691
	051692
	051693
	051694
	051695
	051696
	051697
Analysis Date:	95/12/13
Preparation Date:	95/12/13

Batch Code:	**1212DHA2**
HCl (as Cl) etc.	051681

	Client ID:		T16-HCl NaOH	T16-HCl NaOH
	Zenon ID:		051697 95	051697 95
	Date Sampled:		95/11/24	95/11/24
Component	**MDL**	**Units**		Duplicate
Impinger volume measured		ml	99	-
Fluoride	150	ug	-	-
Cl2 (as Cl)	0.008	mg	0.025	0.023
HCl (as Cl)	0.008	"	-	-

000/7

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Client ID:			T11-HCl NaOH	T11-HCl NaOH	T12-HCl NaOH	T12-HCl NaOH	T13-HCl NaOH	T13-HCl NaOH	T14-HCl NaOH	T14-HCl NaOH	T15-HCl NaOH	T15-HCl NaOH
Zenon ID:			051692 95	051692 95	051693 95	051693 95	051694 95	051694 95	051695 95	051695 95	051696 95	051696 95
Date Sampled:			95/11/21	95/11/21	95/11/21	95/11/21	95/11/21	95/11/21	95/11/23	95/11/23	95/11/24	95/11/24
Component	**MDL**	**Units**		Duplicate		Duplicate		Duplicate		Duplicate		Duplicate
Impinger volume measured		ml	100	-	100	-	100	-	76	-	100	-
Fluoride	150	ug	-	-	-	-	-	-	-	-	-	-
Cl2 (as Cl)	0.008	mg	<	<	<	<	<	<	0.019	<	<	<
HCl (as Cl)	0.008	"	-	-	-	-	-	-	-	-	-	-

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Client ID:			T14-HCl H2SO4	T14-HCl H2SO4	T15-HCl H2SO4	T15-HCl H2SO4	T16-HCl H2SO4	T16-HCl H2SO4	T9-HCl NaOH	T9-HCl NaOH	T10-HCl NaOH	T10-HCl NaOH
Zenon ID:			051687 95	051687 95	051688 95	051688 95	051689 95	051689 95	051690 95	051690 95	051691 95	051691 95
Date Sampled:			95/11/23	95/11/23	95/11/24	95/11/24	95/11/24	95/11/24	95/11/21	95/11/21	95/11/21	95/11/21
Component	**MDL**	**Units**		Duplicate		Duplicate		Duplicate		Duplicate		Duplicate
Impinger volume measured		ml	100	-	100	-	100	-	100	-	100	-
Fluoride	150	ug	170	170	210	210	<	<	-	-	-	-
Cl2 (as Cl)	0.008	mg	-	-	-	-	-	-	0.012	<	<	<
HCl (as Cl)	0.008	"	21	20	45	45	20	20	-	-	-	-

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Client ID:			T9-HCl H2SO4	T9-HCl H2SO4	T10-HCl H2SO4	T10-HCl H2SO4	T11-HCl H2SO4	T11-HCl H2SO4	T12-HCl H2SO4	T12-HCl H2SO4	T13-HCl H2SO4	T13-HCl H2SO4
Zenon ID:			051682 95	051682 95	051683 95	051683 95	051684 95	051684 95	051685 95	051685 95	051686 95	051686 95
Date Sampled:			95/11/21	95/11/21	95/11/21	95/11/21	95/11/22	95/11/22	95/11/22	95/11/22	95/11/23	95/11/23
Component	**MDL**	**Units**	MS Dup	MSD % Rec.		Duplicate		Duplicate		Duplicate		Duplicate
Impinger volume measured		ml	-	-	100	-	100	-	100	-	100	-
Fluoride	150	ug	1100	101	<	<	<160	<160	<	<	<150	<150
Cl2 (as Cl)	0.008	mg	-	-	-	-	-	-	-	-	-	-
HCl (as Cl)	0.008	"	49	110	30	31	21	20	16	16	19	18

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	Client ID:		Method Blank	Blank Spike	% Recoveries	Blank Spike	% Recoveries	T9-HCl H2SO4	T9-HCl H2SO4	T9-HCl H2SO4	T9-HCl H2SO4
	Zenon ID:		051681 95	#1		#2		051682 95	051682 95	051682 95	051682 95
	Date Sampled:		95/11/21					95/11/21	95/11/21	95/11/21	95/11/21
Component	**MDL**	**Units**							Duplicate	M. Spike	MS % Rec.
Impinger volume measured		ml	100	-	-	-	-	100	-	-	-
Fluoride	150	ug	<	210	105	210	105	160	160	1100	99
Cl2 (as Cl)	0.008	mg	<	0.39	97	0.39	96	-	-	-	-
HCl (as Cl)	0.008	"	<	0.38	95	0.38	94	27	27	49	110

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
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Tel 905 332 8788
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Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/27
Date Reported: 95/12/20

Submission No.: 5K0706
Sample No.: 051681-051697

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
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COMMENTS:

Certified by: _____

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1129MNA1**	
Impinger volume measured etc.	051017	
	051018	
	051019	
	051020	
	051021	
	051022	
	051023	
	051024	
	051025	
	051026	
	051027	
	051028	
	051029	
	051030	
	051031	
	051032	
	051033	
Analysis Date:	95/11/29	
Preparation Date:	95/11/29	
Batch Code:	**1207DHA1**	
Fluoride etc.	051017	
	051018	
	051019	
	051020	
	051021	
	051022	
	051023	
	051024	
	051025	
Analysis Date:	95/12/07	
Preparation Date:	95/12/07	
Batch Code:	**1212DHA1**	**1218MNA2**
Cl2 (as Cl) etc.	051017	051026
	051028	051027
	051029	051032
	051030	
	051031	
	051033	
Analysis Date:	95/12/12	95/12/18
Preparation Date:	95/12/12	95/12/18
Batch Code:	**1207DHA1**	**1212DHA1**
HCl (as Cl) etc.	051017	051024
	051018	
	051019	
	051020	
	051021	
	051022	
	051023	
	051025	
Analysis Date:	95/12/07	95/12/12
Preparation Date:	95/12/07	95/12/12

Zenon Environmental Laboratories - Certificate of Analysis

			T4	T5	T5	T6	T6	T7	T7	T8	T8
Client ID:			HCl-NaOH	HCl-NaOH	HCl-NaOH	HCl-NaOH	HCl-NaOH	HCl-NaOH	HCl-NaOH	HCl-NaOH	HCl-NaOH
Zenon ID:			051029 95	051030 95	051030 95	051031 95	051031 95	051032 95	051032 95	051033 95	051033 95
Date Sampled:			95/11/18	95/11/19	95/11/19	95/11/19	95/11/19	95/11/20	95/11/20	95/11/20	95/11/20
Component	**MDL**	**Units**	Duplicate		Duplicate		Duplicate		Duplicate		Duplicate
Impinger volume measured		ml	-	100	-	100	-	100	-	100	-
Fluoride	150	ug	-	-	-	-	-	-	-	-	-
Cl2 (as Cl)	0.008	mg	0.71	<0.080	<0.080	0.23*	0.46*	<0.016	<0.016	0.90*	0.46*
HCl (as Cl)	0.008	"	-	-	-	-	-	-	-	-	-

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	Client ID:		T8 HCl-H2SO4	T8 HCl-H2SO4	T1 HCl-NaOH	T1 HCl-NaOH	T2 HCl-NaOH	T2 HCl-NaOH	T3 HCl-NaOH	T3 HCl-NaOH	T4 HCl-NaOH
	Zenon ID:		051025 95	051025 95	051026 95	051026 95	051027 95	051027 95	051028 95	051028 95	051029 95
	Date Sampled:		95/11/20	95/11/20	95/11/17	95/11/17	95/11/17	95/11/17	95/11/18	95/11/18	95/11/18
Component	**MDL**	**Units**		Duplicate		Duplicate		Duplicate		Duplicate	
Impinger volume measured		ml	100	-	110	-	100	-	100	-	100
Fluoride	150	ug	200	200	-	-	-	-	-	-	-
Cl2 (as Cl)	0.008	mg	-	-	0.18	0.17	0.16	0.16	<0.080	<0.080	0.74
HCl (as Cl)	0.008	"	45	45	-	-	-	-	-	-	-

Zenon Environmental Laboratories - Certificate of Analysis

			T5	T6	T6	T7	T7	T7	T7	T7	T7
	Client ID:		HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4
	Zenon ID:		051022 95	051023 95	051023 95	051024 95	051024 95	051024 95	051024 95	051024 95	051024 95
	Date Sampled:		95/11/19	95/11/19	95/11/19	95/11/20	95/11/20	95/11/20	95/11/20	95/11/20	95/11/20
Component	**MDL**	**Units**	Duplicate		Duplicate		Duplicate	M. Spike	MS % Rec.	MS Dup	MSD % Rec.
Impinger volume measured		ml	-	100	-	100	-	-	-	-	-
Fluoride	150	ug	450	<160	170	160	160	-	-	-	-
Cl2 (as Cl)	0.008	mg	-	-	-	-	-	-	-	-	-
HCl (as Cl)	0.008	"	33	27	28	64	64	110	110	110	110

Zenon Environmental Laboratories - Certificate of Analysis

			T1	T1	T2	T2	T3	T3	T4	T4	T5
	Client ID:		HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4	HCl-H2SO4
	Zenon ID:		051018 95	051018 95	051019 95	051019 95	051020 95	051020 95	051021 95	051021 95	051022 95
	Date Sampled:		95/11/17	95/11/17	95/11/17	95/11/17	95/11/18	95/11/18	95/11/18	95/11/18	95/11/19
Component	**MDL**	**Units**	MS Dup	MSD % Rec.		Duplicate		Duplicate		Duplicate	
Impinger volume measured		ml	-	-	100	-	100	-	100	-	100
Fluoride	150	ug	1200	108	180	180	<150	<150	<150	<150	450
Cl2 (as Cl)	0.008	mg	-	-	-	-	-	-	-	-	-
HCl (as Cl)	0.008	"	57	110	38	38	21	21	17	18	32

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		Method Blank					T1	T1	T1	T1
	Zenon ID:		051017 95	Blank Spike	% Recoveries	Blank Spike	% Recoveries	HCl-H2SO4 051018 95	HCl-H2SO4 051018 95	HCl-H2SO4 051018 95	HCl-H2SO4 051018 95
	Date Sampled:		95/11/17	#1		#2		95/11/17	95/11/17	95/11/17	95/11/17
Component	**MDL**	**Units**							Duplicate	M. Spike	MS % Rec.
Impinger volume measured		ml	100	-	-	-	-	95	-	-	-
Fluoride	150	ug	<	210	105	210	105	180	180	1200	107
Cl2 (as Cl)	0.008	mg	<	0.38	95	0.38	94	-	-	-	-
HCl (as Cl)	0.008	"	<	0.39	98	0.39	97	37	36	58	110

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Certificate of Analysis

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Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/22
Date Reported: 95/12/20

Submission No.: 5K0600
Sample No.: 051017-051033

Regional Laboratories:
British Columbia
Ontario
Quebec

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COMMENTS:

"*" = Duplicates are outside normal control limits because of background interference.

Certified by:

Anion Data

ZEL Summary of Analysis Pre. Dates

Batch Code:	**0126ASA1**
Impinger volume measured etc.	002015
	002016
	002017
	002018
	002019
Analysis Date:	96/01/26
Preparation Date:	96/01/26
Batch Code:	**0129GBA1**
Arsenic etc.	002015
	002016
	002017
	002018
	002019
Analysis Date:	96/02/01
Preparation Date:	96/01/29
Batch Code:	**0129GBA1**
Antimony etc.	002015
	002016
	002017
	002018
	002019
Analysis Date:	96/02/01
Preparation Date:	96/01/29
Batch Code:	**0129GBA1**
Selenium etc.	002015
	002016
	002017
	002018
	002019
Analysis Date:	96/02/01
Preparation Date:	96/01/29
Batch Code:	**0129GBA1**
Aluminum etc.	002015
	002016
	002017
	002018
	002019
Analysis Date:	96/02/01
Preparation Date:	96/01/29

Zenon Environmental Laboratories - Laboratory Method Blanks

Component	MDL	Units		
Batch Code:				
Final volume measured	0	ml	-	-
Batch Code:			-	-
Impinger volume measured	0	"	-	-
Batch Code:			**0129GBA1**	**M. Spike**
Arsenic	2.0	ug	<3.0	71
Batch Code:			0129GBA1	M. Spike
Antimony	3.0	"	<4.5	73
Batch Code:			0129GBA1	M. Spike
Selenium	6.0	"	<9.0	76
Batch Code:			**0129GBA1**	**M. Spike**
Aluminum	3.0	ug	5.5	300
Barium	0.10	"	0.23	150
Beryllium	0.10	"	<0.15	73
Boron	1.0	"	<1.5	150
Cadmium	0.20	"	<0.30	73
Calcium	20	"	84	1600
Chromium	0.40	"	3.2	160
Cobalt	1.0	"	<1.5	150
Copper	0.60	"	<0.90	150
Iron	2.0	"	20	1900
Lead	2.0	"	<3.0	150
Magnesium	5.0	"	<7.5	1600
Manganese	0.50	"	<0.75	150
Molybdenum	0.50	"	<0.75	74
Nickel	2.0	"	<3.0	77
Phosphorus	6.0	"	<9.0	730
Potassium	100	"	<150	1500
Silicon	10.0	"	69	300
Silver	1.0	"	<1.5	75
Sodium	10	"	1200	2800
Strontium	0.10	"	0.20	76
Sulphur	6.0	"	21	160
Thallium	6.0	"	<9.0	150
Tin	5.0	"	<7.5	140
Titanium	1.0	"	<1.5	150
Vanadium	1.0	"	<1.5	75
Zinc	1.0	"	<1.5	290
Zirconium	1.0	"	<1.5	150

Zenon Environmental Laboratories - Certificate of Analysis

			T1	T1	T1	T10	T13	T22
	Client ID:		MP-Proof	MP-Proof	MP-Proof	MP-Proof	MP-Proof	MP-Proof
	Zenon ID:		002016 96	002016 96	002016 96	002017 96	002018 96	002019 96
	Date Sampled:		95/11/17	95/11/17	95/11/17	95/11/24	95/11/24	95/11/24
Component	**MDL**	**Units**	% Recovery	MS Dup	% Recovery			
Thallium	6.0	"	97	160	100	<9.0	<9.0	11
Tin	5.0	"	94	140	95	<7.5	<7.5	17
Titanium	1.0	"	97	150	98	<1.5	<1.5	<1.5
Vanadium	1.0	"	97	74	99	<1.5	<1.5	<1.5
Zinc	1.0	"	97	300	98	16	15	9.0
Zirconium	1.0	"	96	150	97	<1.5	<1.5	<1.5

Zenon Environmental Laboratories - Certificate of Analysis

			T1	T1	T1	T10	T13	T22
	Client ID:		MP-Proof	MP-Proof	MP-Proof	MP-Proof	MP-Proof	MP-Proof
	Zenon ID:		002016 96	002016 96	002016 96	002017 96	002018 96	002019 96
	Date Sampled:		95/11/17	95/11/17	95/11/17	95/11/24	95/11/24	95/11/24
Component	**MDL**	**Units**	% Recovery	MS Dup	% Recovery			
Final volume measured		ml	-	-	-	150	150	150
Impinger volume measured		"	-	-	-	430	260	350
Arsenic	2.0	ug	92	70	93	<3.0	<3.0	INT
Antimony	3.0	"	96	73	97	<4.5	<4.5	8.3
Selenium	6.0	"	100	76	100	<9.0	<9.0	<9.0
Aluminum	3.0	ug	96	300	98	12	10	9.3
Barium	0.10	"	97	150	99	0.53	0.49	0.57
Beryllium	0.10	"	96	73	97	<0.15	<0.15	<0.15
Boron	1.0	"	97	150	99	8.0	11	6.8
Cadmium	0.20	"	96	73	98	0.63	0.70	INT
Calcium	20	"	99	1600	100	120	79	59
Chromium	0.40	"	99	160	100	4.6	1.1	28
Cobalt	1.0	"	100	150	100	<1.5	<1.5	<1.5
Copper	0.60	"	98	150	100	2.7	2.7	2.9
Iron	2.0	"	100	1800	100	82	25	150
Lead	2.0	"	99	160	100	7.4	8.5	5.1
Magnesium	5.0	"	95	1600	97	<7.5	7.7	<7.5
Manganese	0.50	"	98	150	100	240	3800	2800
Molybdenum	0.50	"	97	73	98	<0.75	<0.75	3.3
Nickel	2.0	"	99	78	100	<3.0	<3.0	20
Phosphorus	6.0	"	96	730	98	<9.0	<9.0	120
Potassium	100	"	NS	1500	NS	750	260	260
Silicon	10.0	"	380	760	440	200	140	190
Silver	1.0	"	52*	49	65*	<1.5	<1.5	<1.5
Sodium	10	"	96	3100	98	2000	1100	610
Strontium	0.10	"	99	75	100	0.20	1.2	<0.15
Sulphur	6.0	"	94	170	98	2100	670	5500000

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		Method Blank	Method Blank Spike	Method Blank % Recovery	Method Blank MS Dup	Method Blank % Recovery	T1 MP-Proof	T1 MP-Proof	T1 MP-Proof
	Zenon ID:							002016 96	002016 96	002016 96
	Date Sampled:							95/11/17	95/11/17	95/11/17
Component	**MDL**	**Units**							Duplicate	M. Spike
Thallium	6.0	"	<9.0	150	100	150	100	<9.0	<9.0	150
Tin	5.0	"	<7.5	140	95	140	95	<7.5	<7.5	140
Titanium	1.0	"	<1.5	150	99	150	99	<1.5	<1.5	150
Vanadium	1.0	"	<1.5	75	99	74	99	<1.5	<1.5	73
Zinc	1.0	"	<1.5	290	98	290	98	2.5	2.4	290
Zirconium	1.0	"	<1.5	150	98	150	98	<1.5	<1.5	150

Zenon Environmental Laboratories - Certificate of Analysis

Component	*Client ID:* *Zenon ID:* *Date Sampled:* MDL	Units	Method Blank	Method Blank Spike	Method Blank % Recovery	Method Blank MS Dup	Method Blank % Recovery	T1 MP-Proof 002016 96 95/11/17	T1 MP-Proof 002016 96 95/11/17 Duplicate	T1 MP-Proof 002016 96 95/11/17 M. Spike
Final volume measured		ml	150	-	-	-	-	150	-	-
Impinger volume measured		"	100	-	-	-	-	280	-	-
Arsenic	2.0	ug	<3.0	-	-	-	-	<3.0	<3.0	70
Antimony	3.0	"	<4.5	-	-	-	-	<4.5	<4.5	73
Selenium	6.0	"	<9.0	-	-	-	-	<9.0	<9.0	73
Aluminum	3.0	ug	5.5	300	99	300	99	8.2	8.6	300
Barium	0.10	"	0.23	150	100	150	100	0.30	0.45	150
Beryllium	0.10	"	<0.15	73	98	73	97	<0.15	<0.15	72
Boron	1.0	"	<1.5	150	98	150	97	3.2	3.4	150
Cadmium	0.20	"	<0.30	73	97	73	97	<0.30	<0.30	72
Calcium	20	"	84	1600	100	1600	100	76	79	1600
Chromium	0.40	"	3.2	160	100	150	100	3.6	3.5	150
Cobalt	1.0	"	<1.5	150	100	150	100	<1.5	<1.5	150
Copper	0.60	"	<0.90	150	100	150	100	1.7	1.6	150
Iron	2.0	"	20	1900	100	1800	100	24	24	1800
Lead	2.0	"	<3.0	150	100	150	100	3.4	<3.0	150
Magnesium	5.0	"	<7.5	1600	97	1600	97	7.7	7.6	1600
Manganese	0.50	"	<0.75	150	100	150	100	0.77	0.79	150
Molybdenum	0.50	"	<0.75	74	99	74	99	<0.75	<0.75	72
Nickel	2.0	"	<3.0	77	100	77	99	<3.0	<3.0	77
Phosphorus	6.0	"	<9.0	730	97	730	97	<9.0	<9.0	720
Potassium	100	"	<150	1500	NS	1500	NS	<150	<150	1500
Silicon	10.0	"	69	300	160	290	150	100	100	670
Silver	1.0	"	<1.5	75	100	75	100	<1.5	<1.5	40
Sodium	10	"	1200	2800	100	2700	98	1600	1600	3100
Strontium	0.10	"	0.20	76	100	76	100	0.17	0.20	74
Sulphur	6.0	"	21	160	90	160	92	24	25	170

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
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Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION		LABORATORY INFORMATION	
Attention:	John Chandler	**Contact:**	Ron McLeod
Client Name:	Rigo & Rigo Associates, Inc.	**Project:**	AN951192
Project:	Davis County RR	**Date Received:**	96/01/25
Project Desc:	Analysis of Stack Emissions	**Date Reported:**	96/02/07
Address:	1 Berea Commons Suite 211 Berea, Ohio 44017-2534	**Submission No.:**	6A0432
		Sample No.:	002015-002019
Fax Number:	216-243-2759		
Phone Number:	216-243-5544		

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***"-" = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS:

*Suspect chloride interference on silver recovery
NS = Not Spiked
INT = Interference from high sulphur

Certified by: _____

ANALYTIC LABORATORY REPORT

Method 23 (Organics)
Sampling Train Results

PCDD/F, PCB/CB, PAH and Chlorophenol Analyses In MM5 Trains for Rigo & Rigo Associates, Inc.

A report by

ZENON ENVIRONMENTAL LABORATORIES
5555 North Service Rd.
Burlington, Ontario
L7L 5H7

February 16, 1996

Project No.:	AN951192
Lab No:	051003-052804
Client Project:	Davis County Recovery

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1.0 INTRODUCTION:

Samples derived from recovered MM5 trains were delivered to Zenon Environmental Laboratories for the analysis of polychlorinated dibenzo(p)dioxins and dibenzofurans (PCDD/F), polyaromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), chlorobenzenes (CB) and chlorophenols (CP).

The PCDD/F analysis was performed according to US EPA method 23, the PCB/CB analysis were via modified California Air Resources Board (CARB) method 428, and the PAH/CP analyses were performed via Environment Canada (NITEP/Mid-Connecticut Combustion Test Dec 1989; CD 891201) protocols.

Field spikes of isotopically labeled PCDD/PCDF/PAH/PCB and recovery spikes were added prior to sampling and prior to extractions respectively as prescribed by the appropriate CARB Method 428 and EPA Method 23 protocols. A method spike containing the identical spike used for field spiking was set aside in the laboratory for reference to sample extracts following sampling, extraction and cleanup.

Section 2 of the following report details the analytical methodology, Section 3 discusses the analytical data, Section 4 outlines QA/QC and the analytical data are presented in the Appendices at the end of the report.

Please note that definitions of terms are not universal from method to method. For example the term 'surrogate' can be used for materials added before sampling or before extraction dependent on the method. This can cause confusion during review or data especially in a situation such as this where methods have been derived from different agencies. The definitions relating to material spiked re each analysis is included in Section 2.

2.0 ANALYTICAL METHODOLOGY:

2.1 TRAIN PREPARATION & EXTRACTION:

The samples were prepared and extracted in strict accordance to EPA method 23 protocols except for the changes noted below:

a) The solids were soxhlet extracted sequentially with dichloromethane and then with toluene. The extraction sequence is shown in Figure 1 below and is designed to ensure that there is no compromise to either extraction procedure for method 23 (ie. PCDD/F) nor for SW846 method 0010 (ie. for other semi-volatiles).

b) The aqueous impinger contents were extracted with dichloromethane, the extract dried over anhydrous sodium sulphate and combined with the other organic extracts of the train sections for a single PCDD/F, PAH analysis per train. This was combined in appropriate proportions to the PAH/PCB/CB/CP portions of the extract but not to the PCDD/F portion (as per method 23).

c) The combined extracts above were split in four portions prior to clean-up, one fourth of the combined extracts (not including the impinger extracts) was cleaned for PCDD/F analysis as per method 23, one fourth (including the impinger extracts) was cleaned for PAH/CP analysis as per CARB429 and Environment Canada methods. The remaining extract portions were archived for possible additional analytical requirements.

d) Listing of Internal Standards, Surrogates, Field Spikes and Alternate Standards:

The labelled materials added just prior to extraction and their definitions (please take note of the confusion on definitions from method to method) are:

For PCDD/F (according to method 23 these are defined as internal standards):

2,3,7,8-T4CDD-$^{13}C_{12}$
2,3,7,8-T4CDF-$^{13}C_{12}$
1,2,3,7,8-P5CDD-$^{13}C_{12}$
1,2,3,7,8-P5CDF-$^{13}C_{12}$
1,2,3,6,7,8-H6CDD-$^{13}C_{12}$
1,2,3,6,7,8-H6CDF-$^{13}C_{12}$
1,2,3,4,6,7,8-H7CDD-$^{13}C_{12}$
1,2,3,4,6,7,8-H7CDF-$^{13}C_{12}$
and OCDD-$^{13}C_{12}$

for PCB (according to CARB 428, these are defined as internal standards):

4-Chlorobiphenyl-$^{13}C_6$
3,3',5,5'-Tetrachlorobiphenyl-$^{13}C_{12}$
2,2',3,3',5,5',6,6'-Octachlorobiphenyl-$^{13}C_{12}$
Decachlorobiphenyl-$^{13}C_{12}$

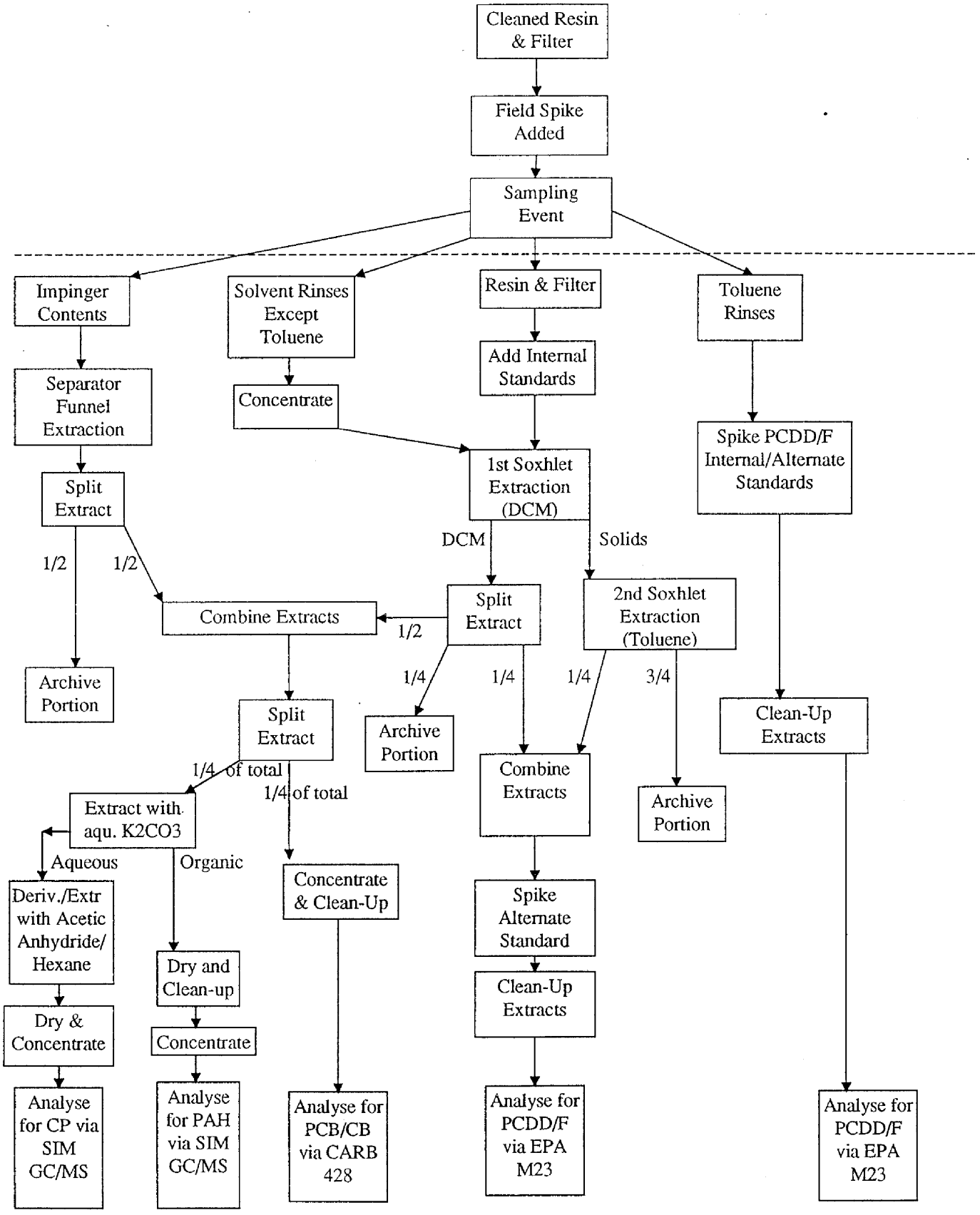
for CB (according to Env. Canada, these are defined as surrogates):

1,3-Dichlorobenzene-$^{2}H_4$
1,2,4-Trichlorobenzene-$^{2}H_3$
Hexachlorobenzene-$^{13}C_{12}$

for PAH (according to Env. Canada, these are defined as surrogates):

Acenaphthylene-$^{2}H_8$
Chrysene-$^{2}H_{12}$
Benzo(a)pyrene-$^{2}H_{12}$

FIGURE 1


Cleaned Resin & Filter
Field Spike Added
Sampling Event
Impinger Contents
Solvent Rinses Except Toluene
Resin & Filter
Toluene Rinses
Separator Funnel Extraction
Concentrate
Add Internal Standards
Spike PCDD/F Internal/Alternate Standards
Split Extract
1st Soxhlet Extraction (DCM)
DCM
Solids
1/2
1/2
Combine Extracts
Split Extract
1/2
2nd Soxhlet Extraction (Toluene)
Archive Portion
1/4
1/4
1/4
3/4
Split Extract
Archive Portion
Clean-Up Extracts
1/4 of total
1/4 of total
Combine Extracts
Archive Portion
Extract with aqu. K2CO3
Aqueous
Organic
Concentrate & Clean-Up
Spike Alternate Standard
Deriv./Extr with Acetic Anhydride/ Hexane
Dry and Clean-up
Clean-Up Extracts
Dry & Concentrate
Concentrate
Analyse for CP via SIM GC/MS
Analyse for PAH via SIM GC/MS
Analyse for PCB/CB via CARB 428
Analyse for PCDD/F via EPA M23
Analyse for PCDD/F via EPA M23

and for CP (according to Env. Canada, these are defined as surrogates):

2,4-Dichlorophenol-$^{2}H_3$
Pentachlorophenol-$^{13}C_6$

Field spiking of the resin traps of the organic trains was as follows:

For PCDD/F (according to method 23, these are defined as surrogates):

2,3,7,8-T4CDD-$^{37}Cl_4$
2,3,4,7,8-P5CDF-$^{13}C_{12}$
1,2,3,4,7,8-H6CDF-$^{13}C_{12}$
1,2,3,4,7,8-H6CDD-$^{13}C_{12}$
1,2,3,4,7,8,9-H7CDF-$^{13}C_{12}$

For PCB (this is defined as a surrogate):

2,2',3,4,5,5',6-Heptachlorobiphenyl-$^{13}C_{12}$

For CB (these are defined as field spikes):

1,4-Dichlorobenzene-$^{2}H_4$
1,2,3-Trichlorobenzene-$^{2}H_3$

For PAH (these are defined as field spikes):

Fluorene-$^{2}H_{10}$
p-Terphenyl-$^{2}H_{14}$

For CP (this is defined as a field spike):

2,6-Dibromo-4-fluorophenol

In addition, the combined extracts are spiked with 1,2,3,7,8,9-H6CDF-$^{13}C_{12}$ (defined by method 23 as an alternate standard) prior to clean-up to monitor PCDD/F clean-up efficiency.

Injection standards added to the appropriate final extracts just prior to injection are:

For PAH:

Acenaphthene-$^{2}H_{10}$
Pyrene-$^{2}H_{10}$
Benzo(e)pyrene-$^{2}H_{12}$

for PCB/CB:

3,3',4,4'-Tetrachlorobiphenyl-$^{13}C_{12}$

for PCDD/F:

1,2,3,4-TCDD-$^{13}C_{12}$
1,2,3,4,7,8-H6CDD-$^{13}C_{12}$

and for CP:

Acenaphthene-$^{2}H_{10}$

2.2 PCDD/F ANALYSIS VIA EPA METHOD 23

The PCDD/F portion of the extract was cleaned and analysed via EPA method 23 protocols using a VG Autospec Ultima high resolution mass spectrometer. All laboratory glassware and reagents were proofed to be clean of PCDD/F contamination prior to any sample preparation.

2.3 CP/PAH via Environment Canada Protocols:

2.3.1 CP/PAH Separation and CP Acetylation:

The portion of the combined raw extracts for PAH/CP analysis were transferred to 1000 mL separatory funnel, along with 3 solvent rinses of the flask. The organic phase was serially back-extracted with 30/20/20 mL portions of pre-cleaned 0.1M potassium carbonate solution shaking vigorously for two minutes each time. The aqueous extract portion was drained into a 125 mL erlenmeyer flask, while the organic phase (containing the other compounds of interest) was dried over Na_2SO_4 and concentrated to 3-5 mL by rotary evaporation at 38°C, exchanged to isooctane for PAH clean-up and analysis.

Via micro-pipette, 0.5 mL of acetic anhydride was added to the aqueous extract and swirled briefly. After allowing the sample to stand for 30 minutes, 8 mL of hexane and 1 mL of isooctane were added to the erlenmeyer flask, the mouth of which was the sealed with pre-rinsed aluminum foil. The sample was then swirled vigorously for two hours on a rotary shaker. Deionized water was then added to raise the organic layer into the neck of the erlenmeyer flask. Approximately 7 mL of the organic phase was carefully withdrawn by Pasteur pipette and transferred to a volume calibrated 15 mL centrifuge tube. (All centrifuge tubes were manually calibrated with isooctane to 0.50 mL levels prior to initial use). Transfer of the remaining extract was facilitated by adding 6 mL of hexane, in 2 mL portions, to the sample flask. The derivatized CP fraction was blown down under nitrogen to a volume of approximately 0.4 mL before adding 50 uL of the internal standard solution (Aceanphthene-d10 in isooctane). A sufficient volume of isooctane was added to bring the sample exactly to the 1.0 mL scribe mark on the centrifuge tube. The CP fraction was then transferred to a 1.5 mL glass, crimp top vial. A Teflon faced, silicone rubber septum inside the vial cap provided an excellent seal. Prepared sample fractions were stored until the date of GC/MS analysis.

The standards for chlorophenol determination were prepared in the same manner as the samples. A portion of a concentrated standard mixture of chlorophenols in acetone was added to a carbonate solution and derivatized to the acetates along side of the test samples (see above). The resultant standard concentrate, now as the chlorophenol acetates were diluted for a 5-point initial calibration of the GC/MS instrument. The elution order of the chlorophenol acetates has been long established on DB5 columns via experiments with individual chlorophenol standards.

2.3.2 PAH & CP Instrumental Analyses:

Extracts were analysed on a Hewlett Packard 5972 GC/MS via selected ion monitoring (SIM) technique. Derivatization of chlorophenols to their corresponding acetate derivatives facilitates excellent chromatography of these analytes in levels appropriate for SIM analysis. In this manner, chlorophenols can be analysed at much lower levels than the underivatized analogues.

Typical instrument conditions are listed below. Ions monitored are dependent on the specific analysis. Quantification and confirming ions for the analyses are listed below.

GC/MS ANALYSIS

Gas Chromatography

Injection Mode	Splitless
Column 30 m DB5 X 0.25 mm ID	
Column Flow	He at 20 cm/sec.

Oven Temperature Profile:
80°C - 2 min;
80°C - 210°C @ 10°C/min;
210°C-290°C @ 16°C/min hold for 10 min.

GC/MS Interface - Direct Couple
Transfer Area - 250°C

Mass spectrometry

Ionization Mode	Electron Impact
Electron Energy	70 eV
Filament Emission	0.5 A
Electron Multiplier	1500 V
Scan	SIM

Quantification was carried out by comparing mass spectrometric responses of selected ions to those of external standards.

The criteria used for the identification of the organics required:
a) the presence of appropriate secondary ions in the mass spectrum
b) signal to noise of at least 3 to 1
c) retention time within 3 seconds of the reference standard after correction for internal standard retention times.
d) appropriate isotopic ratios for chlorinated analytes

CP Monitored GC/MS Ions (m/z)

Compound	Quantification Ions	Confirming Ions
Dichlorophenol Acetates	162	204
Trichlorophenol Acetates	198	240
Tetrachlorophenol Acetates	232	274
Pentachlorophenol Acetate	266	308
2,4-Dichlorophenol-$^{2}H_3$ Acetate	165	
Pentachlorophenol-$^{13}C_6$ Acetate	272	
2,6-dibromo-4-fluorophenol Acetate	270	268

Compound	PAH Monitored GC/MS Ions (m/z) Quantification Ions	Confirming Ions
Naphthalene	128	64
Acenaphthylene	152	153
Acenaphthene	154	153,152
Fluorene	166	165
Phenanthrene	178	176
Anthracene	178	176
Fluoranthene	202	101
Pyrene	202	101
Benz(a)anthracene	228	114
Chrysene	228	114
Benzo(b)fluoranthene	252	126
Benzo(k)fluoranthene	252	126
Benzo(a)pyrene	252	126
Indeno(1,2,3-cd)pyrene	276	138
Dibenzo(ah)anthracene	278	139
Benzo(ghi)perylene	276	138
Tetralin	104	132
Quinoline	129	128
2-Methylnaphthalene	142	141
1-Methylnaphthalene	142	141
Biphenyl	154	153
2-Chloronaphthalene	162	164
Benzo(a)fluorene	216	215
Benzo(b)fluorene	216	215
m-Terphenyl	230	215
o-Terphenyl	230	215
p-Terphenyl	230	215
2-Methylanthracene	192	191
1-Methylphenanthrene	192	191
9-Methylphenanthrene	192	191
9,10-Dimethylanthracene	206	191
Benzo(b)anthracene	228	114
Triphenylene	228	114
Benzo(e)pyrene	252	126
Perylene	252	126
7,12-DMBA	256	241
3-Methylcholanthrene	268	
Dibenzo(a,c)anthracene /Picene	278	139
Coronene	300	150
Dibenzo(a,c)pyrene	302	151

2.4 PCB/CB Instrumental Analyses via CARB 428

Extracts were analysed on a Hewlett Packard 5972 GC/MS for PCB via selected ion monitoring (SIM) technique. The CARB method 429 has been modified to include chlorobenzenes in the same analytical run as PCB.

2.4 PCB/CB VIA CARB METHOD 428:

The polychlorinated biphenyls (PCB) analysis was via strict adherence to CARB method 428 protocols with the following modification:

a) The injection standard of 3,3',4,4'-tetrachlorobiphenyl-$^{13}C_{12}$ was used in place of the recommended compounds phenanthrene-$^{2}H_{10}$ and
chrysene-$^{2}H_{12}$. [the use of labeled PAH as injection standards is a conflict with the standards already spiked into the sample for PAH analysis].

CARB method 428 does not include a description of the analysis for chlorobenzenes but these analytes are cleaned and recovered by the same procedures as PCB. The CB analysis is easily included on the same GC/MS instrumental run as for the PCB determination.

The CB analysis was by selected ion monitoring (SIM) from the same analytical run as for the PCB analysis monitoring the following ions:

CB Monitored GC/MS Ions (m/z)

Compounds	Quantification Ions	Confirming Ions
Dichlorobenzenes	146	148
Trichlorobenzenes	180	182
Tetachlorobenzenes	216	214
Pentachlorobenzene	250	252
Hexachlorobenzene	284	286
Dichlorobenzene-$^{2}H_4$	150	
Trichlorobenzene-$^{2}H_3$	183	
Hexachlorobenzene-$^{13}C_6$	290	

3.0 ANALYTICAL RESULTS

The analytical data for the MM5 trains samples with the associated sample QC data (laboratory method blank, blank matrix spikes and internal/surrogate/field spike recoveries) are presented in the Appendices at the end of this report. The data are not corrected for laboratory method blank nor field blank data. Because these data are derived from isotope dilution methods, the PCDD/F (EPA method 23) and PCB (CARB method 428) data are corrected for 'internal standard' recoveries. The other data from the PAH, CB and CP analyses, are not corrected for 'surrogate' recoveries.

As per the defined scope of work, a selected few of the PCDD/F extracts were analysed on a DB-225 column to confirm the 2,3,7,8-TCDF values. For consistency, the 2,3,7,8-TCDD toxic equivalents have been calculated using the 2,3,7,8-TCDF values from the DB-5 primary column data. The NATO/CCME 1987 toxic equivalent factors were the factors used for all toxic equivalent data calculations. The reported '2,3,7,8-TCDD toxic equivalent' values are based on confirmed positive values only. The 'maximum 2,3,7,8-TCDD toxic equivalent' values are based on either confirmed positive instrument responses to 2,3,7,8-substituted isomers or, in the absence of a confirmed response, on the instrument detection limit for that congener.

As per the defined scope of work on this project, only three of the toluene assurance rinses were analysed for PCDD/F.

See also comments on the appropriate cover pages for each individual analysis for additional information in regards to the analytical data.

4.0 QUALITY CONTROL/QUALITY ASSURANCE (QA/QC)

A complete QA/QC program is employed by ZENON. The elements of this program and a brief discussion of each of the elements are presented below:

Sample Custody

Strict chain of custody is maintained for samples analysed in this project. Samples received from the field were signed off upon delivery and immediately entered into ZENON's lab information system. Prior to extraction, samples were stored under refrigeration in a secure area. All technologists working on this project have kept accurate records of all actions taken with the samples. ZENON also has a security system in place that ensures unauthorized entry into the lab area is immediately known and appropriate staff and police are contacted.

Laboratory Method Blanks

A method blank is an analysis incorporating all aspects of the analysis, excluding the sample. Included is an unused portion of the same resin batch as supplied for the sampling program. In this study, a method blank was processed for each group of samples processed together. The uncorrected laboratory method blank data are presented with the sample data in the Appendices at the end of the report. The analytical data are not corrected for the laboratory method blank.

Blank Resin Matrix Spikes

A portion of the same resin as supplied for the sampling program is spiked with unlabelled (native) analytes and analysed within the sample batch. These blank matrix spike data are presented with the sample data in the Appendices at the end of the report.

Standards -Internal, Surrogate & Recovery

ZENON uses both native and labeled PCDD/F, PCB/CB, CP and PAH standards as identified in the appropriate protocols and has added additional labeled analytes to enhance the minimum requirements for many of the methods. Field or surrogate spikes were added prior to sampling. Every sample was fortified with internal standards from each contaminant group prior to the start of analysis and each extract was fortified with a recovery standard just prior to injection. Five point calibrations were used to define the response curve characteristics.

Data File

All data acquired on the GC/MS systems will be maintained on magnetic tape for a period of three months past the conclusion of the project. The use of the sample analysis logs on the GC/MS systems allows for the rapid identification of the analysis dates and archive tapes.

Quantitation Calculations

As part of the QA/QC in this project, all calculations were performed by computer. Data files will be maintained for three months beyond the end of the project. Copies of all data reports and correspondence will be maintained in the completed project file for six months.

Data Reports and Verification

Transcriptions of the GC/MS data to the ZEL data computers are normally performed by automated electronic transfer. Occasionally, the data are entered manually. Regardless of the approach, the responsibility for the initial data analysis and data transfer resides with one analyst with verification and validation by a second analyst.

APPENDIX 1

Analytical Data

Chlorobenzene Data

ZENON
Environmental
Laboratories

5555 North Service Road
Burlington Ontario
Canada L7L 5H7

Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION		LABORATORY INFORMATION	
Attention:	John Chandler	**Contact:**	Ron McLeod/Yvonne Bond
Client Name:	Rigo & Rigo Associates, Inc.	**Project:**	AN951192
Project:	Davis County RR	**Date Received:**	95/11/22
Project Desc:	Analysis of Stack Emissions	**Date Reported:**	96/01/15
Address:	1 Berea Commons Suite 211 Berea, Ohio 44017-2534	**Submission No.:**	5L0054
		Sample No.:	051002
Fax Number:	216-243-2759		
Phone Number:	216-243-5544		

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS: **CHLOROBENZENE FINAL REPORT**

"NS" = Not Spiked

"*" = A fresh surrogate spiking solution was prepared for the last batch of CB samples processed. In error, 1,2,3-Trichlorobenzene-2H3 was added to the solution rather than 1,2,4-Trichlorobenzene-2H3. Therefore this batch of samples had 1,2,3-Trichlorobenzene-2H3 added both as a "surrogate" and as a "field spike". Therefore only one average recovery is available for both field spike and surrogate recoveries.

Certified by:

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		Method Blank					B1-OC	T1-OC	T2-OC	T3-OC
	Zenon ID:		051002 95	Blank		Blank		051003 95	051004 95	051005 95	051006 95
	Date Sampled:		95/11/20	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/20	95/11/17	95/11/18	95/11/18
Component	**MDL**	**Units**									
1,2-Dichlorobenzene	0.050	ug	<0.20	0.21	51	0.28	70	<0.20	0.45	0.55	0.50
1,3-Dichlorobenzene	0.050	"	<0.20	0.21	52	0.29	71	<0.20	0.53	0.70	0.66
1,4-Dichlorobenzene	0.050	"	<0.20	0.34	84	0.43	107	<0.20	0.56	1.1	0.58
1,2,3-Trichlorobenzene	0.050	"	<0.20	0.22	56	0.33	83	<0.20	0.54	0.67	0.61
1,2,4-Trichlorobenzene	0.050	"	<0.20	0.22	56	0.32	80	<0.20	1.8	2.2	1.7
1,3,5-Trichlorobenzene	0.050	"	<0.20	0.22	55	0.32	81	<0.20	0.21	0.28	0.25
1,2,3,4-Tetrachlorobenzene	0.050	"	<0.20	0.24	59	0.33	83	<0.20	0.65	1.00	0.78
1,2,3,5-1,2,4,5-Tetrachlorobenzene	0.050	"	<0.20	0.45	57	0.67	84	<0.20	1.4	1.8	1.5
Pentachlorobenzene	0.050	"	<0.20	0.24	59	0.33	84	<0.20	0.99	1.4	1.1
Hexachlorobenzene	0.050	"	<0.20	0.28	69	0.37	92	<0.20	0.29	0.45	0.38
Surrogate Recoveries		%									
2H4-1,3-Dichlorobenzene			59	51	51	72	72	32	56	73	80
2H3-1,2,4-Trichlorobenzene			66	53	53	79	79	37	70	76	88
13C6-Hexachlorobenzene			74	66	66	90	90	55	84	85	100
Field Spike		%									
2H4-1,4-Dichlorobenzene			NS	NS	NS	NS	NS	30	54	68	72
2H3-1,2,3-Trichlorobenzene			NS	NS	NS	NS	NS	32	60	65	73

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	Client ID:		T4-OC	T5-OC	Method Blank					T8-OC	T9-OC
	Zenon ID:		051007 95	051008 95	051661 95	Blank		Blank		051662 95	051663 95
	Date Sampled:		95/11/19	95/11/19	95/11/21	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/21	95/11/21
Component	**MDL**	**Units**									
1,2-Dichlorobenzene	0.050	ug	0.18	0.57	<0.20	0.41	100	0.42	100	0.46	0.51
1,3-Dichlorobenzene	0.050	"	0.21	0.72	<0.20	0.41	100	0.40	99	0.53	0.64
1,4-Dichlorobenzene	0.050	"	0.30	0.78	0.31	0.75	190	0.80	200	1.2	1.1
1,2,3-Trichlorobenzene	0.050	"	0.22	0.49	<0.20	0.40	100	0.40	100	0.25	0.35
1,2,4-Trichlorobenzene	0.050	"	0.57	1.5	<0.20	0.42	100	0.40	100	0.74	1.0
1,3,5-Trichlorobenzene	0.050	"	<0.20	0.22	<0.20	0.40	100	0.39	98	<0.20	<0.20
1,2,3,4-Tetrachlorobenzene	0.050	"	0.27	0.51	<0.20	0.42	110	0.42	100	<0.20	0.26
1,2,3,5-1,2,4,5-Tetrachlorobenzene	0.050	"	0.53	0.96	<0.20	0.83	100	0.82	100	0.44	0.65
Pentachlorobenzene	0.050	"	0.46	0.63	<0.20	0.39	98	0.39	97	<0.20	0.25
Hexachlorobenzene	0.050	"	<0.20	<0.20	<0.20	0.38	94	0.38	94	<0.20	<0.20
Surrogate Recoveries		%									
2H4-1,3-Dichlorobenzene			27	85	58	62	62	49	49	46	50
2H3-1,2,4-Trichlorobenzene			37	86	67	68	68	54	54	54	58
13C6-Hexachlorobenzene			87	95	76	75	75	60	60	67	69
Field Spike		%									
2H4-1,4-Dichlorobenzene			28	75	NS	NS	NS	NS	NS	54	57
2H3-1,2,3-Trichlorobenzene			33	73	NS	NS	NS	NS	NS	61	67

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	Client ID:		T10-OC	T11-OC	T12-OC	T13-OC	Method Blank				
	Zenon ID:		051664 95	051665 95	051666 95	051667 95	052193 95	Blank		Blank	
	Date Sampled:		95/11/22	95/11/22	95/11/23	95/11/23	95/11/22	Spike #1	% Recoveries	Spike #2	% Recoveries
Component	**MDL**	**Units**									
1,2-Dichlorobenzene	0.050	ug	0.79	0.41	0.74	0.71	<0.20	0.43	110	0.44	110
1,3-Dichlorobenzene	0.050	"	0.95	0.50	0.85	0.81	<0.20	0.45	110	0.45	110
1,4-Dichlorobenzene	0.050	"	1.9	0.86	1.2	1.7	0.39	0.68	170	0.60	150
1,2,3-Trichlorobenzene	0.050	"	0.96	0.23	0.73	0.76	<0.20	0.37	93	0.38	95
1,2,4-Trichlorobenzene	0.050	"	2.4	0.69	1.5	1.8	<0.20	0.37	92	0.37	92
1,3,5-Trichlorobenzene	0.050	"	0.38	<0.20	0.30	0.29	<0.20	0.36	89	0.36	91
1,2,3,4-Tetrachlorobenzene	0.050	"	1.1	<0.20	0.88	0.92	<0.20	0.39	98	0.40	99
1,2,3,5-1,2,4,5-Tetrachlorobenzene	0.050	"	2.4	0.37	1.9	1.9	<0.20	0.74	93	0.77	96
Pentachlorobenzene	0.050	"	1.7	<0.20	1.1	1.2	<0.20	0.37	93	0.41	100
Hexachlorobenzene	0.050	"	0.62	<0.20	0.32	0.43	<0.20	0.41	100	0.42	100
Surrogate Recoveries		%									
2H4-1,3-Dichlorobenzene			75	53	60	68	34	56	56	49	49
2H3-1,2,4-Trichlorobenzene			77	57	64	70	53*	75*	75*	68*	68*
13C6-Hexachlorobenzene			79	68	68	75	48	71	71	63	63
Field Spike		%									
2H4-1,4-Dichlorobenzene			87	61	67	78	NS	NS	NS	NS	NS
2H3-1,2,3-Trichlorobenzene			85	64	70	78	NS	NS	NS	NS	NS

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			B2-OC	T6-OC	T7-OC	T14-OC	T15-OC	T16-OC	T17-OC	T18-OC	Method Blank
Zenon ID:			052194 95	052195 95	052196 95	052197 95	052198 95	052199 95	052200 95	052201 95	052798 95
Date Sampled:			95/11/22	95/11/20	95/11/20	95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/25
Component	**MDL**	**Units**									
1,2-Dichlorobenzene	0.050	ug	<0.20	0.76	0.74	0.82	0.75	0.92	0.72	0.83	<0.20
1,3-Dichlorobenzene	0.050	"	<0.20	0.83	0.86	0.93	0.88	1.0	0.88	1.1	<0.20
1,4-Dichlorobenzene	0.050	"	0.86	1.3	1.3	1.2	2.5	2.6	1.2	1.3	0.39
1,2,3-Trichlorobenzene	0.050	"	<0.20	0.67	0.68	0.37	0.36	0.49	0.43	0.64	<0.20
1,2,4-Trichlorobenzene	0.050	"	<0.20	2.8	2.4	1.1	1.3	1.3	1.3	2.1	<0.20
1,3,5-Trichlorobenzene	0.050	"	<0.20	0.26	0.26	0.20	<0.20	0.23	0.20	0.28	<0.20
1,2,3,4-Tetrachlorobenzene	0.050	"	<0.20	0.84	0.79	0.21	<0.20	0.34	0.33	0.70	<0.20
1,2,3,5-1,2,4,5-Tetrachlorobenzene	0.050	"	<0.20	1.8	1.7	0.58	0.51	0.80	0.79	1.6	<0.20
Pentachlorobenzene	0.050	"	<0.20	1.7	1.4	<0.20	<0.20	0.34	0.30	0.78	<0.20
Hexachlorobenzene	0.050	"	<0.20	0.36	0.37	<0.20	<0.20	<0.20	<0.20	0.25	<0.20
Surrogate Recoveries		%									
2H4-1,3-Dichlorobenzene			42	49	51	46	61	53	51	43	34
2H3-1,2,4-Trichlorobenzene			62*	67*	66*	59*	71*	62*	65*	55*	53*
13C6-Hexachlorobenzene			69	70	68	60	66	60	66	62	48
Field Spike		%									
2H4-1,4-Dichlorobenzene			53	58	55	55	68	58	60	51	NS
2H3-1,2,3-Trichlorobenzene			62*	67*	66*	59*	71*	62*	65*	55*	NS

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		B3-OC	T19-OC	T20-OC	T21-OC	T22-OC	T23-OC
	Zenon ID:		052799 95	052800 95	052801 95	052802 95	052803 95	052804 95
	Date Sampled:		95/11/25	95/11/26	95/11/27	95/11/27	95/11/28	95/11/28
Component	**MDL**	**Units**						
1,2-Dichlorobenzene	0.050	ug	<0.20	1.4	1.2	1.7	0.86	0.85
1,3-Dichlorobenzene	0.050	"	<0.20	1.2	1.1	1.1	0.93	1.0
1,4-Dichlorobenzene	0.050	"	0.84	1.4	1.3	1.1	1.3	1.1
1,2,3-Trichlorobenzene	0.050	"	<0.20	1.1	0.55	0.87	0.33	0.37
1,2,4-Trichlorobenzene	0.050	"	<0.20	3.5	1.9	2.1	0.94	1.1
1,3,5-Trichlorobenzene	0.050	"	<0.20	0.39	0.27	0.29	<2.0	<0.20
1,2,3,4-Tetrachlorobenzene	0.050	"	<0.20	1.6	0.39	0.51	<0.20	<0.20
1,2,3,5-1,2,4,5-Tetrachlorobenzene	0.050	"	<0.20	3.2	0.94	1.0	0.44	0.53
Pentachlorobenzene	0.050	"	<0.20	2.2	0.34	0.47	<0.20	<0.20
Hexachlorobenzene	0.050	"	<0.20	0.57	<0.20	<0.20	<0.20	<0.20
Surrogate Recoveries		%						
2H4-1,3-Dichlorobenzene			39	47	42	57	54	47
2H3-1,2,4-Trichlorobenzene			59*	55*	55*	69*	71*	63*
13C6-Hexachlorobenzene			57	56	59	67	67	65
Field Spike		%						
2H4-1,4-Dichlorobenzene			46	52	49	64	66	54
2H3-1,2,3-Trichlorobenzene			59*	55*	55*	69*	71*	63*

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1212MB01**	**1213VC01**	**1219VC01**
1,2-Dichlorobenzene etc.	051002	051661	052193
	051003	051662	052194
	051004	051663	052195
	051005	051664	052196
	051006	051665	052197
	051007	051666	052198
	051008	051667	052199
			052200
			052201
			052798
			052799
			052800
			052801
			052802
			052803
			052804
Analysis Date:	95/12/13	95/12/21	95/12/22
Preparation Date:	95/12/12	95/12/13	95/12/19

PCB Data

ZENON Environmental Laboratories
5555 North Service Road Burlington Ontario Canada L7L 5H7
Tel 905 332 8788 Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/22
Date Reported: 96/01/15

Submission No.: 5L0054
Sample No.: 051002-052798

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
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Solids data is based on dry weight except for biota analyses.
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Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

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COMMENTS: **PCB FINAL REPORT**

"NS" = Not spiked

Certified by: _____

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		Method Blank					B1-OC	T1-OC	T2-OC	T3-OC
Zenon ID:		051002 95	Blank		Blank		051003 95	051004 95	051005 95	051006 95
Date Sampled:		95/11/20	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/20	95/11/17	95/11/18	95/11/18
Component	**Units**									
Chlorobiphenyls	ug	<0.0050	0.19	94	0.18	90	<0.0080	<0.014	<0.014	<0.015
Dichlorobiphenyls	"	0.011	0.23	110	0.22	110	<0.0090	<0.030	<0.018	<0.019
Trichlorobiphenyls	"	<0.0080	0.21	100	0.21	100	<0.0090	<0.022	<0.019	<0.020
Tetrachlorobiphenyls	"	<0.016	0.19	96	0.21	110	<0.013	<0.029	<0.019	<0.010
Pentachlorobiphenyls	"	0.0080	0.22	110	0.21	110	<0.020	<0.015	<0.0090	<0.023
Hexachlorobiphenyls	"	<0.020	0.23	120	0.22	110	<0.0090	<0.010	<0.019	<0.013
Heptachlorobiphenyls	"	<0.018	0.19	97	0.18	89	<0.020	<0.010	<0.021	<0.011
Octachlorobiphenyls	"	<0.016	0.22	110	0.22	110	<0.020	<0.026	<0.021	<0.036
Nonachlorobiphenyls	"	<0.032	0.21	110	0.21	100	<0.028	<0.028	<0.029	<0.029
Decachlorobiphenyl	"	<0.024	0.22	110	0.21	110	<0.040	<0.043	<0.022	<0.042
PCB (total)	"	0.018	2.1	110	2.1	100	<0.040	<0.043	<0.040	<0.042
Internal Recoveries	%									
4-Chlorobiphenyl-13C6		78	69	69	102	102	53	91	93	101
3,3,5,5-Tetrachlorobiphenyl-13C12		103	91	91	108	108	95	105	102	112
2,2,3,3,5,5,6,6-Octachlorobiphenyl-13C12		75	73	73	83	83	70	75	76	85
Decachlorobiphenyl-13C12		92	88	88	98	98	91	93	94	112
Surrogate Recoveries	%									
2,2,3,4,5,5,6-Heptachlorobiphenyl-13C12		NS	NS	NS	NS	NS	92	89	87	99

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		T4-OC	T5-OC	Method Blank					T8-OC	T9-OC
Zenon ID:		051007 95	051008 95	051661 95	Blank		Blank		051662 95	051663 95
Date Sampled:		95/11/19	95/11/19	95/11/21	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/21	95/11/21
Component	**Units**									
Chlorobiphenyls	ug	<0.017	<0.015	<0.0030	0.69	86	0.72	90	<0.020	<0.016
Dichlorobiphenyls	"	<0.021	<0.015	<0.0060	0.73	91	0.73	92	<0.011	<0.012
Trichlorobiphenyls	"	<0.022	<0.023	<0.0030	0.69	86	0.72	90	<0.016	<0.060
Tetrachlorobiphenyls	"	<0.019	<0.018	<0.0060	0.61	76	0.60	75	<0.012	<0.0090
Pentachlorobiphenyls	"	<0.027	<0.025	<0.0070	0.68	85	0.67	84	<0.015	<0.012
Hexachlorobiphenyls	"	<0.013	<0.012	<0.0090	0.68	85	0.68	85	<0.015	<0.012
Heptachlorobiphenyls	"	<0.022	<0.020	<0.010	0.62	78	0.61	77	<0.010	<0.010
Octachlorobiphenyls	"	<0.037	<0.037	<0.014	0.73	92	0.72	91	<0.0090	<0.013
Nonachlorobiphenyls	"	<0.030	<0.030	<0.012	0.69	86	0.70	87	<0.013	<0.010
Decachlorobiphenyl	"	<0.045	<0.044	<0.014	0.62	78	0.62	78	<0.012	<0.0080
PCB (total)	"	<0.045	<0.044	<0.015	6.7	84	6.8	85	<0.016	<0.060
Internal Recoveries	%									
4-Chlorobiphenyl-13C6		85	98	80	80	80	61	61	70	74
3,3,5,5-Tetrachlorobiphenyl-13C12		106	116	88	90	90	73	73	91	87
2,2,3,3,5,5,6,6-Octachlorobiphenyl-13C12		77	78	67	66	66	55	55	73	67
Decachlorobiphenyl-13C12		99	101	86	84	84	68	68	85	88
Surrogate Recoveries	%									
2,2,3,4,5,5,6-Heptachlorobiphenyl-13C12		94	94	NS	NS	NS	NS	NS	98	92

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		T10-OC	T11-OC	T12-OC	T13-OC	Method Blank				
Zenon ID:		051664 95	051665 95	051666 95	051667 95	052193 95	Blank		Blank	
Date Sampled:		95/11/22	95/11/22	95/11/23	95/11/23	95/11/22	Spike #1	% Recoveries	Spike #2	% Recoveries
Component	**Units**									
Chlorobiphenyls	ug	<0.019	<0.029	<0.027	<0.019	<0.0060	0.73	91	0.77	96
Dichlorobiphenyls	"	<0.28	<0.074	<0.054	<0.038	<0.011	0.77	97	0.81	100
Trichlorobiphenyls	"	<0.17	<0.14	<0.075	<0.067	<0.019	0.73	91	0.82	100
Tetrachlorobiphenyls	"	<0.023	<0.021	<0.018	<0.012	<0.011	0.64	80	0.66	82
Pentachlorobiphenyls	"	<0.30	<0.27	<0.20	<0.12	<0.018	0.73	92	0.72	90
Hexachlorobiphenyls	"	<0.018	<0.020	<0.014	<0.011	<0.012	0.73	91	0.74	92
Heptachlorobiphenyls	"	<0.0050	<0.0060	<0.015	<0.0060	<0.010	0.51	64	0.48	59
Octachlorobiphenyls	"	<0.0070	<0.013	<0.011	<0.0050	<0.011	0.72	90	0.73	91
Nonachlorobiphenyls	"	<0.023	<0.012	<0.013	<0.0080	<0.011	0.67	84	0.68	85
Decachlorobiphenyl	"	<0.010	<0.010	<0.012	<0.0090	<0.013	0.63	78	0.62	78
PCB (total)	"	<0.30	<0.27	<0.20	<0.12	<0.019	6.9	86	7.0	88
Internal Recoveries	%									
4-Chlorobiphenyl-13C6		90	74	72	84	52	76	76	68	68
3,3,5,5-Tetrachlorobiphenyl-13C12		96	85	80	95	67	92	92	85	85
2,2,3,3,5,5,6,6-Octachlorobiphenyl-13C12		72	63	59	72	59	78	78	70	70
Decachlorobiphenyl-13C12		85	84	70	86	76	96	96	87	87
Surrogate Recoveries	%									
2,2,3,4,5,5,6-Heptachlorobiphenyl-13C12		99	88	82	98	NS	NS	NS	NS	NS

Client:Rigo Rigo Associates, Inc. Project:Davis County RR

00027

Client ID:		B2-OC	T6-OC	T7-OC	T14-OC	T15-OC	T16-OC	T17-OC	T18-OC
Zenon ID:		052194 95	052195 95	052196 95	052197 95	052198 95	052199 95	052200 95	052201 95
Date Sampled:		95/11/22	95/11/20	95/11/20	95/11/24	95/11/24	95/11/25	95/11/25	95/11/26
Component	**Units**								
Chlorobiphenyls	ug	<0.0060	<0.0070	<0.011	<0.012	<0.0090	<0.012	<0.018	<0.015
Dichlorobiphenyls	"	<0.0090	<0.0090	<0.010	<0.067	<0.023	<0.030	<0.047	<0.036
Trichlorobiphenyls	"	<0.010	<0.0090	<0.022	<0.19	<0.049	<0.10	<0.080	<0.056
Tetrachlorobiphenyls	"	<0.0060	<0.0070	<0.0060	<0.030	<0.016	<0.019	<0.014	<0.0090
Pentachlorobiphenyls	"	<0.012	<0.033	<0.043	<0.52	<0.012	<0.28	<0.21	<0.11
Hexachlorobiphenyls	"	<0.016	<0.0080	<0.013	<0.025	<0.016	<0.012	<0.016	<0.0090
Heptachlorobiphenyls	"	<0.0090	<0.0090	<0.012	<0.012	<0.0080	<0.012	<0.010	<0.011
Octachlorobiphenyls	"	<0.011	<0.012	<0.0080	<0.010	<0.0090	<0.0080	<0.010	<0.010
Nonachlorobiphenyls	"	<0.0070	<0.0070	<0.0070	<0.0090	<0.0070	<0.0080	<0.0080	<0.0090
Decachlorobiphenyl	"	<0.010	<0.0090	<0.0080	<0.011	<0.010	<0.011	<0.011	<0.012
PCB (total)	"	<0.016	<0.034	<0.043	<0.52	<0.049	<0.28	<0.21	<0.11
Internal Recoveries	%								
4-Chlorobiphenyl-13C6		76	79	76	70	94	69	77	66
3,3,5,5-Tetrachlorobiphenyl-13C12		104	100	98	83	96	83	89	92
2,2,3,3,5,5,6,6-Octachlorobiphenyl-13C12		88	76	77	62	74	64	69	70
Decachlorobiphenyl-13C12		106	98	97	83	84	79	84	84
Surrogate Recoveries	%								
2,2,3,4,5,5,6-Heptachlorobiphenyl-13C12		114	104	101	87	98	86	91	94

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Client ID:		Method Blank	B3-OC	T19-OC	T20-OC	T21-OC	T22-OC	T23-OC
Zenon ID:		052798 95	052799 95	052800 95	052801 95	052802 95	052803 95	052804 95
Date Sampled:		95/11/25	95/11/25	95/11/26	95/11/27	95/11/27	95/11/28	95/11/28
Component	**Units**							
Chlorobiphenyls	ug	<0.0060	<0.011	<0.017	<0.018	<0.017	<0.013	<0.017
Dichlorobiphenyls	"	<0.011	<0.010	<0.015	<0.010	<0.015	<0.013	<0.011
Trichlorobiphenyls	"	<0.019	<0.010	<0.042	<0.011	<0.0090	<0.0090	<0.019
Tetrachlorobiphenyls	"	<0.011	<0.0080	<0.012	<0.0080	<0.0070	<0.0090	<0.010
Pentachlorobiphenyls	"	<0.018	<0.0090	<0.094	<0.020	<0.019	<0.013	<0.013
Hexachlorobiphenyls	"	<0.012	<0.0090	<0.014	<0.0090	<0.010	<0.011	<0.0080
Heptachlorobiphenyls	"	<0.010	<0.011	<0.012	<0.010	<0.018	<0.0090	<0.0080
Octachlorobiphenyls	"	<0.011	<0.0080	<0.010	<0.010	<0.0080	<0.0090	<0.0090
Nonachlorobiphenyls	"	<0.011	<0.0080	<0.0090	<0.0080	<0.0080	<0.0080	<0.0070
Decachlorobiphenyl	"	<0.013	<0.011	<0.012	<0.011	<0.010	<0.011	<0.0090
PCB (total)	"	<0.019	<0.011	<0.094	<0.020	<0.019	<0.013	<0.019
Internal Recoveries	%							
4-Chlorobiphenyl-13C6		52	62	66	66	78	77	74
3,3,5,5-Tetrachlorobiphenyl-13C12		67	86	79	83	92	88	95
2,2,3,3,5,5,6,6-Octachlorobiphenyl-13C12		59	73	62	66	71	69	71
Decachlorobiphenyl-13C12		76	88	74	81	89	83	90
Surrogate Recoveries	%							
2,2,3,4,5,5,6-Heptachlorobiphenyl-13C12		NS	95	84	88	96	90	96

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1128FB01**	**1213VC01**	**1219VC01**
Chlorobiphenyls etc.	051002	051661	052193
	051003	051662	052194
	051004	051663	052195
	051005	051664	052196
	051006	051665	052197
	051007	051666	052198
	051008	051667	052199
			052200
			052201
			052798
			052799
			052800
			052801
			052802
			052803
			052804
Analysis Date:	95/12/13	95/12/21	95/12/22
Preparation Date:	95/11/28	95/12/13	95/12/19

Chlorophenol Data

ZENON Environmental Laboratories

5555 North Service Road
Burlington Ontario
Canada L7L 5H7

Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION		LABORATORY INFORMATION	
Attention:	John Chandler	**Contact:**	Ron McLeod/Yvonne Bond
Client Name:	Rigo & Rigo Associates, Inc.	**Project:**	AN951192
Project:	Davis County RR	**Date Received:**	95/11/22
Project Desc:	Analysis of Stack Emissions	**Date Reported:**	96/01/16
Address:	1 Berea Commons Suite 211 Berea, Ohio 44017-2534	**Submission No.:**	5L0054
		Sample No.:	051002
Fax Number:	216-243-2759		
Phone Number:	216-243-5544		

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***"-" = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS: **CHLOROPHENOL FINAL DATA**

Certified by:

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:			Method Blank					B1-OC	T1-OC	T2-OC	T3-OC	T4-OC
Zenon ID:			051002 95	Blank		Blank		051003 95	051004 95	051005 95	051006 95	051007 95
Date Sampled:			95/11/20	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/20	95/11/17	95/11/18	95/11/18	95/11/19
Component	**MDL**	**Units**										
2,3-Dichlorophenol	0.05	ug	<0.20	1.9	95	1.5	76	<0.20	<0.20	<0.20	<0.20	<0.20
2,5-2,4-Dichlorophenol	0.05	"	<0.20	3.7	94	2.8	70	<0.20	<0.95	<0.69	<0.53	<0.49
2,6-Dichlorophenol	0.05	"	<0.20	1.6	80	1.2	60	<0.20	<0.20	<0.20	<0.20	<0.20
3,4-Dichlorophenol	0.05	"	<0.20	1.9	96	1.4	71	<0.20	<0.20	<0.20	<0.20	<0.20
3,5-Dichlorophenol	0.05	"	<0.20	1.9	93	1.4	69	<0.20	<0.20	<0.20	<0.20	<0.20
2,3,4-Trichlorophenol	0.05	"	<0.20	1.8	90	1.5	74	<0.20	0.26	0.21	<0.20	<0.20
2,3,5-Trichlorophenol	0.05	"	<0.20	1.8	92	1.7	86	<0.20	<0.20	<0.20	<0.20	<0.20
2,3,6-Trichlorophenol	0.05	"	<0.20	1.7	86	1.6	81	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	0.05	"	<0.20	1.8	89	1.5	76	<0.20	0.31	0.26	<0.20	<0.20
2,4,6-Trichlorophenol	0.05	"	<0.20	1.9	93	1.5	76	<0.20	3.0	4.7	2.7	2.3
3,4,5-Trichlorophenol	0.05	"	<0.20	1.9	92	1.4	67	<0.20	<0.20	<0.20	<0.20	<0.20
2,3,4,5-Tetrachlorophenol	0.05	"	<0.20	2.0	101	1.9	96	<0.20	<0.20	<0.20	<0.20	<0.20
2,3,4,6-Tetrachlorophenol	0.05	"	<0.20	1.9	95	1.9	94	<0.20	2.5	3.8	2.2	1.6
2,3,5,6-Tetrachlorophenol	0.05	"	<0.20	1.7	87	1.8	91	<0.20	3.1	<0.20	<0.20	<0.20
Pentachlorophenol	0.05	"	<0.20	1.9	95	2.1	105	<0.20	0.69	1.3	0.76	0.45
Surrogate Recoveries		%										
d3-2,4-Dichlorophenol			58	82	82	60	60	41	82	97	157	145
13C6-Pentachlorophenol			81	68	68	78	78	81	79	87	71	74
Field Spike		%										
2,6-Dibromo-4-fluorophenol			NS	NS	NS	NS	NS	53	43	80	83	62

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T5-OC	Method Blank					T8-OC	T9-OC	T10-OC	T11-OC
	Zenon ID:		051008 95	051661 95	Blank		Blank		051662 95	051663 95	051664 95	051665 95
	Date Sampled:		95/11/19	95/11/21	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/21	95/11/21	95/11/22	95/11/22
Component	**MDL**	**Units**										
2,3-Dichlorophenol	0.05	ug	<0.20	<0.20	1.1	57	0.88	44	<0.20	<0.20	<0.20	<0.20
2,5-2,4-Dichlorophenol	0.05	"	<0.48	<0.20	1.6	80	1.2	29	<0.20	<0.20	<0.62	<0.20
2,6-Dichlorophenol	0.05	"	<0.20	<0.20	0.57	29	0.61	31	<0.20	<0.20	<0.20	<0.20
3,4-Dichlorophenol	0.05	"	<0.20	<0.20	1.3	66	1.1	54	<0.20	<0.20	<0.20	<0.20
3,5-Dichlorophenol	0.05	"	<0.20	<0.20	1.4	35	1.1	57	<0.20	<0.20	<0.20	<0.20
2,3,4-Trichlorophenol	0.05	"	<0.20	<0.20	0.80	40	0.74	37	<0.20	<0.20	0.23	<0.20
2,3,5-Trichlorophenol	0.05	"	<0.20	<0.20	1.2	62	1.2	58	<0.20	<0.20	<0.20	<0.20
2,3,6-Trichlorophenol	0.05	"	<0.20	<0.20	1.2	62	1.2	59	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	0.05	"	<0.20	<0.20	0.91	46	0.88	44	<0.20	<0.20	0.32	<0.20
2,4,6-Trichlorophenol	0.05	"	2.9	<0.20	1.2	59	1.0	52	0.47	0.65	1.5	<0.39
3,4,5-Trichlorophenol	0.05	"	<0.20	<0.20	1.9	93	0.90	45	<0.20	<0.20	<0.20	<0.20
2,3,4,5-Tetrachlorophenol	0.05	"	<0.20	<0.20	1.3	66	1.3	64	<0.20	<0.20	0.23	<0.20
2,3,4,6-Tetrachlorophenol	0.05	"	1.0	<0.20	1.4	68	1.3	65	<0.20	0.27	1.6	<0.20
2,3,5,6-Tetrachlorophenol	0.05	"	<0.20	<0.20	1.4	71	1.4	69	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	0.05	"	0.27	<0.20	1.7	85	1.6	81	<0.20	<0.20	0.72	<0.20
Surrogate Recoveries		%										
d3-2,4-Dichlorophenol			125	16	17	17	12	12	41	42	45	46
13C6-Pentachlorophenol			58	44	52	52	47	47	43	45	51	44
Field Spike		%										
2,6-Dibromo-4-fluorophenol			65	NS	NS	NS	NS	NS	15	10	16	23

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	Client ID:		T12-OC	T13-OC	Method Blank					B2-OC	T6-OC	T7-OC
	Zenon ID:		051666 95	051667 95	052193 95	Blank		Blank		052194 95	052195 95	052196 95
	Date Sampled:		95/11/23	95/11/23	95/11/22	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/22	95/11/20	95/11/20
Component	**MDL**	**Units**										
2,3-Dichlorophenol	0.05	ug	<0.20	<0.20	<0.20	1.2	58	0.87	44	<0.20	<0.20	<0.20
2,5-2,4-Dichlorophenol	0.05	"	<0.57	<0.47	<0.20	2.1	53	1.7	42	<0.20	<0.36	<0.47
2,6-Dichlorophenol	0.05	"	<0.20	<0.20	<0.20	0.95	48	0.93	47	<0.20	<0.20	<0.20
3,4-Dichlorophenol	0.05	"	<0.20	<0.20	<0.20	1.1	56	0.70	35	<0.20	<0.20	<0.20
3,5-Dichlorophenol	0.05	"	<0.20	<0.20	<0.20	1.1	56	0.67	34	<0.20	<0.20	<0.20
2,3,4-Trichlorophenol	0.05	"	<0.20	<0.20	<0.20	1.1	53	0.97	49	<0.20	<0.20	<0.20
2,3,5-Trichlorophenol	0.05	"	<0.20	<0.20	<0.20	1.2	59	1.2	61	<0.20	<0.20	<0.20
2,3,6-Trichlorophenol	0.05	"	<0.20	<0.20	<0.20	1.2	59	1.3	67	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	0.05	"	0.20	<0.20	<0.20	1.0	51	0.98	49	<0.20	<0.20	<0.20
2,4,6-Trichlorophenol	0.05	"	1.5	1.4	<0.20	1.1	56	1.3	66	<0.20	2.3	2.5
3,4,5-Trichlorophenol	0.05	"	<0.20	<0.20	<0.20	1.0	50	0.66	33	<0.20	<0.20	<0.20
2,3,4,5-Tetrachlorophenol	0.05	"	<0.20	<0.20	<0.20	1.3	65	1.4	72	<0.20	<0.20	<0.20
2,3,4,6-Tetrachlorophenol	0.05	"	1.2	1.1	<0.20	1.4	69	1.5	75	<0.20	2.1	1.8
2,3,5,6-Tetrachlorophenol	0.05	"	<0.20	<0.20	<0.20	1.4	71	1.6	79	<0.20	<0.20	<0.20
Pentachlorophenol	0.05	"	0.43	0.41	<0.20	1.7	87	1.9	95	<0.20	0.87	0.70
Surrogate Recoveries		%										
d3-2,4-Dichlorophenol			43	47	12	34	45	32	43	54	51	65
13C6-Pentachlorophenol			38	45	53	52	36	58	39	52	52	59
Field Spike		%										
2,6-Dibromo-4-fluorophenol			41	37	NS	NS	NS	NS	NS	39	38	63

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	Client ID:		T14-OC	T15-OC	T16-OC	T17-OC	T18-OC	Method Blank	B3-OC	T19-OC	T20-OC	T21-OC
	Zenon ID:		052197 95	052198 95	052199 95	052200 95	052201 95	052798 95	052799 95	052800 95	052801 95	052802 95
	Date Sampled:		95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/25	95/11/25	95/11/26	95/11/27	95/11/27
Component	**MDL**	**Units**										
2,3-Dichlorophenol	0.05	ug	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,5-2,4-Dichlorophenol	0.05	"	<0.20	<0.22	<1.2	<0.22	<0.64	<0.20	<0.20	<0.67	<0.20	<1.6
2,6-Dichlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3,4-Dichlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3,5-Dichlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,3,4-Trichlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.28	<0.20	<0.20
2,3,5-Trichlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,3,6-Trichlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,4,5-Trichlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	0.21	<0.20	<0.20	0.36	<0.20	<0.20
2,4,6-Trichlorophenol	0.05	"	0.71	0.70	2.4	0.46	2.1	<0.20	<0.20	2.3	<0.20	3.8
3,4,5-Trichlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2,3,4,5-Tetrachlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.27	<0.20	<0.20
2,3,4,6-Tetrachlorophenol	0.05	"	0.22	0.22	0.48	0.32	1.5	<0.20	<0.20	2.1	0.31	0.43
2,3,5,6-Tetrachlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	0.05	"	<0.20	<0.20	<0.20	<0.20	0.54	<0.20	<0.20	1.1	<0.20	<0.20
Surrogate Recoveries		%										
d3-2,4-Dichlorophenol			51	59	67	32	60	12	48	40	37	55
13C6-Pentachlorophenol			50	54	62	53	57	53	57	53	48	53
Field Spike		%										
2,6-Dibromo-4-fluorophenol			51	52	65	12	12	NS	37	29	18	50

	Client ID:		T22-OC	T23-OC
	Zenon ID:		052803 95	052804 95
	Date Sampled:		95/11/28	95/11/28
Component	MDL	Units		
2,3-Dichlorophenol	0.05	ug	<0.20	<0.20
2,5-2,4-Dichlorophenol	0.05	"	<0.20	<0.20
2,6-Dichlorophenol	0.05	"	<0.20	<0.20
3,4-Dichlorophenol	0.05	"	<0.20	<0.20
3,5-Dichlorophenol	0.05	"	<0.20	<0.20
2,3,4-Trichlorophenol	0.05	"	<0.20	<0.20
2,3,5-Trichlorophenol	0.05	"	<0.20	<0.20
2,3,6-Trichlorophenol	0.05	"	<0.20	<0.20
2,4,5-Trichlorophenol	0.05	"	<0.20	<0.20
2,4,6-Trichlorophenol	0.05	"	0.64	0.28
3,4,5-Trichlorophenol	0.05	"	<0.20	<0.20
2,3,4,5-Tetrachlorophenol	0.05	"	<0.20	<0.20
2,3,4,6-Tetrachlorophenol	0.05	"	<0.20	<0.20
2,3,5,6-Tetrachlorophenol	0.05	"	<0.20	<0.20
Pentachlorophenol	0.05	"	<0.20	<0.20
Surrogate Recoveries		%		
d3-2,4-Dichlorophenol			59	8.0
13C6-Pentachlorophenol			64	73
Field Spike		%		
2,6-Dibromo-4-fluorophenol			26	8.0

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1128FB01**	**1213VC01**	**1219VC02**	**0109MB01**
2,3-Dichlorophenol etc.	051002	051661	052193	052804
	051003	051662	052194	
	051004	051663	052195	
	051005	051664	052196	
	051006	051665	052197	
	051007	051666	052198	
	051008	051667	052199	
			052200	
			052201	
			052798	
			052799	
			052800	
			052801	
			052802	
			052803	
			052804	
Analysis Date:	95/12/18	95/12/29	96/01/03	96/01/11
Preparation Date:	95/11/28	95/12/13	95/12/19	96/01/09

PAH Data

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION		LABORATORY INFORMATION	
Attention:	John Chandler	**Contact:**	Ron McLeod/Yvonne Bond
Client Name:	Rigo & Rigo Associates, Inc.	**Project:**	AN951192
Project:	Davis County RR	**Date Received:**	95/10/30
Project Desc:	Analysis of Stack Emissions	**Date Reported:**	96/01/15
Address:	1 Berea Commons Suite 211 Berea, Ohio 44017-2534	**Submission No.:**	5L0054
		Sample No.:	046644-052798
Fax Number:	216-243-2759		
Phone Number:	216-243-5544		

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS: **PAH FINAL REPORT**

"NS"=Not spiked

Certified by:

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		Method Blank					B1-OC	T1-OC	T2-OC	T3-OC
	Zenon ID:		051002 95	Blank		Blank		051003 95	051004 95	051005 95	051006 95
	Date Sampled:		95/11/20	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/20	95/11/17	95/11/18	95/11/18
Component	**MDL**	**Units**									
Naphthalene	0.025	ug	<0.10	2.6	160	2.3	140	2.2	3.5	3.5	3.5
Acenaphthylene	0.025	"	0.69	1.7	110	1.6	98	<0.10	<0.10	<0.10	<0.10
Acenaphthene	0.025	"	<0.10	1.7	110	1.6	100	<0.10	<0.10	<0.10	<0.10
Fluorene	0.025	"	<0.10	1.8	110	1.7	100	<0.10	<0.10	<0.10	<0.10
Phenanthrene	0.025	"	<0.10	1.8	110	1.6	100	<0.10	0.19	0.12	<0.10
Anthracene	0.025	"	<0.10	1.9	120	1.6	100	<0.10	<0.10	<0.10	<0.10
Fluoranthene	0.025	"	<0.10	2.1	130	1.7	110	<0.10	<0.13	<0.10	<0.10
Pyrene	0.025	"	<0.10	2.1	130	1.8	110	<0.10	<0.10	<0.10	<0.10
Benz(a)anthracene	0.025	"	<0.10	1.9	120	1.6	99	<0.10	<0.10	<0.10	<0.10
Chrysene	0.025	"	<0.10	1.9	120	1.6	100	<0.10	<0.10	<0.10	<0.10
Benzo(b)fluoranthene	0.025	"	<0.10	1.6	100	1.4	90	<0.10	<0.10	<0.10	<0.10
Benzo(k)fluoranthene	0.025	"	<0.10	1.9	120	1.7	110	<0.10	<0.10	<0.10	<0.10
Benzo(a)pyrene	0.025	"	<0.10	1.8	110	1.6	99	<0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-cd)pyrene	0.025	"	<0.10	1.4	89	1.4	88	<0.10	<0.10	<0.10	<0.10
Dibenzo(ah)anthracene	0.025	"	<0.10	1.7	100	1.6	100	<0.10	<0.10	<0.10	<0.10
Benzo(ghi)perylene	0.025	"	<0.10	1.6	100	1.6	100	<0.10	<0.10	<0.10	<0.10
Surrogate Recoveries		%									
Anthracene-2H10			82	95	95	82	82	88	81	95	89
Chrysene-2H12			81	98	98	83	83	89	79	84	86
Benzo(a)pyrene-2H12			85	95	95	83	83	89	79	100	92
Field Spike		%									
Fluorene-2H10			NS	NS	NS	NS	NS	87	76	88	85
p-Terphenyl-2H14			NS	NS	NS	NS	NS	98	95	97	91

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T4-OC	T5-OC	Method Blank					T8-OC	T9-OC
	Zenon ID:		051007 95	051008 95	051661 95	Blank		Blank		051662 95	051663 95
	Date Sampled:		95/11/19	95/11/19	95/11/21	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/21	95/11/21
Component	**MDL**	**Units**									
Naphthalene	0.025	ug	3.9	6.2	0.65	2.6	160	2.3	150	2.0	2.7
Acenaphthylene	0.025	"	<0.10	<0.10	<0.10	1.7	110	1.4	86	<0.10	<0.10
Acenaphthene	0.025	"	<0.12	<0.10	<0.10	1.8	120	1.6	99	<0.10	<0.10
Fluorene	0.025	"	<0.10	<0.10	<0.10	1.8	120	1.6	98	<0.10	<0.10
Phenanthrene	0.025	"	<0.10	<0.10	<0.10	1.8	110	1.5	94	0.15	0.20
Anthracene	0.025	"	<0.10	<0.10	<0.10	1.6	100	1.3	83	<0.10	<0.10
Fluoranthene	0.025	"	<0.10	<0.10	<0.10	1.8	110	1.5	95	<0.10	0.16
Pyrene	0.025	"	<0.10	<0.10	<0.10	1.8	120	1.5	96	<0.10	0.14
Benz(a)anthracene	0.025	"	<0.10	<0.10	<0.10	1.8	110	1.6	100	<0.10	<0.10
Chrysene	0.025	"	<0.10	<0.10	<0.10	1.8	110	1.6	99	<0.10	<0.10
Benzo(b)fluoranthene	0.025	"	<0.10	<0.10	<0.10	1.6	98	1.6	98	<0.10	<0.10
Benzo(k)fluoranthene	0.025	"	<0.10	<0.10	<0.10	1.8	110	1.3	81	<0.10	<0.10
Benzo(a)pyrene	0.025	"	<0.10	<0.10	<0.10	1.6	97	1.3	81	<0.10	<0.10
Indeno(1,2,3-cd)pyrene	0.025	"	<0.10	<0.10	<0.10	1.2	77	1.0	64	<0.10	<0.10
Dibenzo(ah)anthracene	0.025	"	<0.10	<0.10	<0.10	1.6	98	1.3	81	<0.10	<0.10
Benzo(ghi)perylene	0.025	"	<0.10	<0.10	<0.10	1.5	95	1.3	78	<0.10	<0.10
Surrogate Recoveries		%									
Anthracene-2H10			89	75	69	76	76	62	62	80	70
Chrysene-2H12			90	82	84	90	90	80	80	93	94
Benzo(a)pyrene-2H12			85	73	74	82	82	69	69	82	81
Field Spike		%									
Fluorene-2H10			90	78	NS	NS	NS	NS	NS	94	82
p-Terphenyl-2H14			104	92	NS	NS	NS	NS	NS	108	101

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	Client ID:		T10-OC	T11-OC	T12-OC	T13-OC	Method Blank				
	Zenon ID:		051664 95	051665 95	051666 95	051667 95	052193 95	Blank		Blank	
	Date Sampled:		95/11/22	95/11/22	95/11/23	95/11/23	95/11/22	Spike #1	% Recoveries	Spike #2	% Recoveries
Component	**MDL**	**Units**									
Naphthalene	0.025	ug	2.5	1.1	3.2	3.9	<0.42	1.5	92	2.3	140
Acenaphthylene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.1	67	1.4	90
Acenaphthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.1	69	1.5	92
Fluorene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.1	70	1.4	87
Phenanthrene	0.025	"	0.20	<0.10	0.12	<0.10	<0.10	1.1	71	1.4	89
Anthracene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.2	77	1.6	100
Fluoranthene	0.025	"	0.19	<0.10	<0.10	<0.10	<0.10	1.4	88	1.6	100
Pyrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.4	89	1.7	100
Benz(a)anthracene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.2	73	1.6	97
Chrysene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.2	75	1.6	99
Benzo(b)fluoranthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.1	66	1.3	82
Benzo(k)fluoranthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.2	77	1.6	100
Benzo(a)pyrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.1	66	1.5	91
Indeno(1,2,3-cd)pyrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	0.81	51	0.99	62
Dibenzo(ah)anthracene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	0.99	62	1.2	76
Benzo(ghi)perylene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	0.95	59	1.2	75
Surrogate Recoveries		%									
Anthracene-2H10			68	58	78	91	62	58	58	77	77
Chrysene-2H12			108	57	97	113	70	60	60	79	79
Benzo(a)pyrene-2H12			65	66	91	106	56	57	57	77	77
Field Spike		%									
Fluorene-2H10			96	60	82	94	NS	NS	NS	NS	NS
p-Terphenyl-2H14			108	72	102	117	NS	NS	NS	NS	NS

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		B2-OC	T6-OC	T7-OC	T14-OC	T15-OC	T16-OC	T17-OC	T18-OC	Method Blank
	Zenon ID:		052194 95	052195 95	052196 95	052197 95	052198 95	052199 95	052200 95	052201 95	052798 95
	Date Sampled:		95/11/22	95/11/20	95/11/20	95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/25
Component	**MDL**	**Units**									
Naphthalene	0.025	ug	1.0	2.8	2.2	2.2	2.2	20	1.8	1.9	0.42
Acenaphthylene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	1.6	<0.10	<0.10	<0.10
Acenaphthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluorene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	0.83	<0.10	0.14	<0.10
Anthracene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	0.38	<0.10	0.16	<0.10
Pyrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	0.41	<0.10	0.11	<0.10
Benz(a)anthracene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chrysene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(b)fluoranthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(k)fluoranthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)pyrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-cd)pyrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dibenzo(ah)anthracene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(ghi)perylene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Surrogate Recoveries		%									
Anthracene-2H10			80	63	74	58	63	69	44	71	62
Chrysene-2H12			78	75	79	67	78	81	76	67	70
Benzo(a)pyrene-2H12			86	61	77	56	66	68	43	69	56
Field Spike		%									
Fluorene-2H10			91	98	94	82	91	93	74	83	NS
p-Terphenyl-2H14			71	94	95	87	84	97	82	80	NS

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	Client ID:		B3-OC	T19-OC	T20-OC	T21-OC	T22-OC	T23-OC
	Zenon ID:		052799 95	052800 95	052801 95	052802 95	052803 95	052804 95
	Date Sampled:		95/11/25	95/11/26	95/11/27	95/11/27	95/11/28	95/11/28
Component	**MDL**	**Units**						
Naphthalene	0.025	ug	1.5	2.3	2.6	11	2.1	2.1
Acenaphthylene	0.025	"	<0.10	<0.10	<0.10	0.12	<0.10	<0.10
Acenaphthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluorene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	0.33
Phenanthrene	0.025	"	<0.10	0.11	<0.10	0.52	<0.10	<0.10
Anthracene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Pyrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benz(a)anthracene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chrysene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(b)fluoranthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(k)fluoranthene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)pyrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-cd)pyrene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dibenzo(ah)anthracene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(ghi)perylene	0.025	"	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Surrogate Recoveries		%						
Anthracene-2H10			71	44	53	54	52	56
Chrysene-2H12			75	69	96	70	83	90
Benzo(a)pyrene-2H12			83	41	41	54	56	40
Field Spike		%						
Fluorene-2H10			81	64	81	77	85	76
p-Terphenyl-2H14			82	73	89	73	85	113

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	Client ID:		Method Blank	B1-OC	T1-OC	T2-OC	T3-OC	T4-OC	T5-OC	Method Blank	T8-OC
	Zenon ID:		051002 95	051003 95	051004 95	051005 95	051006 95	051007 95	051008 95	051661 95	051662 95
	Date Sampled:		95/11/20	95/11/20	95/11/17	95/11/18	95/11/18	95/11/19	95/11/19	95/11/21	95/11/21
Component	**MDL**	**Units**									
Tetralin	0.05	ug	<0.20	<0.34	<1.5	1.3	1.4	1.5	1.8	<0.20	0.94
Quinoline	0.075	"	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Methylnaphthalene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1-Methylnaphthalene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Biphenyl	0.05	"	<0.20	<0.20	0.37	0.57	0.58	0.60	2.1	<0.20	1.4
2-Chloronaphthalene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)fluorene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluorene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
m-Terphenyl	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Terphenyl	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
p-Terphenyl	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylanthracene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1-Methylphenanthrene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
9-Methylphenanthrene (max. value)	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
9,10-Dimethylanthracene	0.20	"	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80
Benzo(b)anthracene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Triphenylene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(e)pyrene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Perylene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
7,12-Dimethylbenzo(a)anthracene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3-Methylcholanthrene	1.0	"	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Dibenzo(a,c)anthracene/Picene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Coronene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenzo(a,c)pyrene	0.1	"	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T9-OC	T10-OC	T11-OC	T12-OC	T13-OC	Method Blank	B2-OC	T6-OC	T7-OC
	Zenon ID:		051663 95	051664 95	051665 95	051666 95	051667 95	052193 95	052194 95	052195 95	052196 95
	Date Sampled:		95/11/21	95/11/22	95/11/22	95/11/23	95/11/23	95/11/22	95/11/22	95/11/20	95/11/20
Component	**MDL**	**Units**									
Tetralin	0.05	ug	1.1	1.0	0.46	1.4	1.7	<0.20	<0.35	<1.3	<1.3
Quinoline	0.075	"	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Methylnaphthalene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1-Methylnaphthalene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Biphenyl	0.05	"	1.1	16	5.9	5.5	4.4	<0.20	<0.20	1.1	1.3
2-Chloronaphthalene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)fluorene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluorene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
m-Terphenyl	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Terphenyl	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
p-Terphenyl	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylanthracene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1-Methylphenanthrene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
9-Methylphenanthrene (max. value)	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
9,10-Dimethylanthracene	0.20	"	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80
Benzo(b)anthracene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Triphenylene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(e)pyrene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Perylene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
7,12-Dimethylbenzo(a)anthracene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3-Methylcholanthrene	1.0	"	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Dibenzo(a,c)anthracene/Picene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Coronene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenzo(a,c)pyrene	0.1	"	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

Zenon Environmental Laboratories - Certificate of Analysis

	Client ID:		T14-OC	T15-OC	T16-OC	T17-OC	T18-OC	Method Blank	B3-OC	T19-OC	T20-OC
	Zenon ID:		052197 95	052198 95	052199 95	052200 95	052201 95	052798 95	052799 95	052800 95	052801 95
	Date Sampled:		95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/25	95/11/25	95/11/26	95/11/27
Component	**MDL**	**Units**									
Tetralin	0.05	ug	<1.1	<1.1	<1.2	<0.96	<0.64	<0.20	<0.28	0.82	<1.7
Quinoline	0.075	"	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-Methylnaphthalene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1-Methylnaphthalene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Biphenyl	0.05	"	5.0	3.3	3.1	1.8	1.8	<0.20	<0.20	1.1	0.51
2-Chloronaphthalene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)fluorene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(b)fluorene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
m-Terphenyl	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Terphenyl	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
p-Terphenyl	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Methylanthracene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1-Methylphenanthrene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
9-Methylphenanthrene (max. value)	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
9,10-Dimethylanthracene	0.20	"	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80
Benzo(b)anthracene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Triphenylene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(e)pyrene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Perylene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
7,12-Dimethylbenzo(a)anthracene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
3-Methylcholanthrene	1.0	"	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Dibenzo(a,c)anthracene/Picene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Coronene	0.05	"	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Dibenzo(a,c)pyrene	0.1	"	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

	Client ID:		T21-OC	T22-OC	T23-OC
	Zenon ID:		052802 95	052803 95	052804 95
	Date Sampled:		95/11/27	95/11/28	95/11/28
Component	**MDL**	**Units**			
Tetralin	0.05	ug	<1.2	<1.0	<1.3
Quinoline	0.075	"	<0.30	<0.30	<0.30
2-Methylnaphthalene	0.05	"	0.34	<0.20	<0.20
1-Methylnaphthalene	0.05	"	0.33	<0.20	<0.20
Biphenyl	0.05	"	1.2	0.51	0.64
2-Chloronaphthalene	0.05	"	<0.20	<0.20	<0.20
Benzo(a)fluorene	0.05	"	<0.20	<0.20	<0.20
Benzo(b)fluorene	0.05	"	<0.20	<0.20	<0.20
m-Terphenyl	0.05	"	<0.20	<0.20	<0.20
o-Terphenyl	0.05	"	<0.20	<0.20	<0.20
p-Terphenyl	0.05	"	<0.20	<0.20	<0.20
2-Methylanthracene	0.05	"	<0.20	<0.20	<0.20
1-Methylphenanthrene	0.05	"	<0.20	<0.20	<0.20
9-Methylphenanthrene (max. value)	0.05	"	<0.20	<0.20	<0.20
9,10-Dimethylanthracene	0.20	"	<0.80	<0.80	<0.80
Benzo(b)anthracene	0.05	"	<0.20	<0.20	<0.20
Triphenylene	0.05	"	<0.20	<0.20	<0.20
Benzo(e)pyrene	0.05	"	<0.20	<0.20	<0.20
Perylene	0.05	"	<0.20	<0.20	<0.20
7,12-Dimethylbenzo(a)anthracene	0.05	"	<0.20	<0.20	<0.20
3-Methylcholanthrene	1.0	"	<4.0	<4.0	<4.0
Dibenzo(a,c)anthracene/Picene	0.05	"	<0.20	<0.20	<0.20
Coronene	0.05	"	<0.20	<0.20	<0.20
Dibenzo(a,c)pyrene	0.1	"	<0.4	<0.4	<0.4

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1103MB01**	**1128FB01**	**1213VC01**	**1219VC01**	**0109MB01**
Naphthalene etc.	046644	051002	051661	052193	052801
		051003	051662	052194	052804
		051004	051663	052195	
		051005	051664	052196	
		051006	051665	052197	
		051007	051666	052198	
		051008	051667	052199	
				052200	
				052201	
				052798	
				052799	
				052800	
				052801	
				052802	
				052803	
				052804	
Analysis Date:	95/11/03	95/12/19	95/12/29	96/01/04	96/01/11
Preparation Date:	95/11/03	95/11/28	95/12/13	95/12/19	96/01/09

PCDD/F DB5 Column Data

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION		LABORATORY INFORMATION	
Attention:	John Chandler	**Contact:**	Ron McLeod/Yvonne Bond
Client Name:	Rigo & Rigo Associates, Inc.	**Project:**	AN951192
Project:	Davis County RR	**Date Received:**	95/11/22
Project Desc:	Analysis of Stack Emissions	**Date Reported:**	96/01/15
Address:	1 Berea Commons Suite 211 Berea, Ohio 44017-2534	**Submission No.:**	5L0054
		Sample No.:	051002
Fax Number:	216-243-2759		
Phone Number:	216-243-5544		

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS: **PCDD/F FINAL REPORT**

"NS" = Not spiked

Certified by: _____

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		Method Blank		Blank		Blank		B1-OC		T1-OC		T2-OC	
Zenon ID:		051002 95		Spike #1	% Recoveries	Spike #2	% Recoveries	051003 95		051004 95		051005 95	
Date Sampled:		95/11/20						95/11/20		95/11/17		95/11/18	
Component	**Units**												
PCDD/F / # of isomers													
Total Cl4-Dibenzofurans	pg	6.4	1	4600	91	4500	90	4.7	1	40000	18	45000	18
Total Cl5-Dibenzofurans	"	<4.0	0	12000	123	12000	123	<3.2	0	33000	15	27000	16
Total Cl6-Dibenzofurans	"	23	1	24000	121	24000	118	20	1	13000	11	8900	11
Total Cl7-Dibenzofurans	"	<5.7	0	12000	123	12000	124	<6.6	0	6800	4	4100	4
Cl8-Dibenzofuran	"	37	1	11000	107	11000	108	17	1	600	1	390	1
Total Cl4-Dibenzo-p-dioxins	"	<4.4	0	5900	119	5900	118	14	1	8600	15	6800	15
Total Cl5-Dibenzo-p-dioxins	"	5.9	1	5400	107	5300	107	7.2	1	12000	11	5700	13
Total Cl6-Dibenzo-p-dioxins	"	<6.3	0	18000	122	18000	118	20	2	12000	7	5900	7
Total Cl7-Dibenzo-p-dioxins	"	9.0	1	5600	112	5600	113	11	1	13000	2	6200	2
Cl8-Dibenzo-p-dioxin	"	38	1	12000	117	12000	119	24	1	10000	1	5100	1
Internal Recoveries	%												
2,3,7,8-T4CDF-13C-12		104	-	91	91	92	92	98	-	114	-	115	-
2,3,7,8-T4CDD-13C-12		101	-	71	71	73	73	83	-	92	-	89	-
1,2,3,7,8-P5CDF-13C-12		101	-	90	90	94	94	94	-	114	-	106	-
1,2,3,7,8-P5CDD-13C-12		120	-	115	115	117	117	113	-	124	-	127	-
1,2,3,6,7,8-H6CDF-13C-12		92	-	86	86	87	87	114	-	115	-	107	-
1,2,3,6,7,8-H6CDD-13C-12		87	-	86	86	85	85	108	-	110	-	101	-
1,2,3,4,6,7,8-H7CDF-13C-12		99	-	96	96	98	98	99	-	99	-	94	-
1,2,3,4,6,7,8-H7CDD-13C-12		97	-	103	103	106	106	104	-	105	-	100	-
OCDD-13C-12		91	-	101	101	103	103	98	-	105	-	94	-
Surrogate Recoveries	%												
2,3,7,8-T4CDD-37Cl4		NS	-	NS	NS	NS	NS	90	-	95	-	92	-
2,3,4,7,8-P5CDF-13C-12		NS	-	NS	NS	NS	NS	106	-	109	-	111	-
1,2,3,4,7,8-H6CDF-13C-12		NS	-	NS	NS	NS	NS	80	-	85	-	88	-
1,2,3,4,7,8-H6CDD-13C-12		NS	-	NS	NS	NS	NS	84	-	91	-	90	-
1,2,3,4,7,8,9-H7CDF-13C-12		NS	-	NS	NS	NS	NS	101	-	106	-	107	-
Alternate	%												
1,2,3,7,8,9-H6CDF-13C-12		101	-	113	113	112	112	104	-	115	-	111	-

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		T3-OC		T4-OC		T5-OC		Method Blank		Blank		Blank	
Zenon ID:		051006 95		051007 95		051008 95		051661 95		Spike #1	% Recoveries	Spike #2	% Recoveries
Date Sampled:		95/11/18		95/11/19		95/11/19		95/11/21					
Component	**Units**												
PCDD/F / # of isomers													
Total Cl4-Dibenzofurans	pg	34000	18	11000	16	3600	17	8.2	1	6200	125	6300	125
Total Cl5-Dibenzofurans	"	27000	17	10000	14	3100	11	6.3	2	13000	127	14000	129
Total Cl6-Dibenzofurans	"	11000	11	4900	11	1800	11	52	4	26000	128	27000	130
Total Cl7-Dibenzofurans	"	5300	4	2700	4	1100	4	23	2	12000	123	12000	122
Cl8-Dibenzofuran	"	650	1	380	1	210	1	67	1	13000	130	13000	128
Total Cl4-Dibenzo-p-dioxins	"	5500	15	2000	15	910	15	<5.2	0	5400	109	5400	108
Total Cl5-Dibenzo-p-dioxins	"	5700	11	2800	11	900	10	11	1	6100	123	6100	121
Total Cl6-Dibenzo-p-dioxins	"	6400	7	3600	7	2000	7	27	2	19000	127	23000	125
Total Cl7-Dibenzo-p-dioxins	"	6700	2	4000	2	2300	2	42	2	6100	122	6000	120
Cl8-Dibenzo-p-dioxin	"	5900	1	3900	1	2400	1	79	1	12000	121	12000	123
Internal Recoveries	%												
2,3,7,8-T4CDF-13C-12		117	-	123	-	111	-	99	-	105	105	121	121
2,3,7,8-T4CDD-13C-12		95	-	100	-	89	-	89	-	92	92	96	96
1,2,3,7,8-P5CDF-13C-12		102	-	112	-	102	-	122	-	123	123	127	127
1,2,3,7,8-P5CDD-13C-12		122	-	124	-	124	-	117	-	117	117	122	122
1,2,3,6,7,8-H6CDF-13C-12		100	-	108	-	108	-	116	-	115	115	92	92
1,2,3,6,7,8-H6CDD-13C-12		98	-	101	-	101	-	92	-	88	88	71	71
1,2,3,4,6,7,8-H7CDF-13C-12		91	-	98	-	96	-	116	-	108	108	95	95
1,2,3,4,6,7,8-H7CDD-13C-12		101	-	108	-	105	-	99	-	92	92	78	78
OCDD-13C-12		94	-	103	-	96	-	91	-	91	91	70	70
Surrogate Recoveries	%												
2,3,7,8-T4CDD-37Cl4		89	-	90	-	89	-	NS	-	NS	NS	NS	NS
2,3,4,7,8-P5CDF-13C-12		107	-	107	-	111	-	NS	-	NS	NS	NS	NS
1,2,3,4,7,8-H6CDF-13C-12		91	-	92	-	90	-	NS	-	NS	NS	NS	NS
1,2,3,4,7,8-H6CDD-13C-12		83	-	93	-	86	-	NS	-	NS	NS	NS	NS
1,2,3,4,7,8,9-H7CDF-13C-12		109	-	109	-	107	-	NS	-	NS	NS	NS	NS
Alternate	%												
1,2,3,7,8,9-H6CDF-13C-12		113	-	118	-	117	-	90	-	120	120	125	125

Client ID:		T8-OC		T9-OC		T10-OC		T11-OC		T12-OC		T13-OC	
Zenon ID:		051662 95		051663 95		051664 95		051665 95		051666 95		051667 95	
Date Sampled:		95/11/21		95/11/21		95/11/22		95/11/22		95/11/23		95/11/23	
Component	**Units**												
PCDD/F / # of isomers													
Total Cl4-Dibenzofurans	pg	1700	17	2100	16	64000	19	990	16	64000	17	47000	18
Total Cl5-Dibenzofurans	"	2000	16	2400	16	53000	16	1100	14	55000	16	41000	16
Total Cl6-Dibenzofurans	"	1400	11	1600	11	21000	12	740	9	20000	12	17000	12
Total Cl7-Dibenzofurans	"	720	3	1100	4	7000	4	510	4	6400	4	7600	4
Cl8-Dibenzofuran	"	150	1	350	1	670	1	280	1	550	1	900	1
Total Cl4-Dibenzo-p-dioxins	"	720	14	550	14	6200	15	290	14	9200	15	7000	15
Total Cl5-Dibenzo-p-dioxins	"	1900	11	1500	11	10000	12	310	8	11000	11	9700	11
Total Cl6-Dibenzo-p-dioxins	"	4700	7	3200	7	9300	7	850	7	9700	7	11000	7
Total Cl7-Dibenzo-p-dioxins	"	5500	2	4100	2	6400	2	990	2	8000	2	10000	2
Cl8-Dibenzo-p-dioxin	"	5500	1	4400	1	5000	1	1300	1	6400	1	9400	1
Internal Recoveries	%												
2,3,7,8-T4CDF-13C-12		123	-	129	-	103	-	69	-	129	-	129	-
2,3,7,8-T4CDD-13C-12		94	-	106	-	105	-	58	-	87	-	97	-
1,2,3,7,8-P5CDF-13C-12		124	-	123	-	106	-	65	-	119	-	126	-
1,2,3,7,8-P5CDD-13C-12		122	-	121	-	95	-	66	-	120	-	123	-
1,2,3,6,7,8-H6CDF-13C-12		97	-	92	-	109	-	68	-	88	-	98	-
1,2,3,6,7,8-H6CDD-13C-12		82	-	77	-	81	-	62	-	74	-	75	-
1,2,3,4,6,7,8-H7CDF-13C-12		88	-	84	-	95	-	57	-	86	-	89	-
1,2,3,4,6,7,8-H7CDD-13C-12		83	-	79	-	89	-	58	-	78	-	83	-
OCDD-13C-12		76	-	70	-	80	-	51	-	68	-	72	-
Surrogate Recoveries	%												
2,3,7,8-T4CDD-37Cl4		91	-	90	-	87	-	90	-	89	-	91	-
2,3,4,7,8-P5CDF-13C-12		117	-	122	-	111	-	114	-	126	-	127	-
1,2,3,4,7,8-H6CDF-13C-12		98	-	104	-	92	-	103	-	103	-	91	-
1,2,3,4,7,8-H6CDD-13C-12		121	-	130	-	124	-	110	-	129	-	126	-
1,2,3,4,7,8,9-H7CDF-13C-12		106	-	112	-	105	-	111	-	102	-	102	-
Alternate	%												
1,2,3,7,8,9-H6CDF-13C-12		124	-	121	-	129	-	86	-	125	-	130	-

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		Method Blank		Blank		Blank		B2-OC		T6-OC		T7-OC	
Zenon ID:		052193 / 052798		Spike #1	% Recoveries	Spike #2	% Recoveries	052194 95		052195 95		052196 95	
Date Sampled:		95/11/22						95/11/22		95/11/20		95/11/20	
Component	**Units**												
PCDD/F / # of isomers													
Total Cl4-Dibenzofurans	pg	15	2	4900	98	5000	101	18	2	47000	18	39000	17
Total Cl5-Dibenzofurans	"	14	2	12000	123	13000	125	31	5	38000	16	30000	16
Total Cl6-Dibenzofurans	"	62	3	24000	122	25000	125	57	5	16000	12	13000	12
Total Cl7-Dibenzofurans	"	36	2	12000	123	13000	126	38	3	7300	4	6000	4
Cl8-Dibenzofuran	"	98	1	11000	114	12000	119	43	1	890	1	820	1
Total Cl4-Dibenzo-p-dioxins	"	5.7	1	4600	91	4700	93	14	1	5100	15	4600	15
Total Cl5-Dibenzo-p-dioxins	"	25	2	5400	109	5600	113	16	2	6100	10	5300	11
Total Cl6-Dibenzo-p-dioxins	"	60	4	18000	123	19000	127	91	6	9200	7	8000	7
Total Cl7-Dibenzo-p-dioxins	"	41	2	5600	111	5800	115	100	2	7900	2	7400	2
Cl8-Dibenzo-p-dioxin	"	87	1	12000	121	12000	125	150	1	6600	1	6600	1
Internal Recoveries	%												
2,3,7,8-T4CDF-13C-12		81	-	85	85	84	84	100	-	81	-	105	-
2,3,7,8-T4CDD-13C-12		77	-	96	96	93	93	97	-	83	-	99	-
1,2,3,7,8-P5CDF-13C-12		89	-	88	88	88	88	110	-	88	-	110	-
1,2,3,7,8-P5CDD-13C-12		91	-	95	95	95	95	116	-	95	-	114	-
1,2,3,6,7,8-H6CDF-13C-12		82	-	97	97	95	95	99	-	99	-	99	-
1,2,3,6,7,8-H6CDD-13C-12		73	-	85	85	87	87	91	-	83	-	91	-
1,2,3,4,6,7,8-H7CDF-13C-12		86	-	88	88	93	93	88	-	89	-	92	-
1,2,3,4,6,7,8-H7CDD-13C-12		85	-	88	88	91	91	92	-	92	-	95	-
OCDD-13C-12		86	-	86	86	92	92	86	-	97	-	89	-
Surrogate Recoveries	%												
2,3,7,8-T4CDD-37Cl4		NS	-	NS	NS	NS	NS	85	-	86	-	88	-
2,3,4,7,8-P5CDF-13C-12		NS	-	NS	NS	NS	NS	109	-	117	-	113	-
1,2,3,4,7,8-H6CDF-13C-12		NS	-	NS	NS	NS	NS	88	-	90	-	97	-
1,2,3,4,7,8-H6CDD-13C-12		NS	-	NS	NS	NS	NS	86	-	111	-	93	-
1,2,3,4,7,8,9-H7CDF-13C-12		NS	-	NS	NS	NS	NS	106	-	114	-	114	-
Alternate	%												
1,2,3,7,8,9-H6CDF-13C-12		90	-	96	96	90	90	90	-	89	-	95	-

Client ID:		T14-OC		T15-OC		T16-OC		T17-OC		T18-OC		B3-OC		T19-OC	
Zenon ID:		052197 95		052198 95		052199 95		052200 95		052201 95		052799 95		052800 95	
Date Sampled:		95/11/24		95/11/24		95/11/25		95/11/25		95/11/26		95/11/25		95/11/26	
Component	**Units**														
PCDD/F / # of isomers															
Total Cl4-Dibenzofurans	pg	1500	17	510	15	1400	17	1400	18	42000	18	46	7	93000	19
Total Cl5-Dibenzofurans	"	1600	16	560	14	1000	14	1000	15	27000	16	55	6	70000	16
Total Cl6-Dibenzofurans	"	900	10	400	11	560	11	480	12	9700	12	79	6	37000	12
Total Cl7-Dibenzofurans	"	470	3	290	4	270	3	250	4	3600	4	57	3	16000	4
Cl8-Dibenzofuran	"	110	1	150	1	75	1	130	1	420	1	95	1	3000	1
Total Cl4-Dibenzo-p-dioxins	"	270	14	120	9	270	13	200	12	4300	15	20	2	14000	15
Total Cl5-Dibenzo-p-dioxins	"	450	10	230	12	330	9	250	10	3600	10	44	3	21000	11
Total Cl6-Dibenzo-p-dioxins	"	1100	7	560	7	940	7	660	7	4700	7	130	6	18000	7
Total Cl7-Dibenzo-p-dioxins	"	1400	2	670	2	930	2	610	2	3700	2	130	2	12000	2
Cl8-Dibenzo-p-dioxin	"	1500	1	810	1	1000	1	560	1	3300	1	240	1	8800	1
Internal Recoveries	%														
2,3,7,8-T4CDF-13C-12		80	-	110	-	112	-	106	-	109	-	107	-	96	-
2,3,7,8-T4CDD-13C-12		82	-	103	-	104	-	102	-	98	-	105	-	95	-
1,2,3,7,8-P5CDF-13C-12		93	-	119	-	117	-	111	-	110	-	121	-	90	-
1,2,3,7,8-P5CDD-13C-12		101	-	121	-	122	-	113	-	111	-	117	-	83	-
1,2,3,6,7,8-H6CDF-13C-12		97	-	99	-	108	-	98	-	98	-	100	-	87	-
1,2,3,6,7,8-H6CDD-13C-12		85	-	91	-	85	-	78	-	78	-	92	-	76	-
1,2,3,4,6,7,8-H7CDF-13C-12		86	-	96	-	96	-	89	-	88	-	103	-	84	-
1,2,3,4,6,7,8-H7CDD-13C-12		88	-	96	-	95	-	87	-	87	-	99	-	82	-
OCDD-13C-12		88	-	89	-	88	-	78	-	84	-	86	-	74	-
Surrogate Recoveries	%														
2,3,7,8-T4CDD-37Cl4		88	-	87	-	89	-	84	-	87	-	86	-	83	-
2,3,4,7,8-P5CDF-13C-12		118	-	113	-	115	-	114	-	117	-	122	-	106	-
1,2,3,4,7,8-H6CDF-13C-12		89	-	101	-	90	-	92	-	96	-	96	-	100	-
1,2,3,4,7,8-H6CDD-13C-12		105	-	97	-	114	-	124	-	128	-	103	-	112	-
1,2,3,4,7,8,9-H7CDF-13C-12		111	-	108	-	107	-	107	-	109	-	104	-	104	-
Alternate	%														
1,2,3,7,8,9-H6CDF-13C-12		92	-	92	-	91	-	88	-	88	-	84	-	86	-

Client ID:		T20-OC		T21-OC		T22-OC		T23-OC	
Zenon ID:		052801 95		052802 95		052803 95		052804 95	
Date Sampled:		95/11/27		95/11/27		95/11/28		95/11/28	
Component	**Units**								
PCDD/F / # of isomers									
Total Cl4-Dibenzofurans	pg	3500	18	2700	18	500	15	470	15
Total Cl5-Dibenzofurans	"	3400	16	1500	12	560	14	540	13
Total Cl6-Dibenzofurans	"	2000	12	1200	12	390	11	430	11
Total Cl7-Dibenzofurans	"	1000	4	260	3	240	4	290	4
Cl8-Dibenzofuran	"	200	1	180	1	62	1	110	1
Total Cl4-Dibenzo-p-dioxins	"	560	15	1900	14	130	10	110	10
Total Cl5-Dibenzo-p-dioxins	"	820	11	960	9	180	8	160	9
Total Cl6-Dibenzo-p-dioxins	"	1400	7	1700	7	450	7	500	7
Total Cl7-Dibenzo-p-dioxins	"	1400	2	1400	2	450	2	640	2
Cl8-Dibenzo-p-dioxin	"	1400	1	1500	1	510	1	870	1
Internal Recoveries	%								
2,3,7,8-T4CDF-13C-12		85	-	101	-	114	-	113	-
2,3,7,8-T4CDD-13C-12		80	-	101	-	104	-	105	-
1,2,3,7,8-P5CDF-13C-12		81	-	98	-	99	-	97	-
1,2,3,7,8-P5CDD-13C-12		78	-	99	-	97	-	98	-
1,2,3,6,7,8-H6CDF-13C-12		88	-	99	-	96	-	96	-
1,2,3,6,7,8-H6CDD-13C-12		72	-	80	-	77	-	75	-
1,2,3,4,6,7,8-H7CDF-13C-12		82	-	92	-	87	-	85	-
1,2,3,4,6,7,8-H7CDD-13C-12		80	-	90	-	86	-	84	-
OCDD-13C-12		68	-	79	-	76	-	74	-
Surrogate Recoveries	%								
2,3,7,8-T4CDD-37Cl4		83	-	84	-	82	-	83	-
2,3,4,7,8-P5CDF-13C-12		108	-	113	-	112	-	116	-
1,2,3,4,7,8-H6CDF-13C-12		91	-	92	-	93	-	91	-
1,2,3,4,7,8-H6CDD-13C-12		117	-	121	-	125	-	128	-
1,2,3,4,7,8,9-H7CDF-13C-12		105	-	104	-	108	-	109	-
Alternate	%								
1,2,3,7,8,9-H6CDF-13C-12		85	-	90	-	85	-	87	-

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1128FB01**	**1213VC01**	**1213VC01**	**1213VC01**	**1213VC01**	**1219VC01**	**1219VC01**
Total Cl4-Dibenzofurans etc.	051002	051661	051662	051665	052193	052195	052798
	051003		051663		052194	052196	052799
	051004		051664		052197	052201	052800
	051005		051666		052198	052798	052801
	051006		051667		052199		052802
	051007				052200		052803
	051008						052804
Analysis Date:	95/12/04	95/12/19	95/12/20	96/01/13	95/12/27	95/12/27	95/12/28
Preparation Date:	95/11/28	95/12/13	95/12/13	95/12/13	95/12/13	95/12/19	95/12/19

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/22
Date Reported: 96/01/15

Submission No.: 5L0054
Sample No.: 051002

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***"-" = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS:

"*" = TEF and Maximum TEF based on NATO Factors

Certified by: _____

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		Method Blank					B1-OC	T1-OC	T2-OC	T3-OC
Zenon ID:		051002 95	Blank		Blank		051003 95	051004 95	051005 95	051006 95
Date Sampled:		95/11/20	Spike #1	% Recovery	Spike #2	% Recovery	95/11/20	95/11/17	95/11/18	95/11/18
Component	**Units**									
2,3,7,8-Cl4-Dibenzofuran (DB5)	pg	6.4	4600	91	4500	90	4.7	4700	4600	3700
2,3,7,8-Cl4-Dibenzo-p-dioxin	"	<4.4	5900	119	5900	118	14	540	410	340
1,2,3,7,8-Cl5-Dibenzofuran	"	<4.0	5900	118	5900	119	<3.2	2200	1800	1800
2,3,4,7,8-Cl5-Dibenzofuran	"	<4.0	6400	128	6400	127	<3.3	2500	1800	1800
1,2,3,7,8-Cl5-Dibenzo-p-dioxin	"	5.9	5400	107	5300	107	7.2	950	550	530
1,2,3,4,7,8-Cl6-Dibenzofuran	"	<5.7	5900	118	6000	121	<4.5	2900	2000	2300
1,2,3,6,7,8-Cl6-Dibenzofuran	"	<3.8	5500	111	5600	111	<3.0	1300	910	1100
2,3,4,6,7,8-Cl6-Dibenzofuran	"	<5.6	6400	127	6200	123	<4.4	1400	940	1200
1,2,3,7,8,9-Cl6-Dibenzofuran	"	29	6400	128	6100	121	26	<100	<82	<120
1,2,3,4,7,8-Cl6-Dibenzo-p-dioxin	"	<7.8	5800	117	5300	105	14	600	300	280
1,2,3,6,7,8-Cl6-Dibenzo-p-dioxin	"	<5.2	6000	121	6200	125	6.9	900	460	480
1,2,3,7,8,9-Cl6-Dibenzo-p-dioxin	"	<6.5	6300	127	6000	121	<6.0	1300	640	680
1,2,3,4,6,7,8-Cl7-Dibenzofuran	"	<5.1	6300	125	6300	125	<5.9	4300	2600	3100
1,2,3,4,7,8,9-Cl7-Dibenzofuran	"	<6.4	6000	120	6100	123	<7.4	350	230	390
1,2,3,4,6,7,8-Cl7-Dibenzo-p-dioxin	"	9.0	5600	112	5600	113	11	6400	3100	3400
1,2,3,4,6,7,8,9-Cl8-Dibenzofuran	"	37	11000	107	11000	108	17	600	390	650
1,2,3,4,6,7,8,9-Cl8-Dibenzo-p-dioxin	"	38	12000	117	12000	119	24	10000	5100	5900
2,3,7,8 Toxic Equivalence*	pg	6.6	-	-	-	-	23	3800	2700	2600
Maximum Toxic Equivalence	"	<17	-	-	-	-	<26	<3800	<2700	<2600

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		T4-OC	T5-OC	Method Blank					T8-OC	T9-OC
Zenon ID:		051007 95	051008 95	051661 95	Blank		Blank		051662 95	051663 95
Date Sampled:		95/11/19	95/11/19	95/11/21	Spike #1	% Recoveries	Spike #2	% Recoveries	95/11/21	95/11/21
Component	**Units**									
2,3,7,8-Cl4-Dibenzofuran (DB5)	pg	1300	470	8.2	6200	125	6300	125	270	330
2,3,7,8-Cl4-Dibenzo-p-dioxin	"	120	43	<5.2	5400	109	5400	108	26	29
1,2,3,7,8-Cl5-Dibenzofuran	"	680	180	3.0	6500	128	6500	128	110	130
2,3,4,7,8-Cl5-Dibenzofuran	"	730	270	3.3	6600	126	7000	129	170	180
1,2,3,7,8-Cl5-Dibenzo-p-dioxin	"	250	78	11	6100	123	6100	121	69	63
1,2,3,4,7,8-Cl6-Dibenzofuran	"	1100	380	3.8	6700	128	6700	130	290	320
1,2,3,6,7,8-Cl6-Dibenzofuran	"	480	170	5.2	6300	126	6500	129	150	160
2,3,4,6,7,8-Cl6-Dibenzofuran	"	560	240	4.8	6500	129	7100	130	220	260
1,2,3,7,8,9-Cl6-Dibenzofuran	"	<63	<47	46	6100	122	6400	127	44	53
1,2,3,4,7,8-Cl6-Dibenzo-p-dioxin	"	170	79	<8.1	6500	129	8300	127	130	120
1,2,3,6,7,8-Cl6-Dibenzo-p-dioxin	"	260	150	8.8	6600	125	6700	124	330	230
1,2,3,7,8,9-Cl6-Dibenzo-p-dioxin	"	380	180	17	6000	120	8100	122	360	280
1,2,3,4,6,7,8-Cl7-Dibenzofuran	"	1600	630	10	6600	118	6300	127	520	620
1,2,3,4,7,8,9-Cl7-Dibenzofuran	"	190	100	13	5600	111	5800	115	71	98
1,2,3,4,6,7,8-Cl7-Dibenzo-p-dioxin	"	2000	1200	29	6100	122	6000	120	2800	2100
1,2,3,4,6,7,8,9-Cl8-Dibenzofuran	"	380	210	67	13000	130	13000	128	150	350
1,2,3,4,6,7,8,9-Cl8-Dibenzo-p-dioxin	"	3900	2400	79	12000	121	12000	123	5500	4400
2,3,7,8 Toxic Equivalence*	pg	1100	410	17	-	-	-	-	370	370
Maximum Toxic Equivalence	"	<1100	<420	<23	-	-	-	-	<370	<370

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		T10-OC	T11-OC	T12-OC	T13-OC	Method Blank				
Zenon ID:		051664 95	051665 95	051666 95	051667 95	052193 / 052798	Blank		Blank	
Date Sampled:		95/11/22	95/11/22	95/11/23	95/11/23	95/11/22	Spike #1	% Recoveries	Spike #2	% Recoveries
Component	**Units**									
2,3,7,8-Cl4-Dibenzofuran (DB5)	pg	6600	120	7400	5600	11	4900	99	5000	101
2,3,7,8-Cl4-Dibenzo-p-dioxin	"	560	37	630	500	5.7	4600	91	4700	93
1,2,3,7,8-Cl5-Dibenzofuran	"	4100	93	4100	2900	5.6	6200	123	6200	124
2,3,4,7,8-Cl5-Dibenzofuran	"	3500	96	3600	3100	8.7	6100	123	6300	126
1,2,3,7,8-Cl5-Dibenzo-p-dioxin	"	1200	54	1200	1100	18	5400	109	5600	113
1,2,3,4,7,8-Cl6-Dibenzofuran	"	4200	140	4000	3500	6.9	6400	127	6000	120
1,2,3,6,7,8-Cl6-Dibenzofuran	"	2400	88	2300	1800	<8.7	5800	116	6400	128
2,3,4,6,7,8-Cl6-Dibenzofuran	"	1800	92	2000	1900	12	6100	121	6400	128
1,2,3,7,8,9-Cl6-Dibenzofuran	"	180	39	160	180	53	6200	124	6100	121
1,2,3,4,7,8-Cl6-Dibenzo-p-dioxin	"	700	74	680	740	13	6500	129	6500	130
1,2,3,6,7,8-Cl6-Dibenzo-p-dioxin	"	700	84	730	830	15	5800	116	6100	122
1,2,3,7,8,9-Cl6-Dibenzo-p-dioxin	"	1200	120	1300	1400	27	6200	124	6500	130
1,2,3,4,6,7,8-Cl7-Dibenzofuran	"	4600	260	4400	4900	15	6200	125	6300	127
1,2,3,4,7,8,9-Cl7-Dibenzofuran	"	380	76	290	400	21	6100	121	6300	126
1,2,3,4,6,7,8-Cl7-Dibenzo-p-dioxin	"	3200	520	3800	5000	32	5600	111	5800	115
1,2,3,4,6,7,8,9-Cl8-Dibenzofuran	"	670	280	550	900	98	11000	114	12000	119
1,2,3,4,6,7,8,9-Cl8-Dibenzo-p-dioxin	"	5000	1300	6400	9400	87	12000	121	12000	125
2,3,7,8 Toxic Equivalence*	pg	5000	200	5200	4400	34	-	-	-	-
Maximum Toxic Equivalence	"	<5000	<200	<5200	<4400	<35	-	-	-	-

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		B2-OC	T6-OC	T7-OC	T14-OC	T15-OC	T16-OC	T17-OC	T18-OC	B3-OC
Zenon ID:		052194 95	052195 95	052196 95	052197 95	052198 95	052199 95	052200 95	052201 95	052799 95
Date Sampled:		95/11/22	95/11/20	95/11/20	95/11/24	95/11/24	95/11/25	95/11/25	95/11/26	95/11/25
Component	**Units**									
2,3,7,8-Cl4-Dibenzofuran (DB5)	pg	13	5300	4500	220	84	160	150	4300	15
2,3,7,8-Cl4-Dibenzo-p-dioxin	"	14	400	350	26	18	20	20	330	15
1,2,3,7,8-Cl5-Dibenzofuran	"	7.0	2600	2300	120	44	66	65	2000	10
2,3,4,7,8-Cl5-Dibenzofuran	"	7.8	2700	1900	140	52	76	69	1900	9.9
1,2,3,7,8-Cl5-Dibenzo-p-dioxin	"	11	930	740	54	22	29	28	560	19
1,2,3,4,7,8-Cl6-Dibenzofuran	"	8.3	3200	2500	190	81	110	86	2000	9.8
1,2,3,6,7,8-Cl6-Dibenzofuran	"	6.9	1800	1500	110	46	59	47	1000	8.4
2,3,4,6,7,8-Cl6-Dibenzofuran	"	8.1	1600	1300	120	57	61	52	890	9.9
1,2,3,7,8,9-Cl6-Dibenzofuran	"	33	140	140	<35	39	28	31	90	43
1,2,3,4,7,8-Cl6-Dibenzo-p-dioxin	"	21	600	410	67	34	470	41	320	28
1,2,3,6,7,8-Cl6-Dibenzo-p-dioxin	"	13	770	670	93	47	71	50	350	21
1,2,3,7,8,9-Cl6-Dibenzo-p-dioxin	"	17	1100	880	110	56	74	55	570	31
1,2,3,4,6,7,8-Cl7-Dibenzofuran	"	19	4500	3700	330	160	190	140	2300	28
1,2,3,4,7,8,9-Cl7-Dibenzofuran	"	13	490	410	45	28	27	22	200	19
1,2,3,4,6,7,8-Cl7-Dibenzo-p-dioxin	"	62	4000	3800	740	360	490	320	1800	78
1,2,3,4,6,7,8,9-Cl8-Dibenzofuran	"	43	890	820	110	150	75	130	420	95
1,2,3,4,6,7,8,9-Cl8-Dibenzo-p-dioxin	"	150	6600	6600	1500	810	1000	560	3300	240
2,3,7,8 Toxic Equivalence*	pg	37	3900	3100	230	110	190	130	2600	49
Maximum Toxic Equivalence	"	<37	<3900	<3100	<240	<110	<190	<130	<2600	<49

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		T19-OC	T20-OC	T21-OC	T22-OC	T23-OC
Zenon ID:		052800 95	052801 95	052802 95	052803 95	052804 95
Date Sampled:		95/11/26	95/11/27	95/11/27	95/11/28	95/11/28
Component	**Units**					
2,3,7,8-Cl4-Dibenzofuran (DB5)	pg	11000	480	380	80	74
2,3,7,8-Cl4-Dibenzo-p-dioxin	"	840	47	29	15	15
1,2,3,7,8-Cl5-Dibenzofuran	"	5100	260	<130	42	42
2,3,4,7,8-Cl5-Dibenzofuran	"	4700	290	170	53	51
1,2,3,7,8-Cl5-Dibenzo-p-dioxin	"	2000	110	67	24	23
1,2,3,4,7,8-Cl6-Dibenzofuran	"	7300	400	240	79	91
1,2,3,6,7,8-Cl6-Dibenzofuran	"	3900	210	120	43	47
2,3,4,6,7,8-Cl6-Dibenzofuran	"	3600	230	140	54	57
1,2,3,7,8,9-Cl6-Dibenzofuran	"	310	37	37	<27	24
1,2,3,4,7,8-Cl6-Dibenzo-p-dioxin	"	1100	91	80	37	42
1,2,3,6,7,8-Cl6-Dibenzo-p-dioxin	"	1200	110	110	37	42
1,2,3,7,8,9-Cl6-Dibenzo-p-dioxin	"	2200	180	140	47	54
1,2,3,4,6,7,8-Cl7-Dibenzofuran	"	9200	610	<450	130	170
1,2,3,4,7,8,9-Cl7-Dibenzofuran	"	1000	77	58	24	22
1,2,3,4,6,7,8-Cl7-Dibenzo-p-dioxin	"	5700	690	690	230	340
1,2,3,4,6,7,8,9-Cl8-Dibenzofuran	"	3000	200	180	62	110
1,2,3,4,6,7,8,9-Cl8-Dibenzo-p-dioxin	"	8800	1400	1500	510	870
2,3,7,8 Toxic Equivalence*	pg	7600	450	280	98	100
Maximum Toxic Equivalence	"	<7600	<450	<290	<100	<100

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1128FB01**	**1213VC01**	**1213VC01**	**1213VC01**	**1213VC01**	**1219VC01**	**1219VC01**
2,3,7,8-Cl4-Dibenzofuran (DB5) etc.	051002	051661	051662	051665	052193	052195	052798
	051003		051663		052194	052196	052799
	051004		051664		052197	052201	052800
	051005		051666		052198	052798	052801
	051006		051667		052199		052802
	051007				052200		052803
	051008						052804
Analysis Date:	95/12/04	95/12/19	95/12/20	96/01/13	95/12/27	95/12/27	95/12/28
Preparation Date:	95/11/28	95/12/13	95/12/13	95/12/13	95/12/13	95/12/19	95/12/19

2,3,7,8 - TCDF Confirmation Data

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod/Yvonne Bond
Project: AN951192
Date Received: 95/11/22
Date Reported: 96/01/24

Submission No.: 5L0054
Sample No.: 051007-052803

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***"-" = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS:

Certified by: R. McLeod

Zenon Environmental Laboratories - Certificate of Analysis

Client ID:		T4-OC	T11-OC	T12-OC	T6-OC	T17-OC	T22-OC
Zenon ID:		051007 95	051665 95	051666 95	052195 95	052200 95	052803 95
Date Sampled:		95/11/19	95/11/22	95/11/23	95/11/20	95/11/25	95/11/28
Component	**Units**						
2,3,7,8-TCDF (SP2331)	pg	330	31	2500	1400	32	17
Internal Recoveries	%						
2,3,7,8-TCDF-13C12		113	100	114	87	103	103

Client:Rigo Rigo Associates, Inc. Project:Davis County RR

ZEL Summary of Analysis Pre. Dates

Batch Code:	**1128FB01**	**1213VC01**	**1213VC01**	**1219VC01**
2,3,7,8-TCDF (SP2331) etc.	051007	051665 051666 052195	052200	052803
Analysis Date:	96/01/22	96/01/22	96/01/23	96/01/23
Preparation Date:	95/11/28	95/12/13	95/12/13	95/12/19

PCDD/F Data

Toluene Rinses

ZENON Environmental Laboratories
5555 North Service Road
Burlington Ontario
Canada L7L 5H7
Tel 905 332 8788
Fax 905 332 9169

Certificate of Analysis

CLIENT INFORMATION

Attention: John Chandler
Client Name: Rigo & Rigo Associates, Inc.
Project: Davis County RR
Project Desc: Analysis of Stack Emissions

Address: 1 Berea Commons
Suite 211
Berea, Ohio
44017-2534
Fax Number: 216-243-2759
Phone Number: 216-243-5544

LABORATORY INFORMATION

Contact: Ron McLeod
Project: AN951192
Date Received: 96/01/22
Date Reported: 96/02/16

Submission No.: 6A0351
Sample No.: 001671-001674

Regional Laboratories:
British Columbia
Ontario
Quebec

NOTES: ***"-" = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available***
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by Zenon are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Seventeenth Edition. Other methods are based on the principles of MISA or EPA methodologies.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at Zenon for a period of three weeks from receipt of data or as per contract.

COMMENTS:

Certified by: _____

Zenon Environmental Laboratories - Certificate of Analysis

		Method	T6-OC	T12-OC	T19-OC
Client ID:		Blank	Toluene	Toluene	Toluene
Zenon ID:		001671 96	001672 96	001673 96	001674 96
Date Sampled:		95/11/26	95/11/20	95/11/23	95/11/26
Component	**Units**				
Total Cl4-Dibenzofurans	pg	<5.3	180	63	100
Total Cl5-Dibenzofurans	"	2.6	530	95	190
Total Cl6-Dibenzofurans	"	8.8	370	70	170
Total Cl7-Dibenzofurans	"	2.2	200	50	140
Cl8-Dibenzofuran	"	12	49	16	47
Total Cl4-Dibenzo-p-dioxins	"	<5.6	14	<1.6	<3.4
Total Cl5-Dibenzo-p-dioxins	"	3.6	81	11	26
Total Cl6-Dibenzo-p-dioxins	"	<1.9	200	59	99
Total Cl7-Dibenzo-p-dioxins	"	12	240	89	120
Cl8-Dibenzo-p-dioxin	"	24	310	160	180
Internal Recoveries	%				
2,3,7,8-T4CDF-13C-12		44	76	74	77
2,3,7,8-T4CDD-13C-12		41	80	82	80
1,2,3,7,8-P5CDF-13C-12		47	65	66	70
1,2,3,7,8-P5CDD-13C-12		54	85	87	89
1,2,3,6,7,8-H6CDF-13C-12		73	82	81	86
1,2,3,6,7,8-H6CDD-13C-12		66	82	81	86
1,2,3,4,6,7,8-H7CDF-13C-12		75	76	75	80
1,2,3,4,6,7,8-H7CDD-13C-12		64	82	80	89
OCDD-13C-12		60	76	72	83
Alternate	%				
1,2,3,7,8,9-H6CDF-13C-12		50	81	80	84
2,3,7,8-Cl4-Dibenzofuran (DB5)	pg	<4.6	33	10	14
2,3,7,8-Cl4-Dibenzo-p-dioxin	"	<5.6	3.0	<1.6	<3.4
1,2,3,7,8-Cl5-Dibenzofuran	"	<1.9	43	9.9	18
2,3,4,7,8-Cl5-Dibenzofuran	"	<2.0	42	9.4	18
1,2,3,7,8-Cl5-Dibenzo-p-dioxin	"	3.6	15	<4.5	9.4
1,2,3,4,7,8-Cl6-Dibenzofuran	"	<1.7	64	13	32
1,2,3,6,7,8-Cl6-Dibenzofuran	"	1.6	44	10	20
2,3,4,6,7,8-Cl6-Dibenzofuran	"	<2.0	44	9.0	24
1,2,3,7,8,9-Cl6-Dibenzofuran	"	8.2	11	11	10
1,2,3,4,7,8-Cl6-Dibenzo-p-dioxin	"	<2.2	8.3	3.4	6.0
1,2,3,6,7,8-Cl6-Dibenzo-p-dioxin	"	<1.7	19	6.3	8.8
1,2,3,7,8,9-Cl6-Dibenzo-p-dioxin	"	<2.0	27	9.6	16
1,2,3,4,6,7,8-Cl7-Dibenzofuran	"	2.0	120	29	79
1,2,3,4,7,8,9-Cl7-Dibenzofuran	"	<1.9	19	3.6	11
1,2,3,4,6,7,8-Cl7-Dibenzo-p-dioxin	"	7.2	130	48	66
1,2,3,4,6,7,8,9-Cl8-Dibenzofuran	"	12	49	16	47
1,2,3,4,6,7,8,9-Cl8-Dibenzo-p-dioxin	"	24	310	160	180

ZEL Summary of Analysis Pre. Dates

Batch Code:	**0202FB01**
PCDD/F	001671
	001672
	001673
	001674
Analysis Date:	96/02/14
Preparation Date:	96/02/02

CHAIN OF CUSTODY FORMS

Field Through Laboratory

Chain of Custody

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95·11·24

COOLER 11

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: BCE NICK LAVALLE

BCE PROJECT #: 5416265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
				500	G		
T11-OC TS1	156		FILTER				
T11-OC-TS2	157		DCM				
T11-OC-TS3	158		TOLUENE				
T11-OC-TS4	159		IMP. CONT.				
T11-OC TS5	160		XAD				
T10-OC TS1	151		FILTER				
T10-OC TS2	152		DCM				
T10-OC TS3	153		TOLUENE				
T10-OC TS4	154		IMP. CONT.				
T10-OC TS5	155		XAD				

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3:15pm K Wren & Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00001

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-~~20~~ 27 ~~Box #1~~ COOLER 10

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT:

BCE PROJECT #:

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
B2-OC-TS2	182		DCM ACTONE			
B2-OC-TS3	183		TOLUENE			
B2-OC-TS5	185		IMP. CONT.			
T13-OC-TS1	191		FILTER			
T13-OC-TS2	192		DCM			
T13-OC-TS3	193		TOLUENE			
T13-OC-TS5	195		IMP. CONTS			
T13-OC-TS4	194		XAD			
T12-OC-TS2	187		DCM			
T12-OC-TS3	188		TOLUENE			
T12-OC-TS5	190		IMP. CONTENTS			
T12-OC-TS4	189		XAD			
T12-OC-TS1	186		FILTER			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/11/27 3:50 pm Maxine Vernon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00002

BO AR-CONCORD ENVIRONMENTAL

DATE: 95.11.22

COOLER #8

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5916265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T8-OC-TS2	122		DCM/ACETONE	500ml	G	
T9-OC-TS2	127		"	"	"	
T8-OC-TS5	125		RO	"	"	
T9-OC-TS5	130		"	"	"	
T8-OC-TS3	123		TOLUENE	"	"	
T9-OC-TS3	128		"	"	"	
T8-OC-TS1	121		FILTER	FOIL		
T9-OC-TS1	126		FILTER	"		
T8-OC-TS4	124		XAD			
T9-OC-TS4	129		XAD			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3:15 Aurora-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00003

BOVAR-CONCORD ENVIRONMENTAL

Box 9

DATE: 95-11-22

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T3-MP-TS4-1	58		5% HNO_3 + 10% H_2O_2	500 ml	G	
T6-MP-TS4-1	104		↓	"	"	
T7-MP-TS4-1	116		↓	"	"	
T8-MP-TS4-1	134		↓	"	"	
T9-MP-TS4-1	146		↓	"	"	
T8-MP-TS3	133		0.1N HNO_3 RINSE	"	"	
T9-MP-TS3	145		"	"	"	
T9-HCl-TS1	139		0.1N H_2SO_4	250 ml	P	
T10-HCl-TS1	141		"	"	"	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951124 3:15 K Grant - Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

000004

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95 · 11 · 25

B 14

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST # _____

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T14-MP-TS5C	233		HCL RINSE	500	G	
T15-MP-TS5C	245		"	500	G	
T9 HCL-TS2	135		~~HCL RINSE~~ IMP + 3+4	250	P	
T10 · HCL-TS2	142		IMP 3+4	"	"	
T11-HCL-TS1	169		IMP. 1+2	"	"	
T11-HCL-TS2	170		IMP 3+4	"	"	
T12-HCL-TS1	171		IMP 1+2	"	"	
T12-HCL-TS2	172		IMP 3+4			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3:15pm K Lavallee - Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED: _____

00005

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95.11.28

C15

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. L

BCE PROJECT #: 5916265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T21-OC TS1	316		~~FILTER~~	~~FOIL~~		
T21-OC TS2	317		DCM	500	G	
T21-OC TS3	318		TOLUENE	"	"	
T21-OC TS4	319		XAD	RESIN		
T21-OC TS5	320		IMP. CONT.	500	G	
B3-OC TS1	276		~~FILTER~~	~~FOIL~~		
B3-OC TS2	277		DCM	500	G	
B3-OC TS3	278		TOLUENE	"	"	
B3-OC TS4	279		XAD	RESIN		
B3-OC TS5	280		IMP. CONT.	500	G	
T20-MP-TS2	322		Acetone	500	G	
T21-MP-TS2	334		Acetone	500	G	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		[illegible] - Zenon 951130 2:00pm			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00006

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95 11 29

C1+ C15

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N L

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T22-MP-TS2	362		ACETONE	500	G	
T23-MP-TS2	364		"	"	"	
T22-OC-TS1	341		FILTER	FOIL		
T22-OC-TS2	342		DCM	500	G	
T22-OC-TS3	343		TOLUENE	"	"	
T22-OC-TS4	344		RESIN	XAD		
T22-OC-TS5	345		IMP. CONT	500	G	
T21-OC-TS1	316		FILTER	FOIL		
T23-OC-TS1	346		"	"		
T23-OC-TS2	347		DCM	500	G	
T23-OC-TS3	348		TOLUENE	"	"	
T23-OC-TS4	349		RESIN	XAD		
T23 OC TS5	350		IMP. CONT	500	G	
B3-OC-TS1	276		FILTER	FOIL		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		Karina Zenon 951130 2:00p.			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY:

QC CHECKED:

00007

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95.11.29

B28

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: NL

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
REAGENT BLANK			0.1N HNO_3			ARCHIVE
"	28		"			"
"			"			"
"			"			"
"			5% HNO_3/10% HCl			
"			"			
"						
T 19 PROOF			0.1N HNO_3			
T 20 PROOF			"			
T 21 PROOF			"			
T 22 PROOF			"			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		2:00pm Klaus Zenon 951130			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00008

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95.11.29

B3a

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: NL

BCE PROJECT #: 5416265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
Reagent Blank	23	OC	toluene	250	G		ARCHIVE
"	22	OC	ACETONE	250	"		
"	25	OC	ACETONE	500	"		
"	389	OC	ACETONE	"	"		
"	400	OC	ACETONE	1L	"		

Relinquished by	Date/Time	Received by
		2:00 95/11/30

Relinquished by	Date/Time	Received by

REMARKS

LABORATORY:

QC CHECKED:

00009

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-29

B27

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: NL.

BCE PROJECT #: 5916265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T10-MP-PROOF			0.1N HNO_3	500	G		
T11-MP-PROOF			"	"	"		
T12-MP-PROOF			"	"	"		
T13-MP-PROOF			"	250	G		
T14-MP-PROOF			"	"	"		
T15-MP-PROOF			"	"	"		
T16-MP-PROOF			"	"	"		
T17-MP-PROOF			"	"	"		
T18-MP-PROOF			"	"	"		
			"				

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		2:00 Klaumx-Zenon 95/11/30			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00010

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-29

B26

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: NL

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T1-MP-PROOF			0.1N HNO3	500	G	ARCHIVE
T2 "			"	"	"	"
T3 "			"	"	"	"
T4 "			"	"	"	"
T5 "			"	"	"	"
T6 "			"	"	"	"
T7 "			"	"	"	"
T8 "			"	"	"	"
T9 "			"	"	"	"

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		Kenneth Zenon 2:00pm 95/11/30			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

000011

BOVAR-CONCORD ENVIRONMENTAL

B21

DATE: 95-11-29

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N L

BCE PROJECT #: 5466265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T16MP · TS4.1	259		5% HNO_3 10% H_2O_2	500	G		
T17MP TS4.1	271		"	"	"		
T20MP TS4.1	324		"	"	"		
T21 MP TS4.1	336		"	"	"		
T22 · MP TS4.1	354		"	"	"		
T23 MP TS4.1	366		"	"	"		
T23 MP TS4.2	367		HNO_3 RINSE	"	"		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		Klaus-Zoran 95/12/01 11:30.			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY:

QC CHECKED:

00012

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-29

B22

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T21-MP-TS4.2	337		HNO3 RINSE	500	G	
T21-MP-TS5.A	338		"	500	G	
T22-MP-TS3	353		"	500	G	
T22-MP-TS5A	356		"	500	G	
T22-MP-TS4.2	355		"	"	"	
T23-MP-TS3	365		"	"	"	
T23-MP-TS5A	368		"	"	"	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		K Lavine Zenon 1:30 951201			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: _____ QC CHECKED: _____

00013

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95·11·28

B19

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #: _____

CONTACT: N L

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T16-MP TS3	258		0.1N HNO3	250	G	
T16-MP TS4-2	260		" RINSE	500	G	
T17-MP TS3	270		"	500	G	
T17-MP-TS4-2	272			500	G	
T20-MP-TS3	323		FRONT HALF	"	"	
T20-MP-TS4-2	325		BACK HALF	"	"	
T20-MP-TS5-A	326		IMP. 4 CONTS.	"	"	
T21-MP-TS3	335		FRONT HALF	"	"	
T20-MP-TS1	321		FILTER			
T21-MP-TS2	333		FILTER			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		1:30pm. Karina Zenon 951201			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED: _____

00014

BOVAR-CONCORD ENVIRONMENTAL

DATE: Nov 28 / 95

B20

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL.: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N

BCE PROJECT #: 5416265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T16-MP-T55a	263		HCl RINSE IN H_2O	500 ml	G		
T17-MP-T55c	275		"	"	"		
T18 "	295		"	"	"		
T19 "	310		"	"	"		
T20 "	328		"	"	"		
T21 "	340		"	"	"		
T22 "	358		"	"	"		
T23 "	370		"	1L	G		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		1:30. Chris-Zenon 951261			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00015

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95.11.28

C15

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. L

BCE PROJECT #: 5916265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
~~T21-OC TS1~~	~~316~~		~~FILTER~~	~~FOIL~~			
T21-OC TS2	317		DCM	500	G		
T21-OC TS3	318		TOLUENE	"	"		
T21-OC TS4	319		XAD	RESIN			
T21-OC TS5	320		IMP. CONT.	500	G		
B3-OC TS1	276		~~FILTER~~	~~FOIL~~			
B3-OC TS2	277		DCM	500	G		
B3-OC TS3	278		TOLUENE	"	"		
B3-OC TS4	279		XAD	RESIN			
B3-OC TS5	280		IMP. CONT.	500	G		
T20-MP-TS2	322		Acetone	500	G		
T21-MP-TS2	334		Acetone	500	G		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		1:30pm. K Cavus - Zenon 951201			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: Zenon

QC CHECKED:

00016

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95.11.28

B18

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N L

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T14-MP-TSSB	232		KMnO4	500	G	
T15-MP-TSSB	244		"	"	"	
T16-MP-TSSB	262		"	"	"	
T17-MP-TSSB	274		"	"	"	
T18-MP-TSSB	297		"	"	"	
T19-MP-TSSB	309		"	"	"	
T20-MP-TSSB	327		"	"	"	
T21-MP-TSSB	339		"	"	"	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		Chris - Zenon 1:30 951201			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00017

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-29

~~B28~~ B31

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: NL

BCE PROJECT #: 541 6265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
Reagent Blk	5		$KMnO_4$			
"			"			
"			"			
"			H_2O			
"	21		"			
"	26		"			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		Klaus-Zenon 1:30 95/12/01			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00018

BOVAR-CONCORD ENVIRONMENTAL

B28

DATE: 95.11.29

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: NL

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
REAGENT BANK			0.1N HNO_3			ARCHIVE
"	28		"			"
"			"			"
"			"			"
"			5% HNO_3/10% H_2O_2			
"			"			
"						
T 19 PROOF			0.1N HNO_3			
T 20 PROOF			"			
T 21 PROOF			"			
T 22 PROOF			"			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		1:30 K Clausen-Zenon 95/12/01			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00019

BOVAR-CONCORD ENVIRONMENTAL

DATE: _____

B29

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST # _____

CONTACT:

BCE PROJECT #:

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
REAGENT BLANK	29		H_2O + HCl	1L	G		ARCHIVE
"			"	1L	G		
"			"	500	G		
"			√ 0.1N H_2SO_4	500	P		
"			√ 0.1N NaOH	500	P		
FILTER BLANK	24		FILTER	FOIL			
"	16	5110	"	"			
"	√	738					
"	√	5260					
"		5299					
"	√	914					

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: _____

QC CHECKED: _____

00020

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-29

C17
~~C15~~

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N L

BCE PROJECT #: C416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T22-MP-TS2	363		ACETONE	500	G	
T23-MP-TS2	364		"	"	"	
T22-OC-TS1	341		FILTER	FOIL		
T22-OC-TS2	342		DCM	500	G	
T22-OC-TS3	343		TOLUENE	"	"	
T22-OC-TS4	344		RESIN	XAD		
T22-OC-TS5	345		IMP. CONT	500	G	
T21-OC-TS1	316		FILTER	FOIL		
T23-OC-TS1	346		"	"		
T23-OC-TS2	347		DCM	500	G	
T23-OC-TS3	348		TOLUENE	"	"	
T23-OC-TS4	349		RESIN	XAD		
T23-OC-TS5	350		IMP. CONT	500	G	
B3-OC-TS1	276		FILTER	FOIL		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		1:30pm. [illegible] 951201			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: _____ QC CHECKED: _____

00021

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95·11·29

B24

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N.L.

BCE PROJECT #: 5416265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T17-HCl-TS1	269						
T18 HCl TS1	266						
T19 HCl TS1	299						
T20 HCl TS1	301						
T21 HCl TS1	330						
T22 HCl TS1	332						
T23 HCl TS1	379						
T2[redacted]							

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		Klaus. Zenn 951130 2:00pm.			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: Zenn.

QC CHECKED:

00022

BOVAR-CONCORD ENVIRONMENTAL

B 29

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: _____

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #: _____

CONTACT:

BCE PROJECT #:

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
REAGENT BLANK	29		H_2O + HCO	1L	G	ARCHIVE
"			"	1L	G	
"			"	500	G	
"			√ 0.1N H_2SO_4	500	P	
"			√ 0.1N NaOH	500	P	
FILTER BLANK	24		FILTER	FOIL		
"	16	5110	"	"		
"	√	738				
"	√	5260				
"		5299				
"	√	914				

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		Klaus-Zenon 95/12/2 2:00pm.			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: _____

QC CHECKED: _____

00023

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-29

B25

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: NL

BCE PROJECT #: 591 6265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T17-HCL-TS2	265		NaOH	500	P		
T18-HCL-TS2	277		"	"	"		
T19-HCL-TS2	300		"	"	"		
T20-HCL-TS2	302		"	"	"		
T21-HCL-TS2	329		"	"	"		
T22-HCL-TS2	331		"	"	"		
T23-HCL-TS2	360		"	"	"		
~~T24-HCL-TS2~~			"				

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		Klevine-Zenon 95/11/30 2:00pm			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00024

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95.11.25

B15

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #:

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T13-HCl-TS1	204		imp. 1+2	250	P		
T13-HCl-TS2	205		imp. 3+4	"	"		
T14-HCl-TS1	206		imp 1+2	"	"		
T14-HCl-TS2	207		imp 3+4	"	"		
T15-HCl-TS1	234		imp 1+2	"	"		
T15-HCl-TS2	235		imp 3+4	"	"		
T16-HCl-TS1	236		imp 1+2	"	"		
T16-HCl-TS2	237		imp 3+4	"	"		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/11/27 3:15 Karina-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: _____ QC CHECKED: _____

00025

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95·11·18

Box #1

CHAIN OF CUSTODY RECORD PAGE 1 OF 4

TEST # 1

CONTACT: N. LAVALLE

BCE PROJECT #: 5716265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T1-OC-T55	56	95·11·17	IMP. CONTENT	500ml	G	~~1 of 2~~ 2 of 2
T1-MP-T55c	15	"	HCl RINSE	"	"	
T1-MP-T56b	14	"	IMP. STG KMnO4	"	"	
T2-HCl-T52	20	"	NaOH	500ml	P	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00026

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95 · 11 · 21

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 541 6265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T4-MP-TS5C	88	95-11-19	HCl RINSE in H_2O	500ml	G	
T5-MP-TS5C	96	"	"	"	"	
T5 HCl TS1	97	"	IMP CONTENTS in H_2O	"	P	
T5 HCl TS2	98	"	IMP CONTENTS in H_2O	"	P	
T6 HCl-TS1	99	"	IMP. CONTENTS in H_2O	"	P	
T6 HCl-TS2	100	"	IMP. CONTENTS in H_2O	"	P	
~~T6-MP-TS5C~~	~~108~~	~~95-11-20~~	~~HCl RINSE~~			
T7-HCl-TS1	109	95-11-20	IMP. CONTENTS 1+2	"	P	
T7-HCl TS2	110	95-11-20	IMP. CONTENTS 3+4	"	P	
T8 HCl TS1	111	95-11-20	IMP. CONTENTS 1+2	"	"	
T8-HCl TS2	112	95-11-20	IMP. CONTENTS 3+4	"	"	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00027

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95. 11. 19

Box #1

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	HCl	CC	Metals	Mercury	Particulate	COMMENTS
T3-HCl-TS1	42	95-11-18	0.1N H_2SO_4 + (H_2O)	500 ml	P	✓					
T3-HCl-TS2	43	"	0.1N NaOH + (H_2O)	"	"		✓				
T4-HCl-TS1	44	"	0.1N H_2SO_4 + (H_2O)	"	"	✓					
T4-HCl-TS2	45	"	0.1N NaOH + (H_2O)	"	"		✓				
T2-MP-TS5-A	47	"	IMP. CONTENTS + (H_2O)	"	G				X		
T2-MP-TS5-C	46	"	HCl in H_2O	"	"				X		
T3-MP-TS5-B	59	"	IMP. CONTENTS (H_2O)	"	"				X		
T3-MP-TS5-C	62	"	HCl in H_2O	"	"				X		
[illegible]											
[illegible]											
T2-MP-TS7											
T3-MP-TS7											

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

000028

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95-11-18

Box # 2

CHAIN OF CUSTODY RECORD PAGE 2 OF 4

TEST #

CONTACT: M. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T1-HCl TS2	18	95-11-17	NaOH	500 ml	P	
T2-HCl TS1	19	"	0.1N H_2SO_4	"	"	
T1-HCl-TS1	17	"	0.1N H_2SO_4	"	"	
T1-OC-TS5A	5A	"	IMP. CON		G	1 of 2
T2-MP-TS1	8	"	FILTER	PETRI	SMALL	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00029

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95-11-18

Box #2

CHAIN OF CUSTODY RECORD PAGE 2 OF 4

TEST #

CONTACT: P. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T1-HCl TS2	18	95-11-17	NaOH	500 ml	P	
T2-HCl TS1	19	"	0.1N H_2SO_4	"	"	
T1-HCl-TS1	17	"	0.1N H_2SO_4	"	"	
T1-OC-TS3A	5A	"	IMP. CON		G	1 of 2
T2-MP-TS1	8	"	FILTER	PETRI. SMALL		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/11/22 12:45pm Kaman Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00030

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95-11-20

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T4-MP-TS4-1	84	95.11.20	WATER	500ml	G	
T5-MP-TS4-1	92		WATER	"	"	
T4-OC-TS3	65		TOLUENE	"	"	
T4-OC-TS5	67		WATER	"	"	
			TRAP 15	GLASS		
			TRAP 12			
			TRAP 11			
T4-OC-TS1	63		FILTER	FOIL		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951122 12:45pm Katrina-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00031

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95-11-20

COOLER 3

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T5-MP-TS2	90	95-11-20	ACETONE	500	G	
T4-MP-TS2	82		"	"	"	
T3-OC-TS2	37		DCM ACETONE	"	"	
T3-OC-TS5	40		H_2O (WATER)	"	"	
T3-OC-TS3	38		TOLUENE	"	"	
T2-OC-TS3	32		TOLUENE	"	"	
T2-OC-TS5	34		H_2O (WATER)	"	"	1 of 2
T2-OC-TS5	35		H_2O (WATER	"	"	2 of 2
			TRAP 12	GLASS		
			TRAP 13	"		
T2-OC-TS1	30		FILTER	FOIL		
T3-OC-TS1	36		FILTER	FOIL		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951122 12:45pm Kevin Zemon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00032

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95·11·21

B3

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. Lavalle

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T1-MP-TS4-2	12	95.11.17	0.1N HNO_3	500	G	
T1-MP-TS5-A	13	↓	0.1N HNO_3	"	"	
T1-MP-TS4-1	11		5% HNO_3 / 10% H_2O_2	"	"	
T1-MP-TS3	10	↓	0.1N HNO_3	"	"	
T2-MP-TS4-2	49	95.11.18	0.1N HNO_3	"	"	
T2-MP-TS4-1	50	↓	5% HNO_3 / 10% H_2O_2	"	"	
T3-MP-TS3	57	↓	0.1N HNO_3	"	"	
T3-MP-TS5-A	61		0.1N HNO_3	"	"	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3:15 pm Karens - Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00033

BOVAR-CONCORD ENVIRONMENTAL

B11

DATE: _____

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #_____

CONTACT:

BCE PROJECT #:

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T7-MP-TSSC	120		Hcl soln	500	G	
T8-MP-TSSC	138					
T9-MP-TSSC	150					
T10-MP-TSSC	168					
T11-MP-TSSC	180					
T12-MP-TSSC	203					
T13-MP-TSSC	215					

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3:15 p.m. K Cameron-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMRKS		

LABORATORY: _____ QC CHECKED: _____

00034

BOVAR-CONCORD ENVIRONMENTAL

B10

DATE: 95·11·24

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #: B10

CONTACT: N. LAVALLE

BCE PROJECT #: B 5416265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T4MPTSSB	87		KMnO4 -01	500	G		
T5-MPTSSB	95						
T6-MPTSSD	107						
T7-MP-TSSC	119						
T8-MP-TSSD	137						
T9-MP-TSSC	149						
T10-MP-TSSC	167						
T11-MP-TSSC	175						
T12-MP-TSSC	202						
T13-MP-TSSC	214						

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/11/27 3.15pm. Kimara Lemon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: _____

QC CHECKED: _____

00035

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-24

B12

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T10-MP-TS4-1	164		5% HNO_3 10% H_2O_2	500	G	
T11-MP-TS4-1	176		"	"	"	
T12-MP-TS4-1	199		"	"	"	
T13-MP-TS4-1	211		"	"	"	
T11-MP-TS3	210		0.1 N HNO_3	"	"	
T13-MP-TS4-2	212		"	"	"	
T10-MP-TS1	161		FILTER			
T11-MP-TS1	173		"			
T12-MP-TS1	196		"			
T13-MP-TS1	208		"			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3:15 pm K Cancena-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00036

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-24

87

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T-10 MP-TS5-A	166		0.1 HNO3	500	G	
T-10 MP-TS3	163					
T-10 MP-TS4-2	165					
T-11-MP-TS5A	178					
T-11 MP-TS3	175					
T11-MP-TS4-2	177					
T12-MP-TS5A	201					
T12-MP-TS3	198					
T12-MP-TS4-2	200					
T13-MP-TS5-A	213					

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3.15 pm. Kamisha-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00037

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95. 11. 25

B13

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE 1 OF 1

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: B 5916265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T14-MP-TS3	228		0.1N HNO_3	250	G	
T14-MP-TS4-1	229		HNO_3 + H_2O_2	500	G	
T14-MP-TS4-2	230		0.1N HNO_3	"	"	
T14-MP-TS5-A	231		"	250	"	
T15-MP-TS3	240		0.1N HNO_3	"	"	
T15-MP-TS4-1	241		HNO_3 + H_2O_2	500	"	
T15-MP-TS5-A	242		0.1N HNO_3	"	"	
T14-MP-TS1	226 ~~[illegible]~~		FILTER			
T15 MP-TS1	~~[illegible]~~ 238		FILTER			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3:15pm. K Clemens-Jenson			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY:

QC CHECKED:

00038

BOVAR-CONCORD ENVIRONMENTAL

Box 8

DATE: 95.11.22

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #:

ANALYSES

	Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
	T3-MP-TS4-2	60		0.1N HNO3	500m	G	
2	T4-MP-TS4-2	85			"	"	
	T5-MP-TS4-2	93					
4	T6-MP-TS4-2	105					
?	T7-MP-TS4-2	117					
6	T8-MP-TS4-2	135					
	T9-MP-TS4-2	147					
8	T5-MP TS3	91					
	T6-MP-TS3	103					
10	T7-MP-TS3	115					

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/11/27 3:15 pm. Klaus Zemon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: _____ QC CHECKED: _____

00039

'B5

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95.11.12

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST # _____

CONTACT: N. CAVALLE

BCE PROJECT #: 5416265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T2-MP-TSSA	48		IMP4 CONTENTS	500ml	G		
T4-MP-TSSA	86						
T5-MP-TSSA	94		0.1N RINSE				
T6-MP-TSSA	106						
T7-MP-TSSA	118						
T8-MP-TSSA	136						
T9-MP-TSSA	148						
T2-MP-TS3	51			500ml	P		
T4-MP-TS3	83			"	"		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3:15pm K Cavallo-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED: _____

00040

BOVAR-CONCORD ENVIRONMENTAL

B6

DATE: _____

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST # _____

CONTACT:

BCE PROJECT #:

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T2-MP TS1	41		FILTER	Petri Dish	Plastic	
T3-MP TS1	54		"	"	"	
T4-MP TS1	81		"	"	"	
T5-MP TS1	89		"	"	"	
T6-MP-TS1	101		"	"	"	
T7-MP-TS1	113		"	"	"	
T8-MP-TS1	131		"	"	"	
T9-MP-TS1	143		"	"	"	
T6-MP-TS2	102		ACETONE RINSE	500 ml	glass	
T7-MP-TS2	102a		"	"	"	
T8-MP-TS2	132		"	"	"	
T9-MP-TS2	144		"	"	"	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951172 3:15 pm Karina-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: _____

QC CHECKED: _____

00041

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95 11 22

Box 9

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T3-MP-TS4-1	58		5% HNO_3 + 10% H_2O_2	500 ml	G	
T6-MP-TS4-1	104		↓	"	"	
T7-MP-TS4-1	116		↓	"	"	
T8-MP-TS4-1	134		↓	"	"	
T9-MP-TS4-1	146		↓	"	"	
T8-MP-TS3	133		0.1N HNO_3 RINSE	"	"	
T9-MP-TS3	145		"	"	"	
T9-HCl-TS1	139		0.1N H_2SO_4	250 ml	P	
T10-HCl-TS1	141		"	"	"	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/11/27 3:15 pm Klarma - Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00042

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95. 11. 19

Box #1

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	HCl	CC	Metals	Mercury	Particulate	COMMENTS
T3-HCl-TS1	42	95-11-18	0.1N H_2SO_4 + (H_2O)	500 ml	P	✓					
T3-HCl-TS2	43	"	0.1N NaOH + (H_2O)	"	"		✓				
T4-HCl-TS1	44	"	0.1N H_2SO_4 + (H_2O)	"	"	✓					
T4-HCl-TS2	45	"	0.1N NaOH + (H_2O)	"	"		✓				
T2-MP-TS5-A	47	"	IMP. CONTENTS + (H_2O)	"	G			X			
T2-MP-TS5-C	46	"	HCl in H_2O	"	"			X			
T3-MP-TS5-B	59	"	IMP. CONTENTS (H_2O)	"	"			X			
T3-MP-TS5-C	62	"	HCl in H_2O	"	"			X			
T2-MP-TS2											
T3-MP-TS2											

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951122 12:45pm Klaus-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00043

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95 · 11 · 25

B 14

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T14-MP-TS5C	233		HCL RINSE	500	G	
T15-MP-TS5C	245		"	500	G	
T9 HCL-TS2	135		IMP 3+4 ~~HCL RINSE~~	250	P	
T10-HCL-TS2	142		IMP 3+4	"	"	
T11-HCL-TS1	169		IMP. 1+2	"	"	
T11-HCL-TS2	170		IMP 3+4	"	"	
T12-HCL-TS1	171		IMP 1+2	"	"	
T12-HCL TS2	172		IMP 3+4			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951127 3:15, Carmo Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00044

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95 · 11 · 21

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 541 6265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
JT4-mP-TSSC	88	95-11-19	HCl RINSE in H_2O	500ml	G	
JT5-mP-TSSC	96	"	"	"	"	
JT5 HCl TS1	97	"	IMP CONTENTS in H_2O	"	P	
JT5 HCl TS2	98	"	IMP CONTENTS in H_2O	"	P	
T6 HCl-TS1	99	"	IMP. CONTENTS in H_2O	"	P	
T6 HCl-TS2	100	"	IMP. CONTENTS in H_2O	"	P	
JT6-mP-TSSC	108	95.11.20	HCl RINSE	"	G	
T7-HCl-TS1	109	95.11.20	IMP. CONTENTS 1+2	"	P	
T7-HCl TS2	110	95.11.20	IMP. CONTENTS 3+4	"	P	
T8 HCl TS1	111	95.11.20	IMP. CONTENTS 1+2	"	"	
T8-HCl TS2	112	95.11.20	IMP. CONTENTS 3+4	"	"	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951122 12:45 Klaus Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00045

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95·11·27

B4B 16

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N-L

BCE PROJECT #: 5416265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T10-MP-TS2	162		ALETONG	250	G		
T11-MP-TS2	174		"	"	"		
T12-MP-TS2	197		"	500	G		
T13-MP-TS2	209		"	"	"		
T14-MP-TS2	227		"	"	"		
T15-MP-TS2	239		"	"	"		
T16-MP-TS2	257		"	"	"		
T17-MP-TS2	269		"	"	"		
T18-MP-TS2	292		"	"	"		
T19-MP-TS2	304		"	"	"		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/12/9 1:55pm K Chung-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: Zenon

QC CHECKED:

00046

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95.11.22

COOLER 9

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

9

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. CAVALLE

BCE PROJECT #: 541 6265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T6-OC-TS1	101		FILTER	FOIL		
T6-OC-TS2	102		DCM/ACETONE	500	G	
T6-OC-TS3	103		TOLUENE	500	G	
T6-OC-TS4	104		XAD	—		
T6-OC-TS5	105		RO	500	G	
T7-OC-TS1	106		FILTER	FOIL		
T7-OC-TS2	107		DCM/ACETONE	500	G	
T7-OC-TS3	108		TOLUENE	500	G	
T7-OC-TS4	109		XAD	—		
T7-OC-TS5	110		RO	500	G	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/11/29 1:55pm Marcello-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ___ QC CHECKED: ___

00047

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95.11.27

COOLER - 12

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. L

BCE PROJECT #: 5916265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T15-OC-TS1	221		FILTER	FOIL			
T15-OC-TS2	222		DCM / ACETONE	500	G		
T15-OC-TS3	223		TOLUENE	"	"		
T15-OC-TS4	224		XAD		"		
T15-OC-TS5	225		IMP. CONT.	500	"		
T16-OC-TS1	246		FILTER	FOIL			
T16-OC-TS2	247		DCM	500	G		
T16-OC-TS3	248		TOLUENE	"	"		
T16-OC-TS4	249		XAD	GLASS			
T16-OC-TS5	250		IMP CONTS	500	G		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/11/29 1:55 p.m. K. Dunn-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00048

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95·11·27

COOLER #14

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N.L

BCE PROJECT #: 5416265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
~~T17-0~~							
T17-OC-TS1	251		FILTER	FOIL			
T17-OC-TS2	252		DCM	500	G		
T17-OC-TS3	253		TOLUENE	"	"		
T17-OC-TS4	254		XAD	RESIN			
T17-OC-TS5	255		IMP. CONT.	500	G		
T18-OC-TS1	281		FILTER	FOIL			
T18-OC-TS2	282		DCM	500	G		
T18-OC-TS3	283		TOLUENE	"	"		
T18-OC-TS4	284		XAD	RESIN			
T18-OC-TS5	285		IMP. CONTS.	500	G		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		951129 1:55pm Khrisa Penon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00049

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95·11·27

COOLER-13

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N.L.

BCE PROJECT #: 5916265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
B2-OC-TS1	181		FILTER	FOIL		
B2-OC TS2	182		DCM	500	G	
B2-OC TS3	183		TOLUENE	"	"	
B2-OC TS4	184		XAD	RESIN		
B2-OC TS5	185		IMP. CONT.	500	G	
T14-OC TS1	216		FILTER	FOIL		
T14-OC TS2	217		DCM	500	G	
T14-OC TS3	218		TOLUENE	"	"	
T14-OC TS4	219		XAD	RESIN		
T14-OC TS5	220		IMP. CONT.	500	G	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
		95/11/29 1:55 Marlene Zemon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: _____ QC CHECKED: _____

00050

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95·11·18

Box #1.

CHAIN OF CUSTODY RECORD PAGE 1 OF 4

TEST # 1

CONTACT: N. LAVALLE

BCE PROJECT #: 5916265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T1-OC-T55	5b	95-11-17	IMP. CONTENT	500ml	G	~~2~~ 2 of 2
T1-MP-T55	c 15	"	HCl RINSE	"	"	
T1-MP-T56b	14	"	IMP. 5+6 KMnO4	"	"	
T2-HCl-T52	20	"	NaOH	500ml	P	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
	95/11/18	951122 12:45pm K Clarkson - Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00051

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95.11.18

Box # 4 - Cooler

CHAIN OF CUSTODY RECORD PAGE 4 OF 4

TEST # 1

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	ANALYSES	COMMENTS
T1-OC-TS1	1	95.11.17	DCM/ACETONE	500	G		
T1-OC-TS7	7	"	TOLUENE	"	"		
T1-OC-TS3	3	"	DCM/ACETONE	"	"		
T1-OC-TS6	6	"	"	"	"		
T1-MP-TS2	9	"	ACETONE	"	"		
T1-OC-TS4	4	"	XAD TRAP	GLASS			
T1-OC-TS2	2	"	FILTER	FOIL			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
	95/11/22 12:45	[illegible]			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

000052

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95.11.20

COOLER 2

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416268

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T2-OC-TS2	31	95.11.20	DCM ACETONE	500ml	G	
B1-OC-TS5	77		WATER H_2O	"	"	
B1-OC-TS2	74		DCM ACETONE	"	"	
B1-OC-TS3	75		TOLUENE	"	"	
T5-OC-TS5	72		WATER	"	"	
T5-OC-TS3	70		TOLUENE	"	"	
T5-OC-TS2	69		DCM/ACETONE	"	"	
T4-OC-TS2	64		DCM/ACETONE	"	"	
T5-OC-TS1	68		FILTER	FOIL		
B1-OC-TS1	73		FILTER			

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
	95/11/22 12:45pm	Hannes - Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00053

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-18

Box #2

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE 2 OF 4

TEST #

CONTACT: M. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T1-HCl TS2	18	95-11-17	NaOH	500 ml	P	
T2-HCl TS1	19	"	0.1N H_2SO_4	"	"	
T1-HU-TS1	17	"	0.1N H_2SO_4	"	"	
T1-OC-TS3A	5A	"	IMP. CON		G	1 of 2
T1-AP-TS1	8	"	FILTER	PETRI	SMALL	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
	95/11/21 12:45 pm	Kaunus - Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00054

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-20

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N. LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T4-MP-TS4-1	84	95.11.20	WATER	500ml	G	
T5-MP-TS4-1	92		WATER	"	"	
T4-OC-TS3	65		SOLVENT	"	"	
T4-OC-TS5	67		WATER	"	"	
			TRAP 15	GLASS		
			TRAP 12			
			TRAP 11			
T4-OC-TS1	63		FILTER	FOIL		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
	95/12/12 45	Hanns-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: Zenon

QC CHECKED:

00055

BOVAR-CONCORD ENVIRONMENTAL

DATE: 95-11-20

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

COOLER 3

CHAIN OF CUSTODY RECORD PAGE ___ OF ___

TEST #

CONTACT: N LAVALLE

BCE PROJECT #: 5416265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T5-MP-TS2	90	95-11-20	ACETONE	500	G	
T4-MP-TS2	82		"	"	"	
T3-OC-TS2	37		DCM ACETONE	"	"	
T3-OC-TS5	40		H_2O (WATER)	"	"	
T3-OC-TS3	38		TOLUENE	"	"	
T2-OC-TS3	32		TOLUENE	"	"	
T2-OC-TS5	34		H_2O (WATER)	"	"	1 of 2
T2-OC-TS5	35		H_2O (WATER	"	"	2 of 2
			TRAP 12	GLASS		
			TRAP 13	"		
T2-OC-TS1	30		FILTER	FOIL		
T2-OC-TS1	36		FILTER	FOIL		

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
	95/11/22 12:45	Kayano - Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00056

BOVAR-CONCORD ENVIRONMENTAL

2 TIPPETT ROAD
DOWNSVIEW, ONT.
M3H 2V2
TEL: 416 630-6331

DATE: 95.11.18

Box # 1

CHAIN OF CUSTODY RECORD PAGE 1 OF 4

TEST # 1

CONTACT: N. LAVALLE

BCE PROJECT #: 5716265

ANALYSES

Sample Code	Seq. No.	Date	Source Description	Container Size	Container G/P	COMMENTS
T1-OC-TS5	5b	95.11.17	IMP. CONTENT	500ml	G	~~1 of 2~~ 2 of 2
T1-MP-TS5c	15	"	HCl RINSE	"	"	
T1-MP-TS6b	14	"	IMP. STG KMnO4	"	"	
T2-HCl-TS2	20	"	NaOH	500ml	P	

Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
	951122 12:45	Hanns-Zenon			
Relinquished by	Date/Time	Received by	Relinquished by	Date/Time	Received by
Relinquished by	Date/Time	Received by	REMARKS		

LABORATORY: ZENON

QC CHECKED:

00057

MBR456 - 051002

CHAIN OF CUSTODY

Zenon Environmental Laboratories
5555 North Service Road
Burlington, Ontario L7L 5H7

Tel: (905) 332-8788
Fax: (905) 332-9169

Rigo - OH.

Page _____ of _____

CLIENT INFORMATION

Company Name: Bayer - Concord.

Project Manager:

Address:

Phone #: Fax #:

Storage: Sampled by:

As per project

ANALYSIS REQUESTED

Zenon Use Only	Field Sample ID	# Bottles	Matrix	Date	Time	ANALYSIS REQUESTED	Level of contamination (low, high, unknown)
51003	B1-OC	500AG×2,	Trap, Filter	Nov. 20.		MBR456 - 051009.	
- 04	T1-OC	500AG×5,	Trap, Filter	Nov. 17.		- B1-OC Toluene - 051010.	
05	T2-OC	500AG×3,	Trap, Filter	Nov. 18.		T1-OC " - 051011	
06.	T3-OC	500AG×2,	Trap, Filter	Nov. 18.		T2-OC " - 051012.	
07.	T4-OC	500AG×2,	Trap, Filter	Nov. 19		T3-OC " - 051013.	
08.	T5-OC	500AG×2,	Trap, Filter	Nov. 19.		T4-OC " - 051014.	
						T5-OC " - 051015.	
						500AG rec.	
051016.	T1-OC Nozzle proof	250AG	- HOLD.	Nov. 16.			

TAT (Turnaround Time)

RUSH TAT MUST HAVE PRIOR APPROVAL

some exceptions apply please contact Lab

- STD 10 Business Days ☐
- RUSH 5 Business Days ☐
- RUSH 48hr ☐
- RUSH 24hr ☐
- Other Business Days ____

PROJECT INFORMATION

Project #:

Site:

PO#:

Zenon Quote #:

Zenon Project #:

Zenon Contact:

SPECIAL DETECTION LIMITS

MISA ☐

SPECIAL REQUIREMENTS / REGULATIONS

REMARKS

Rec'd By:

Storage Loc.:

Date/Time

Client Signature:

Affiliation:

Date/Time:

Received By:

Affiliation:

Date/Time:

WHITE - CLIENT / YELLOW - LAB / PINK - FILE

SEE OVER FOR COMPLETION & SAMPLING INSTRUCTIONS

000056

MBR456 - 051017.

CHAIN OF CUSTODY

Zenon Environmental Laboratories
5555 North Service Road
Burlington, Ontario L7L 5H7

Tel: (905) 332-8788
Fax: (905) 332-9169

Page _____ of _____

CLIENT INFORMATION

Company Name: Rigo-OH (Bovar-Concord).
Project Manager:
Address:
Phone #: Fax #:
Storage:
Sampled by:

ANALYSIS REQUESTED

Zenon Use Only	Field Sample ID	# Bottles	Matrix	Date	Time	9057-HCL	9057-CL2				Level of contamination (low, high, unknown)
51018.	T1-HCL-H2SO4	500P.	Train	Nov.17.	→	X	X	←	T1-HCL-NaOH	51028.	
19.	T2-HCL-H2SO4	↓	↓	Nov.17	→	X	X	←	T2-HCL-NaOH	51027	
20.	T3-HCL-H2SO4			Nov.18.	→	X	X	←	T3-HCL-NaOH	51028	
21.	T4-HCL-H2SO4			Nov.18.	→	X	X	←	T4-HCL-NaOH	51029	
22	T5-HCL-H2SO4			Nov.19.	→	X	X	←	T5-HCL-NaOH	51030	
23	T6-HCL-H2SO4			Nov.19	→	X	X	←	T6-HCL-NaOH	51031	
24	T7-HCL-H2SO4			Nov.20	→	X	X	←	T7-HCL-NaOH	51032.	
25.	T8-HCL-H2SO4	↓	↓	Nov.20.	→	X	X	←	T8-HCL-NaOH	51033.	

TAT (Turnaround Time)

RUSH TAT MUST HAVE PRIOR APPROVAL

**some exceptions apply please contact Lab*

- STD 10 Business Days ☐
- RUSH 5 Business Days ☐
- RUSH 48hr ☐
- RUSH 24hr ☐
- Other Business Days ____

PROJECT INFORMATION

Project #:
Site:
PO#:
Zenon Quote #:
Zenon Project #:
Zenon Contact:

SPECIAL DETECTION LIMITS

MISA ☐

SPECIAL REQUIREMENTS / REGULATIONS

REMARKS

Rec'd By:
Storage Loc.:
Date/Time

Client Signature:
Affiliation:
Date/Time:

Received By:
Affiliation:
Date/Time:

WHITE - CLIENT / YELLOW - LAB / PINK - FILE

SEE OVER FOR COMPLETION & SAMPLING INSTRUCTIONS

000059

TCLP LABORATORY REPORT

Combined Ash Sample Results

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

January 09, 1996
Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 20 A TCLP
NUS SAMPLE NO: P0330952
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNIT
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/21(1200)	
		End Date/Time	12/22(0715)	
		Extraction Fluid	2	
		Final Leachate pH	5.2	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.49	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1.7	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.15	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0002	mg/L
8	APBL	Lead, Leachable (Pb)	26	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.1	mg/L
		2,4,5-trichlorophenol	< 0.5	mg/L
		2,4,6-trichlorophenol	< 0.1	mg/L
		2,4-dinitrotoluene	< 0.1	mg/L
		2-methylphenol [o-cresol]	< 0.1	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.1	mg/L
		hexachlorobenzene	< 0.1	mg/L
		hexachlorobutadiene	< 0.1	mg/L
		hexachloroethane	< 0.1	mg/L
		nitrobenzene	< 0.1	mg/L
		pentachlorophenol	< 0.5	mg/L
		pyridine	< 0.1	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

January 09, 1996
Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 20 A TCLP
NUS SAMPLE NO: P0330952

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G130L	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/19/1145	
		End Date/Time	12/20/0620	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

Halliburton NUS CORPORATION

NUS LABORATORY
5350 Campbells Run Road
Pittsburgh, Pennsylvania 15205

TEL: (412) 747-2500
FAX: (412) 747-2559

January 09, 1996
Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 20 P TCLP
NUS SAMPLE NO: P0330953
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/21(1200)	
		End Date/Time	12/22(0715)	
		Extraction Fluid	2	
		Final Leachate pH	5.4	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.82	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1.6	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.06	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0005	mg/L
8	APBL	Lead, Leachable (Pb)	17	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.1	mg/L
		2,4,5-trichlorophenol	< 0.5	mg/L
		2,4,6-trichlorophenol	< 0.1	mg/L
		2,4-dinitrotoluene	< 0.1	mg/L
		2-methylphenol [o-cresol]	< 0.1	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.1	mg/L
		hexachlorobenzene	< 0.1	mg/L
		hexachlorobutadiene	< 0.1	mg/L
		hexachloroethane	< 0.1	mg/L
		nitrobenzene	< 0.1	mg/L
		pentachlorophenol	< 0.5	mg/L
		pyridine	< 0.1	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L

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Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 20 P TCLP
NUS SAMPLE NO: P0330953

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G130L	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/19(1145)	
		End Date/Time	12/20(0620)	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

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Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 22 A TCLP
NUS SAMPLE NO: P0330954
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/21(1200)	
		End Date/Time	12/22(0715)	
		Extraction Fluid	2	
		Final Leachate pH	5.0	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.49	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1.3	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.12	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0004	mg/L
8	APBL	Lead, Leachable (Pb)	15	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.1	mg/L
		2,4,5-trichlorophenol	< 0.5	mg/L
		2,4,6-trichlorophenol	< 0.1	mg/L
		2,4-dinitrotoluene	< 0.1	mg/L
		2-methylphenol [o-cresol]	< 0.1	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.1	mg/L
		hexachlorobenzene	< 0.1	mg/L
		hexachlorobutadiene	< 0.1	mg/L
		hexachloroethane	< 0.1	mg/L
		nitrobenzene	< 0.1	mg/L
		pentachlorophenol	< 0.5	mg/L
		pyridine	< 0.1	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L

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LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 22 A TCLP
NUS SAMPLE NO: P0330954

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G130L	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/19(1145)	
		End Date/Time	12/20(0620)	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

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January 09, 1996
Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 24 A TCLP
NUS SAMPLE NO: P0330955
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/21(1200)	
		End Date/Time	12/22(0715)	
		Extraction Fluid	2	
		Final Leachate pH	4.9	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.60	mg/L
5	ACDL	Cadmium, Leachable (Cd)	0.97	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.12	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0005	mg/L
8	APBL	Lead, Leachable (Pb)	25	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.1	mg/L
		2,4,5-trichlorophenol	< 0.5	mg/L
		2,4,6-trichlorophenol	< 0.1	mg/L
		2,4-dinitrotoluene	< 0.1	mg/L
		2-methylphenol [o-cresol]	< 0.1	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.1	mg/L
		hexachlorobenzene	< 0.1	mg/L
		hexachlorobutadiene	< 0.1	mg/L
		hexachloroethane	< 0.1	mg/L
		nitrobenzene	< 0.1	mg/L
		pentachlorophenol	< 0.5	mg/L
		pyridine	< 0.1	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L

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LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 24 A TCLP
NUS SAMPLE NO: P0330955

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G130L	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/20(1200)	
		End Date/Time	12/21(0700)	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

2 An elevated detection limit was reported on this attribute due to sample matrix interference.

3 An elevated detection limit was reported on this attribute due to sample matrix interference.

9 An elevated detection limit was reported on this attribute due to sample matrix interference.

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LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 24 P TCLP
NUS SAMPLE NO: P0330956
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/21(1200)	
		End Date/Time	12/22(0715)	
		Extraction Fluid	2	
		Final Leachate pH	4.9	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.17	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1.3	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.17	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0003	mg/L
8	APBL	Lead, Leachable (Pb)	18	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.1	mg/L
		2,4,5-trichlorophenol	< 0.5	mg/L
		2,4,6-trichlorophenol	< 0.1	mg/L
		2,4-dinitrotoluene	< 0.1	mg/L
		2-methylphenol [o-cresol]	< 0.1	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.1	mg/L
		hexachlorobenzene	< 0.1	mg/L
		hexachlorobutadiene	< 0.1	mg/L
		hexachloroethane	< 0.1	mg/L
		nitrobenzene	< 0.1	mg/L
		pentachlorophenol	< 0.5	mg/L
		pyridine	< 0.1	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L

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January 09, 1996
Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 24 P TCLP
NUS SAMPLE NO: P0330956

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G130L	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/20(1200)	
		End Date/Time	12/21(0700)	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

2 An elevated detection limit was reported on this attribute due to sample matrix interference.

3 An elevated detection limit was reported on this attribute due to sample matrix interference.

9 An elevated detection limit was reported on this attribute due to sample matrix interference.

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Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 27 A TCLP
NUS SAMPLE NO: P0330957
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/21(1200)	
		End Date/Time	12/22(0715)	
		Extraction Fluid	2	
		Final Leachate pH	4.9	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.30	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1.5	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.10	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0002	mg/L
8	APBL	Lead, Leachable (Pb)	18	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.1	mg/L
		2,4,5-trichlorophenol	< 0.5	mg/L
		2,4,6-trichlorophenol	< 0.1	mg/L
		2,4-dinitrotoluene	< 0.1	mg/L
		2-methylphenol [o-cresol]	< 0.1	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.1	mg/L
		hexachlorobenzene	< 0.1	mg/L
		hexachlorobutadiene	< 0.1	mg/L
		hexachloroethane	< 0.1	mg/L
		nitrobenzene	< 0.1	mg/L
		pentachlorophenol	< 0.5	mg/L
		pyridine	< 0.1	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L

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LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 27 A TCLP
NUS SAMPLE NO: P0330957

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G13OL	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/20(1200)	
		End Date/Time	12/21(0700)	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

2 An elevated detection limit was reported on this attribute due to sample matrix interference.

3 An elevated detection limit was reported on this attribute due to sample matrix interference.

9 An elevated detection limit was reported on this attribute due to sample matrix interference.

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January 09, 1996
Report No.: 00028922
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LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 27 P TCLP
NUS SAMPLE NO: P0330958
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/26(1335)	
		End Date/Time	12/27(0700)	
		Extraction Fluid	2	
		Final Leachate pH	4.9	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.35	mg/L
5	ACDL	Cadmium, Leachable (Cd)	0.97	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.18	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0003	mg/L
8	APBL	Lead, Leachable (Pb)	17	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.10	mg/L
		2,4,5-trichlorophenol	< 0.50	mg/L
		2,4,6-trichlorophenol	< 0.10	mg/L
		2,4-dinitrotoluene	< 0.10	mg/L
		2-methylphenol [o-cresol]	< 0.10	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.10	mg/L
		hexachlorobenzene	< 0.10	mg/L
		hexachlorobutadiene	< 0.10	mg/L
		hexachloroethane	< 0.10	mg/L
		nitrobenzene	< 0.10	mg/L
		pentachlorophenol	< 0.50	mg/L
		pyridine	< 0.10	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L

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FAX: (412) 747-2559

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 27 P TCLP
NUS SAMPLE NO: P0330958

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G13OL	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/20(1200)	
		End Date/Time	12/21(0700)	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

2 An elevated detection limit was reported on this attribute due to sample matrix interference.

3 An elevated detection limit was reported on this attribute due to sample matrix interference.

9 An elevated detection limit was reported on this attribute due to sample matrix interference.

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January 09, 1996
Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 28 A TCLP
NUS SAMPLE NO: P0330959
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/26(1335)	
		End Date/Time	12/27(0700)	
		Extraction Fluid	2	
		Final Leachate pH	5.0	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.17	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1.5	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.14	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0004	mg/L
8	APBL	Lead, Leachable (Pb)	26	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.10	mg/L
		2,4,5-trichlorophenol	< 0.50	mg/L
		2,4,6-trichlorophenol	< 0.10	mg/L
		2,4-dinitrotoluene	< 0.10	mg/L
		2-methylphenol [o-cresol]	< 0.10	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.10	mg/L
		hexachlorobenzene	< 0.10	mg/L
		hexachlorobutadiene	< 0.10	mg/L
		hexachloroethane	< 0.10	mg/L
		nitrobenzene	< 0.10	mg/L
		pentachlorophenol	< 0.50	mg/L
		pyridine	< 0.10	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L

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January 09, 1996
Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 28 A TCLP
NUS SAMPLE NO: P0330959

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G130L	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/21(1130)	
		End Date/Time	12/22(0715)	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

2 An elevated detection limit was reported on this attribute due to sample matrix interference.

3 An elevated detection limit was reported on this attribute due to sample matrix interference.

9 An elevated detection limit was reported on this attribute due to sample matrix interference.

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January 09, 1996
Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 28 P TCLP
NUS SAMPLE NO: P0330960
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/26(1335)	
		End Date/Time	12/27(0700)	
		Extraction Fluid	2	
		Final Leachate pH	4.9	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.35	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1.0	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.18	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0003	mg/L
8	APBL	Lead, Leachable (Pb)	15	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.10	mg/L
		2,4,5-trichlorophenol	< 0.50	mg/L
		2,4,6-trichlorophenol	< 0.10	mg/L
		2,4-dinitrotoluene	< 0.10	mg/L
		2-methylphenol [o-cresol]	< 0.10	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.10	mg/L
		hexachlorobenzene	< 0.10	mg/L
		hexachlorobutadiene	< 0.10	mg/L
		hexachloroethane	< 0.10	mg/L
		nitrobenzene	< 0.10	mg/L
		pentachlorophenol	< 0.50	mg/L
		pyridine	< 0.10	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L

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LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 28 P TCLP
NUS SAMPLE NO: P0330960

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G130L	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/21(1130)	
		End Date/Time	12/22(0715)	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

2 An elevated detection limit was reported on this attribute due to sample matrix interference.

3 An elevated detection limit was reported on this attribute due to sample matrix interference.

9 An elevated detection limit was reported on this attribute due to sample matrix interference.

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January 09, 1996
Report No.: 00028922

LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
ADDRESS: 1 BEREA COMMONS, SUITE 211
BEREA, OH 44017-2534
ATTENTION: H. GREGOR RIGO

NUS CLIENT NO: 1756 0001
WORK ORDER NO: 55830
VENDOR NO: 16423300

Carbon Copy:

SAMPLE ID: 29 P TCLP
NUS SAMPLE NO: P0330961
P.O. NO.:

DATE SAMPLED: UnAvail
DATE RECEIVED: 15-DEC-95
APPROVED BY: Simanic, Joanne

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	S903	TCLP Bottle Extraction		
		Begin Date/Time	12/26(1335)	
		End Date/Time	12/27(0700)	
		Extraction Fluid	2	
		Final Leachate pH	4.9	
2	AAGL	Silver, Leachable (Ag)	< 0.02	mg/L
3	AASL	Arsenic, Leachable (As)	< 0.2	mg/L
4	ABAL	Barium, Leachable (Ba)	0.18	mg/L
5	ACDL	Cadmium, Leachable (Cd)	1.4	mg/L
6	ACRL	Chromium, Leachable (Cr)	0.15	mg/L
7	AHGL	Mercury, Leachable (Hg)	0.0002	mg/L
8	APBL	Lead, Leachable (Pb)	17	mg/L
9	ASEL	Selenium, Leachable (Se)	< 0.2	mg/L
10	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.10	mg/L
		2,4,5-trichlorophenol	< 0.50	mg/L
		2,4,6-trichlorophenol	< 0.10	mg/L
		2,4-dinitrotoluene	< 0.10	mg/L
		2-methylphenol [o-cresol]	< 0.10	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.10	mg/L
		hexachlorobenzene	< 0.10	mg/L
		hexachlorobutadiene	< 0.10	mg/L
		hexachloroethane	< 0.10	mg/L
		nitrobenzene	< 0.10	mg/L
		pentachlorophenol	< 0.50	mg/L
		pyridine	< 0.10	mg/L
12	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L

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LABORATORY ANALYSIS REPORT

CLIENT NAME: RIGO & RIGO ASSOCIATES
SAMPLE ID: 29 P TCLP
NUS SAMPLE NO: P0330961

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		methoxychlor	< 0.50	ug/L
		toxaphene	< 1.0	ug/L
14	G130L	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.50	ug/L
		2,4-D	< 5.0	ug/L
16	S904	Zero Headspace Extraction [ZHE]		
		Begin Date/Time	12/21(1130)	
		End Date/Time	12/22(0715)	
17	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.05	mg/L
		1,2-dichloroethane	< 0.05	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.5	mg/L
		benzene	< 0.05	mg/L
		carbon tetrachloride	< 0.05	mg/L
		chlorobenzene	< 0.05	mg/L
		chloroform	< 0.05	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.05	mg/L
		trichloroethene [trichloroethylene]	< 0.05	mg/L
		vinyl chloride	< 0.1	mg/L

COMMENTS:

2 An elevated detection limit was reported on this attribute due to sample matrix interference.

3 An elevated detection limit was reported on this attribute due to sample matrix interference.

9 An elevated detection limit was reported on this attribute due to sample matrix interference.

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QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

SAMPLE ID: 20 A TCLP NUS SAMPLE NO: P0330952

LN	TEST CODE	BATCH	SAMPLE PREPARATION LR-METHOD	DATE/TIME	ANALYST	SAMPLE ANALYSIS LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
1	S903	39570	NA			19-1311	22-DEC-95 715	JK	0	
2	AAGL	39616	C4-3010A	22-DEC-95 1844	BW	C4-6010A	03-JAN-96 1549	PAG	39616	3560
3	AASL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
4	ABAL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
5	ACDL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
6	ACRL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
7	AHGL	39659	NA			C6-7470A	26-DEC-95 1445	PAG	39659	PS200
8	APBL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
9	ASEL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
10	OTCLP	39594	C4-3510A	26-DEC-95 0800	RJM	C4-8270A	27-DEC-95 2204	MAR	0	GCMSG
12	G121L	39596	C6-3510B	26-DEC-95 0800	RJM	C6-8081	27-DEC-95 1112	BS	0	RTX-1701
14	G130L	39597	C4-8150A	26-DEC-95 0800	RJM	C4-8150A	26-DEC-95 1833	BS	0	RTX-1701
16	S904	39523	NA			19-1311	20-DEC-95 620	JK	0	
17	OVZHE	39726	NA			C6-8260A	28-DEC-95 1643	RH	0	GCMSH

LR Method Literature Reference
19 EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4 EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6 EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

SAMPLE ID: 20 P TCLP NUS SAMPLE NO: P0330953

LN	TEST CODE	BATCH	SAMPLE PREPARATION LR-METHOD	DATE/TIME	ANALYST	SAMPLE ANALYSIS LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
1	S903	39570	NA			19-1311	22-DEC-95 715	JK	0	
2	AAGL	39616	C4-3010A	22-DEC-95 1844	BW	C4-6010A	03-JAN-96 1549	PAG	39616	3560
3	AASL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
4	ABAL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
5	ACDL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
6	ACRL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
7	AHGL	39659	NA			C6-7470A	26-DEC-95 1445	PAG	39659	PS200
8	APBL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
9	ASEL	39616	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39616	3560
10	OTCLP	39594	C4-3510A	26-DEC-95 0800	RJM	C4-8270A	27-DEC-95 2247	MAR	0	GCMSG
12	G121L	39596	C6-3510B	26-DEC-95 0800	RJM	C6-8081	27-DEC-95 1146	BS	0	RTX-1701
14	G130L	39597	C4-8150A	26-DEC-95 0800	RJM	C4-8150A	26-DEC-95 1915	BS	0	RTX-1701
16	S904	39523	NA			19-1311	20-DEC-95 620	JK	0	
17	OVZHE	39726	NA			C6-8260A	28-DEC-95 1817	RH	0	GCMSH

LR Method Literature Reference

Halliburton NUS CORPORATION

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FAX: (412) 747-2559

QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT

LR Method Literature Reference

19 EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4 EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6 EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

SAMPLE ID: 22 A TCLP NUS SAMPLE NO: P0330954

1	S903	39570	NA		19-1311	22-DEC-95	715	JK	0	
2	AAGL	39616	C4-3010A	22-DEC-95 1844 BW	C4-6010A	03-JAN-96	1549	PAG	39616	3560
3	AASL	39616	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39616	3560
4	ABAL	39616	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39616	3560
5	ACDL	39616	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39616	3560
6	ACRL	39616	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39616	3560
7	AHGL	39659	NA		C6-7470A	26-DEC-95	1445	PAG	39659	PS200
8	APBL	39616	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39616	3560
9	ASEL	39616	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39616	3560
10	OTCLP	39594	C4-3510A	26-DEC-95 0800 RJM	C4-8270A	27-DEC-95	2330	MAR	0	GCMSG
12	G121L	39596	C6-3510B	26-DEC-95 0800 RJM	C6-8081	27-DEC-95	1221	BS	0	RTX-1701
14	G130L	39597	C4-8150A	26-DEC-95 0800 RJM	C4-8150A	26-DEC-95	1956	BS	0	RTX-1701
16	S904	39523	NA		19-1311	20-DEC-95	620	JK	0	
17	OVZHE	39726	NA		C6-8260A	28-DEC-95	1849	RH	0	GCMSH

LR Method Literature Reference
19 EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4 EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6 EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

SAMPLE ID: 24 A TCLP NUS SAMPLE NO: P0330955

1	S903	39570	NA		19-1311	22-DEC-95	715	JK	0	
2	AAGL	39616	C4-3010A	22-DEC-95 1844 BW	C4-6010A	03-JAN-96	1549	PAG	39616	3560
3	AASL	39616	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39616	3560
4	ABAL	39616	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39616	3560
5	ACDL	39616	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39616	3560

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FAX: (412) 747-2559

QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION				SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST		LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
6	ACRL	39616	C4-3010A				C4-6010A	03-JAN-96 1549	PAG	39616	3560
7	AHGL	39659	NA				C6-7470A	26-DEC-95 1445	PAG	39659	PS200
8	APBL	39616	C4-3010A				C4-6010A	03-JAN-96 1549	PAG	39616	3560
9	ASEL	39616	C4-3010A				C4-6010A	03-JAN-96 1549	PAG	39616	3560
10	OTCLP	39594	C4-3510A	26-DEC-95 0800	RJM		C4-8270A	28-DEC-95 13	MAR	0	GCMSG
12	G121L	39596	C6-3510B	26-DEC-95 0800	RJM		C6-8081	27-DEC-95 1255	BS	0	RTX-1701
14	G130L	39597	C4-8150A	26-DEC-95 0800	RJM		C4-8150A	26-DEC-95 2037	BS	0	RTX-1701
16	S904	39552	NA				19-1311	21-DEC-95 700	JK	0	
17	OVZHE	39726	NA				C6-8260A	28-DEC-95 1920	RH	0	GCMSH

LR	Method Literature Reference
19	EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4	EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6	EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

SAMPLE ID: 24 P TCLP NUS SAMPLE NO: P0330956

1	S903	39570	NA				19-1311	22-DEC-95 715	JK	0	
2	AAGL	39673	C4-3010A	28-DEC-95 0800	DEA		C4-6010A	03-JAN-96 1549	PAG	39673	3560
3	AASL	39673	C4-3010A				C4-6010A	03-JAN-96 1549	PAG	39673	3560
4	ABAL	39673	C4-3010A				C4-6010A	03-JAN-96 1549	PAG	39673	3560
5	ACDL	39673	C4-3010A				C4-6010A	03-JAN-96 1549	PAG	39673	3560
6	ACRL	39673	C4-3010A				C4-6010A	03-JAN-96 1549	PAG	39673	3560
7	AHGL	39659	NA				C6-7470A	26-DEC-95 1445	PAG	39659	PS200
8	APBL	39673	C4-3010A				C4-6010A	03-JAN-96 1549	PAG	39673	3560
9	ASEL	39673	C4-3010A				C4-6010A	03-JAN-96 1549	PAG	39673	3560
10	OTCLP	39594	C4-3510A	26-DEC-95 0800	RJM		C4-8270A	28-DEC-95 56	MAR	0	GCMSG
12	G121L	39596	C6-3510B	26-DEC-95 0800	RJM		C6-8081	27-DEC-95 1330	BS	0	RTX-1701
14	G130L	39597	C4-8150A	26-DEC-95 0800	RJM		C4-8150A	26-DEC-95 2118	BS	0	RTX-1701
16	S904	39552	NA				19-1311	21-DEC-95 700	JK	0	
17	OVZHE	39726	NA				C6-8260A	28-DEC-95 1952	RH	0	GCMSH

LR	Method Literature Reference
19	EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4	EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6	EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

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QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
SAMPLE ID: 27 A TCLP							NUS SAMPLE NO: P0330957			
1	S903	39570	NA			19-1311	22-DEC-95 715	JK	0	
2	AAGL	39673	C4-3010A	28-DEC-95 0800	DEA	C4-6010A	03-JAN-96 1549	PAG	39673	3560
3	AASL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
4	ABAL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
5	ACDL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
6	ACRL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
7	AHGL	39660	NA			C6-7470A	26-DEC-95 1445	PAG	39660	PS200
8	APBL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
9	ASEL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
10	OTCLP	39594	C4-3510A	26-DEC-95 0800	RJM	C4-8270A	28-DEC-95 139	MAR	0	GCMSG
12	G121L	39596	C6-3510B	26-DEC-95 0800	RJM	C6-8081	27-DEC-95 1408	BS	0	RTX-1701
14	G130L	39597	C4-8150A	26-DEC-95 0800	RJM	C4-8150A	26-DEC-95 2200	BS	0	RTX-1701
16	S904	39552	NA			19-1311	21-DEC-95 700	JK	0	
17	OVZHE	39726	NA			C6-8260A	28-DEC-95 2024	RH	0	GCMSH

LR Method Literature Reference
19 EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4 EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6 EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

SAMPLE ID: 27 P TCLP							NUS SAMPLE NO: P0330958			
1	S903	39630	NA			19-1311	27-DEC-95 700	JK	0	
2	AAGL	39673	C4-3010A	28-DEC-95 0800	DEA	C4-6010A	03-JAN-96 1549	PAG	39673	3560
3	AASL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
4	ABAL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
5	ACDL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
6	ACRL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
7	AHGL	39776	NA			C6-7470A	02-JAN-96 1030	BJM	39776	PS200
8	APBL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
9	ASEL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
10	OTCLP	39669	C4-3510A	28-DEC-95 0800	RJM	C4-8270A	29-DEC-95 445	AS	0	GCMSF
12	G121L	39671	C6-3510B	28-DEC-95 0800	RJM	C6-8081	28-DEC-95 1418	BS	0	RTX-1701
14	G130L	39672	C4-8150A	28-DEC-95 0800	RJM	C4-8150A	28-DEC-95 1539	BS	0	RTX-1701
16	S904	39552	NA			19-1311	21-DEC-95 700	JK	0	
17	OVZHE	39726	NA			C6-8260A	28-DEC-95 2055	RH	0	GCMSH

LR Method Literature Reference

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SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT

LR Method Literature Reference

19 EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4 EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6 EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

SAMPLE ID: 28 A TCLP NUS SAMPLE NO: P0330959

1	S903	39630	NA		19-1311	27-DEC-95	700	JK	0	
2	AAGL	39673	C4-3010A	28-DEC-95 0800 DEA	C4-6010A	03-JAN-96	1549	PAG	39673	3560
3	AASL	39673	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39673	3560
4	ABAL	39673	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39673	3560
5	ACDL	39673	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39673	3560
6	ACRL	39673	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39673	3560
7	AHGL	39776	NA		C6-7470A	02-JAN-96	1030	BJM	39776	PS200
8	APBL	39673	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39673	3560
9	ASEL	39673	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39673	3560
10	OTCLP	39669	C4-3510A	28-DEC-95 0800 RJM	C4-8270A	29-DEC-95	533	AS	0	GCMSF
12	G121L	39671	C6-3510B	28-DEC-95 0800 RJM	C6-8081	28-DEC-95	1453	BS	0	RTX-1701
14	G130L	39672	C4-8150A	28-DEC-95 0800 RJM	C4-8150A	28-DEC-95	1621	BS	0	RTX-1701
16	S904	39571	NA		19-1311	22-DEC-95	715	JK	0	
17	OVZHE	39803	NA		C6-8260A	03-JAN-96	1351	RH	0	GCMSH

LR Method Literature Reference
19 EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4 EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6 EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

SAMPLE ID: 28 P TCLP NUS SAMPLE NO: P0330960

1	S903	39630	NA		19-1311	27-DEC-95	700	JK	0	
2	AAGL	39673	C4-3010A	28-DEC-95 0800 DEA	C4-6010A	03-JAN-96	1549	PAG	39673	3560
3	AASL	39673	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39673	3560
4	ABAL	39673	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39673	3560
5	ACDL	39673	C4-3010A		C4-6010A	03-JAN-96	1549	PAG	39673	3560

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SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
6	ACRL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
7	AHGL	39776	NA			C6-7470A	02-JAN-96 1030	BJM	39776	PS200
8	APBL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
9	ASEL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
10	OTCLP	39669	C4-3510A	28-DEC-95 0800	RJM	C4-8270A	29-DEC-95 620	AS	0	GCMSF
12	G121L	39671	C6-3510B	28-DEC-95 0800	RJM	C6-8081	28-DEC-95 1527	BS	0	RTX-1701
14	G130L	39672	C4-8150A	28-DEC-95 0800	RJM	C4-8150A	28-DEC-95 1702	BS	0	RTX-1701
16	S904	39571	NA			19-1311	22-DEC-95 715	JK	0	
17	OVZHE	39803	NA			C6-8260A	03-JAN-96 1423	RH	0	GCMSH

LR	Method Literature Reference
19	EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4	EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6	EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

SAMPLE ID: 29 P TCLP NUS SAMPLE NO: P0330961

1	S903	39630	NA			19-1311	27-DEC-95 700	JK	0	
2	AAGL	39673	C4-3010A	28-DEC-95 0800	DEA	C4-6010A	03-JAN-96 1549	PAG	39673	3560
3	AASL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
4	ABAL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
5	ACDL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
6	ACRL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
7	AHGL	39776	NA			C6-7470A	02-JAN-96 1030	BJM	39776	PS200
8	APBL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
9	ASEL	39673	C4-3010A			C4-6010A	03-JAN-96 1549	PAG	39673	3560
10	OTCLP	39669	C4-3510A	28-DEC-95 0800	RJM	C4-8270A	29-DEC-95 708	AS	0	GCMSF
12	G121L	39671	C6-3510B	28-DEC-95 0800	RJM	C6-8081	28-DEC-95 1602	BS	0	RTX-1701
14	G130L	39672	C4-8150A	28-DEC-95 0800	RJM	C4-8150A	28-DEC-95 1743	BS	0	RTX-1701
16	S904	39571	NA			19-1311	22-DEC-95 715	JK	0	
17	OVZHE	39803	NA			C6-8260A	03-JAN-96 1454	RH	0	GCMSH

LR	Method Literature Reference
19	EPA SW-846 (1986). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C4	EPA SW-846 (1992). "Test Methods for Evaluating Solid Waste, Physical/Chemical M
C6	EPA SW-846(1994). "Test Methods for Evaluating Solid Waste, Physical/Chemical Me

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January 09, 1996
Report No.: 00028922

QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
SAMPLE ID:	20 A TCLP		NUS SAMPLE NO:	P0330952	
11	$BNAW	GC/MS BNA SURROGATES			10
		2,4,6-tribromophenol	67	-	
		2-fluorobiphenyl	78	-	
		2-fluorophenol	25	-	
		nitrobenzene-d5	80	-	
		p-terphenyl-d14	103	-	
		phenol-d5	19	-	
13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	143	-	
		tetrachloro-m-xylene	136	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	82	-	
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		1,2-dichloroethane-d4	97	-	
		4-bromofluorobenzene	99	-	
		toluene-d8	99	-	
SAMPLE ID:	20 P TCLP		NUS SAMPLE NO:	P0330953	
11	$BNAW	GC/MS BNA SURROGATES			10
		2-fluorophenol	24	-	
		nitrobenzene-d5	89	-	
		p-terphenyl-d14	102	-	
		phenol-d5	19	-	
		2,4,6-tribromophenol	64	-	
		2-fluorobiphenyl	82	-	
13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	129	-	
		tetrachloro-m-xylene	130	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	67	-	
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		1,2-dichloroethane-d4	96	-	
		4-bromofluorobenzene	98	-	
		toluene-d8	99	-	
SAMPLE ID:	22 A TCLP		NUS SAMPLE NO:	P0330954	
11	$BNAW	GC/MS BNA SURROGATES			10
		2,4,6-tribromophenol	78	-	
		2-fluorobiphenyl	83	-	
		2-fluorophenol	30	-	

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SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
		nitrobenzene-d5	85	-	
		p-terphenyl-d14	88	-	
		phenol-d5	24	-	
13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	114	-	
		tetrachloro-m-xylene	111	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	72	-	
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		toluene-d8	100	-	
		1,2-dichloroethane-d4	95	-	
		4-bromofluorobenzene	99	-	

SAMPLE ID: 24 A TCLP NUS SAMPLE NO: P0330955

11	$BNAW	GC/MS BNA SURROGATES			10
		2,4,6-tribromophenol	57	-	
		2-fluorobiphenyl	79	-	
		2-fluorophenol	20 *	-	
		nitrobenzene-d5	84	-	
		p-terphenyl-d14	86	-	
		phenol-d5	16	-	

* The recovery of the semivolatile surrogate 2-fluorophenol was below QC limits during the original and reextracted analyses of the sample.

13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	124	-	
		tetrachloro-m-xylene	121	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	64	-	
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		1,2-dichloroethane-d4	96	-	
		4-bromofluorobenzene	98	-	
		toluene-d8	100	-	

SAMPLE ID: 24 P TCLP NUS SAMPLE NO: P0330956

11	$BNAW	GC/MS BNA SURROGATES			10
		2,4,6-tribromophenol	74	-	
		2-fluorobiphenyl	78	-	
		2-fluorophenol	28	-	
		nitrobenzene-d5	80	-	
		p-terphenyl-d14	85	-	
		phenol-d5	23	-	

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SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	130	-	
		tetrachloro-m-xylene	125	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	78	-	
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		1,2-dichloroethane-d4	98	-	
		4-bromofluorobenzene	98	-	
		toluene-d8	99	-	
SAMPLE ID:	27 A TCLP		NUS SAMPLE NO:	P0330957	
11	$BNAW	GC/MS BNA SURROGATES			10
		2,4,6-tribromophenol	58	-	
		2-fluorobiphenyl	78	-	
		2-fluorophenol	25	-	
		nitrobenzene-d5	80	-	
		p-terphenyl-d14	83	-	
		phenol-d5	19	-	
13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	117	-	
		tetrachloro-m-xylene	122	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	69	-	
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		1,2-dichloroethane-d4	97	-	
		4-bromofluorobenzene	98	-	
		toluene-d8	100	-	
SAMPLE ID:	27 P TCLP		NUS SAMPLE NO:	P0330958	
11	$BNAW	GC/MS BNA SURROGATES			10
		2,4,6-tribromophenol	77	-	
		2-fluorobiphenyl	79	-	
		2-fluorophenol	34	-	
		nitrobenzene-d5	84	-	
		p-terphenyl-d14	83	-	
		phenol-d5	27	-	
13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	115	-	
		tetrachloro-m-xylene	111	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	57	-	

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SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		1,2-dichloroethane-d4	94	-	
		4-bromofluorobenzene	97	-	
		toluene-d8	100	-	
SAMPLE ID:	28 A TCLP		NUS SAMPLE NO:	P0330959	
11	$BNAW	GC/MS BNA SURROGATES			10
		2,4,6-tribromophenol	71	-	
		2-fluorobiphenyl	78	-	
		2-fluorophenol	27	-	
		nitrobenzene-d5	82	-	
		p-terphenyl-d14	85	-	
		phenol-d5	20	-	
13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	113	-	
		tetrachloro-m-xylene	113	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	68	-	
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		1,2-dichloroethane-d4	96	-	
		4-bromofluorobenzene	96	-	
		toluene-d8	97	-	
SAMPLE ID:	28 P TCLP		NUS SAMPLE NO:	P0330960	
11	$BNAW	GC/MS BNA SURROGATES			10
		2,4,6-tribromophenol	75	-	
		2-fluorobiphenyl	75	-	
		2-fluorophenol	33	-	
		nitrobenzene-d5	79	-	
		p-terphenyl-d14	83	-	
		phenol-d5	26	-	
13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	117	-	
		tetrachloro-m-xylene	115	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	79	-	
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		1,2-dichloroethane-d4	97	-	
		4-bromofluorobenzene	97	-	
		toluene-d8	98	-	

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QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
SAMPLE ID:	29 P TCLP		NUS SAMPLE NO:	P0330961	
11	$BNAW	GC/MS BNA SURROGATES			10
		2,4,6-tribromophenol	79	-	
		2-fluorobiphenyl	79	-	
		2-fluorophenol	33	-	
		nitrobenzene-d5	83	-	
		p-terphenyl-d14	90	-	
		phenol-d5	25	-	
13	$PSTW	PESTICIDES SURROGATE			12
		decachlorobiphenyl	114	-	
		tetrachloro-m-xylene	109	-	
15	$HRBW	HERBICIDES SURROGATE			14
		dichlorophenylacetic acid	68	-	
18	$VOAW	GC/MS VOLATILES SURROGATES			17
		1,2-dichloroethane-d4	96	-	
		4-bromofluorobenzene	98	-	
		toluene-d8	98	-	

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QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	PERCENT RECOVERY	DUPLICATE RECOVERY	RPD	ACCEPTANCE LIMITS
BATCH: 39594	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0332081
OTCLP	SEMIVOLATILES - TCLP				
	1,4-dichlorobenzene [p-dichlorobenzene]	59.7		NA	-
	2,4,5-trichlorophenol	75.8		NA	-
	2,4,6-trichlorophenol	79.2		NA	-
	2,4-dinitrotoluene	90.8		NA	-
	2-methylphenol [o-cresol]	72.5		NA	-
	3/4-methylphenol [m-cresol/p-cresol[B]	73.2		NA	-
	hexachlorobenzene	97.1		NA	-
	hexachlorobutadiene	59.1		NA	-
	hexachloroethane	58.6		NA	-
	nitrobenzene	74.0		NA	-
	pentachlorophenol	72.1		NA	-
BATCH: 39596	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0332085
G121L	ORGANOCHLORINE PESTICIDES - TCLP				
	endrin	120		NA	-
	methoxychlor	110		NA	-
BATCH: 39597	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0332087
G130L	CHLORINATED HERBICIDES - TCLP				
	2,4,5-TP [silvex]	93		NA	-
	2,4-D	92		NA	-
BATCH: 39616	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0332121
ABAL	Barium, Leachable (Ba)	99.0		NA	-
ACDL	Cadmium, Leachable (Cd)	100		NA	-
ACRL	Chromium, Leachable (Cr)	94.0		NA	-
APBL	Lead, Leachable (Pb)	93.4		NA	-
ASEL	Selenium, Leachable (Se)	92.0		NA	-
AAGL	Silver, Leachable (Ag)	96.0		NA	-
AASL	Arsenic, Leachable (As)	96.4		NA	-
BATCH: 39659	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0333182
AHGL	Mercury, Leachable (Hg)	97.6		NA	-

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QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	PERCENT RECOVERY	DUPLICATE RECOVERY	RPD	ACCEPTANCE LIMITS
BATCH: 39660	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0333184
AHGL	Mercury, Leachable (Hg)	97.6		NA	-
BATCH: 39669	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0333200
OTCLP	SEMIVOLATILES - TCLP				
	1,4-dichlorobenzene [p-dichlorobenzene]	65.7		NA	-
	2,4,5-trichlorophenol	77.7		NA	-
	2,4,6-trichlorophenol	78.1		NA	-
	2,4-dinitrotoluene	87.2		NA	-
	2-methylphenol [o-cresol]	73.1		NA	-
	3/4-methylphenol [m-cresol/p-cresol[B]	72.8		NA	-
	hexachlorobenzene	85.9		NA	-
	hexachlorobutadiene	62.8		NA	-
	hexachloroethane	63.4		NA	-
	nitrobenzene	78.5		NA	-
	pentachlorophenol	15.1		NA	-
BATCH: 39671	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0333204
G121L	ORGANOCHLORINE PESTICIDES - TCLP				
	endrin	121		NA	-
	methoxychlor	112		NA	-
BATCH: 39672	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0333206
G130L	CHLORINATED HERBICIDES - TCLP				
	2,4,5-TP [silvex]	108		NA	-
	2,4-D	103		NA	-
BATCH: 39673	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0333208
AAGL	Silver, Leachable (Ag)	104		NA	-
AASL	Arsenic, Leachable (As)	96.4		NA	-
ABAL	Barium, Leachable (Ba)	95.5		NA	-
ACDL	Cadmium, Leachable (Cd)	94.0		NA	-
ACRL	Chromium, Leachable (Cr)	97.0		NA	-
APBL	Lead, Leachable (Pb)	95.6		NA	-
ASEL	Selenium, Leachable (Se)	91.8		NA	-

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QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	PERCENT RECOVERY	DUPLICATE RECOVERY	RPD	ACCEPTANCE LIMITS
BATCH: 39726	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0333290
OVZHE	VOLATILES - TCLP/ZHE				
	1,1-dichloroethene [1,1-dichloroethylene]	106		NA	-
	1,2-dichloroethane	96.0		NA	-
	2-butanone [methylethyl ketone] [MEK]	90.0		NA	-
	benzene	99.2		NA	-
	carbon tetrachloride	112		NA	-
	chlorobenzene	105		NA	-
	chloroform	105		NA	-
	tetrachloroethene [tetrachloroethylene]	105		NA	-
	trichloroethene [trichloroethylene]	107		NA	-
	vinyl chloride	122		NA	-
BATCH: 39776	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0333368
AHGL	Mercury, Leachable (Hg)	90.8		NA	-
BATCH: 39803	SAMPLE ID: Lab Control Sample			NUS SAMPLE NO:	P0333409
OVZHE	VOLATILES - TCLP/ZHE				
	1,1-dichloroethene [1,1-dichloroethylene]	104		NA	-
	1,2-dichloroethane	96.6		NA	-
	2-butanone [methylethyl ketone] [MEK]	87.7		NA	-
	benzene	100		NA	-
	carbon tetrachloride	111		NA	-
	chlorobenzene	103		NA	-
	chloroform	106		NA	-
	tetrachloroethene [tetrachloroethylene]	104		NA	-
	trichloroethene [trichloroethylene]	105		NA	-
	vinyl chloride	106		NA	-

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QUALITY CONTROL REPORT
METHOD BLANK DATA

TEST CODE	Determination	RESULT	UNITS
BATCH: 39594	SAMPLE ID: Method Blank	NUS SAMPLE NO:	P0332082
OTCLP	SEMIVOLATILES - TCLP		
	1,4-dichlorobenzene [p-dichlorobenzene]	< 0.01	mg/L
	2,4,5-trichlorophenol	< 0.05	mg/L
	2,4,6-trichlorophenol	< 0.01	mg/L
	2,4-dinitrotoluene	< 0.01	mg/L
	2-methylphenol [o-cresol]	< 0.01	mg/L
	3/4-methylphenol [m-cresol/p-cresol[B]	< 0.01	mg/L
	hexachlorobenzene	< 0.01	mg/L
	hexachlorobutadiene	< 0.01	mg/L
	hexachloroethane	< 0.01	mg/L
	nitrobenzene	< 0.01	mg/L
	pentachlorophenol	< 0.05	mg/L
	pyridine	< 0.01	mg/L
BATCH: 39596	SAMPLE ID: Method Blank	NUS SAMPLE NO:	P0332086
G121L	ORGANOCHLORINE PESTICIDES - TCLP		
	chlordane	< 0.10	ug/L
	endrin	< 0.05	ug/L
	gamma-BHC [lindane]	< 0.02	ug/L
	heptachlor	< 0.02	ug/L
	methoxychlor	< 0.50	ug/L
	toxaphene	< 1.0	ug/L
BATCH: 39597	SAMPLE ID: Method Blank	NUS SAMPLE NO:	P0332088
G130L	CHLORINATED HERBICIDES - TCLP		
	2,4,5-TP [silvex]	< 0.50	ug/L
	2,4-D	< 5.0	ug/L
BATCH: 39616	SAMPLE ID: Method Blank	NUS SAMPLE NO:	P0332122
AAGL	Silver, Leachable (Ag)	< 0.01	mg/L
AASL	Arsenic, Leachable (As)	< 0.1	mg/L
ABAL	Barium, Leachable (Ba)	< 0.005	mg/L
ACDL	Cadmium, Leachable (Cd)	< 0.005	mg/L
ACRL	Chromium, Leachable (Cr)	< 0.02	mg/L
APBL	Lead, Leachable (Pb)	< 0.05	mg/L
ASEL	Selenium, Leachable (Se)	< 0.1	mg/L

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QUALITY CONTROL REPORT
METHOD BLANK DATA

	TEST CODE	Determination	RESULT	UNITS
BATCH: 39659	SAMPLE ID: Method Blank		NUS SAMPLE NO: P0333183	
	AHGL	Mercury, Leachable (Hg)	< 0.0001	mg/L
BATCH: 39660	SAMPLE ID: Method Blank		NUS SAMPLE NO: P0333185	
	AHGL	Mercury, Leachable (Hg)	< 0.0001	mg/L
BATCH: 39669	SAMPLE ID: Method Blank		NUS SAMPLE NO: P0333201	
	OTCLP	SEMIVOLATILES - TCLP		
		1,4-dichlorobenzene [p-dichlorobenzene]	< 0.01	mg/L
		2,4,5-trichlorophenol	< 0.05	mg/L
		2,4,6-trichlorophenol	< 0.01	mg/L
		2,4-dinitrotoluene	< 0.01	mg/L
		2-methylphenol [o-cresol]	< 0.01	mg/L
		3/4-methylphenol [m-cresol/p-cresol[B]	< 0.01	mg/L
		hexachlorobenzene	< 0.01	mg/L
		hexachlorobutadiene	< 0.01	mg/L
		hexachloroethane	< 0.01	mg/L
		nitrobenzene	< 0.01	mg/L
		pentachlorophenol	< 0.05	mg/L
		pyridine	< 0.01	mg/L
BATCH: 39671	SAMPLE ID: Method Blank		NUS SAMPLE NO: P0333205	
	G121L	ORGANOCHLORINE PESTICIDES - TCLP		
		chlordane	< 0.10	ug/L
		endrin	< 0.05	ug/L
		gamma-BHC [lindane]	< 0.02	ug/L
		heptachlor	< 0.02	ug/L
		methoxychlor	< 0.5	ug/L
		toxaphene	< 1.0	ug/L
BATCH: 39672	SAMPLE ID: Method Blank		NUS SAMPLE NO: P0333207	
	G130L	CHLORINATED HERBICIDES - TCLP		
		2,4,5-TP [silvex]	< 0.5	ug/L
		2,4-D	< 5.0	ug/L

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QUALITY CONTROL REPORT
METHOD BLANK DATA

	TEST CODE	Determination	RESULT	UNITS
BATCH: 39673	SAMPLE ID: Method Blank		NUS SAMPLE NO: P0333209	
	AAGL	Silver, Leachable (Ag)	< 0.01	mg/L
	AASL	Arsenic, Leachable (As)	< 0.1	mg/L
	ABAL	Barium, Leachable (Ba)	< 0.005	mg/L
	ACDL	Cadmium, Leachable (Cd)	< 0.005	mg/L
	ACRL	Chromium, Leachable (Cr)	< 0.02	mg/L
	APBL	Lead, Leachable (Pb)	< 0.05	mg/L
	ASEL	Selenium, Leachable (Se)	< 0.1	mg/L
BATCH: 39726	SAMPLE ID: Method Blank		NUS SAMPLE NO: P0333291	
	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.005	mg/L
		1,2-dichloroethane	< 0.005	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.05	mg/L
		benzene	< 0.005	mg/L
		carbon tetrachloride	< 0.005	mg/L
		chlorobenzene	< 0.005	mg/L
		chloroform	< 0.005	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.005	mg/L
		trichloroethene [trichloroethylene]	< 0.005	mg/L
		vinyl chloride	< 0.01	mg/L
BATCH: 39776	SAMPLE ID: Method Blank		NUS SAMPLE NO: P0333369	
	AHGL	Mercury, Leachable (Hg)	< 0.0001	mg/L
BATCH: 39803	SAMPLE ID: Method Blank		NUS SAMPLE NO: P0333410	
	OVZHE	VOLATILES - TCLP/ZHE		
		1,1-dichloroethene [1,1-dichloroethylene]	< 0.005	mg/L
		1,2-dichloroethane	< 0.005	mg/L
		2-butanone [methylethyl ketone] [MEK]	< 0.05	mg/L
		benzene	< 0.005	mg/L
		carbon tetrachloride	< 0.005	mg/L
		chlorobenzene	< 0.005	mg/L
		chloroform	< 0.005	mg/L
		tetrachloroethene [tetrachloroethylene]	< 0.005	mg/L
		trichloroethene [trichloroethylene]	< 0.005	mg/L
		vinyl chloride	< 0.01	mg/L

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QUALITY CONTROL REPORT
MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

PREP BATCH: 39659 NUS SAMPLE NO: P0330952

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
AHGL	Mercury, Leachable (Hg)	0.00127	0.00139	mg/L	9.0	107	119

PREP BATCH: 39673 NUS SAMPLE NO: P0330957

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
AAGL	Silver, Leachable (Ag)	0.054	0.052	mg/L	3.8	108	104

PREP BATCH: 39673 NUS SAMPLE NO: P0330957

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
AASL	Arsenic, Leachable (As)	5.24	5.24	mg/L	0	105	105

PREP BATCH: 39673 NUS SAMPLE NO: P0330957

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
ABAL	Barium, Leachable (Ba)	2.27	2.25	mg/L	0.9	98.4	97.4

PREP BATCH: 39673 NUS SAMPLE NO: P0330957

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
ACDL	Cadmium, Leachable (Cd)	1.49	1.49	mg/L	0	40.0	40.0

Sample concentration greater than four times spike concentration
Sample concentration greater than four times spike concentration

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QUALITY CONTROL REPORT
MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

PREP BATCH: 39673 NUS SAMPLE NO: P0330957

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
ACRL	Chromium, Leachable (Cr)	0.342	0.332	mg/L	3.0	122	117

PREP BATCH: 39660 NUS SAMPLE NO: P0330957

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
AHGL	Mercury, Leachable (Hg)	0.00122	0.00118	mg/L	3.3	102	98.0

PREP BATCH: 39673 NUS SAMPLE NO: P0330957

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
APBL	Lead, Leachable (Pb)	18.0	17.5	mg/L	2.8	80.0	0

Sample concentration greater than four times spike concentration

PREP BATCH: 39673 NUS SAMPLE NO: P0330957

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
ASEL	Selenium, Leachable (Se)	5.20	5.13	mg/L	1.4	104	103

ANLS BATCH: 39616 NUS SAMPLE NO: P0330850

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
AAGL	Silver, Leachable (Ag)	0.047	0.048	mg/L	2.11	94.0	96.0

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QUALITY CONTROL REPORT
MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

ANLS BATCH: 39616 NUS SAMPLE NO: P0330850

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
AASL	Arsenic, Leachable (As)	5.09	5.04	mg/L	0.987	102	101

ANLS BATCH: 39616 NUS SAMPLE NO: P0330850

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
ABAL	Barium, Leachable (Ba)	2.32	2.32	mg/L	0	94.4	94.4

ANLS BATCH: 39616 NUS SAMPLE NO: P0330850

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
ACDL	Cadmium, Leachable (Cd)	0.045	0.048	mg/L	6.45	90.0	96.0

ANLS BATCH: 39616 NUS SAMPLE NO: P0330850

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
ACRL	Chromium, Leachable (Cr)	0.186	0.188	mg/L	1.07	93.0	94.0

ANLS BATCH: 39616 NUS SAMPLE NO: P0330850

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
APBL	Lead, Leachable (Pb)	0.455	0.471	mg/L	3.46	91.0	94.2

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QUALITY CONTROL REPORT
MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

ANLS BATCH: 39616 NUS SAMPLE NO: P0330850

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
ASEL	Selenium, Leachable (Se)	4.64	4.67	mg/L	0.644	92.8	93.4

ANLS BATCH: 39776 NUS SAMPLE NO: P0331084

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
AHGL	Mercury, Leachable (Hg)	0.00356	0.00344	mg/L	3.4	91.0	79.0

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QUALITY CONTROL REPORT
LEACHATE BLANK DATA

TEST CODE	DETERMINATION	RESULT	UNITS
BATCH: 386	SAMPLE ID: TCLP LEACHATE BLANK 386	NUS SAMPLE NO:	P0332047
AAGL	Silver, Leachable (Ag)	< 0.01	mg/L
AASL	Arsenic, Leachable (As)	< 0.1	mg/L
ABAL	Barium, Leachable (Ba)	0.061	mg/L
Re-analyzed to confirm result. Re-check result: 0.061 mg/L			
ACDL	Cadmium, Leachable (Cd)	< 0.005	mg/L
ACRL	Chromium, Leachable (Cr)	< 0.02	mg/L
AHGL	Mercury, Leachable (Hg)	< 0.0001	mg/L
APBL	Lead, Leachable (Pb)	< 0.05	mg/L
ASEL	Selenium, Leachable (Se)	< 0.1	mg/L
G121L	ORGANOCHLORINE PESTICIDES - TCLP		
	chlordane	< 0.10	ug/L
	endrin	< 0.05	ug/L
	gamma-BHC [lindane]	< 0.02	ug/L
	heptachlor	< 0.02	ug/L
	methoxychlor	< 0.50	ug/L
	toxaphene	< 1.0	ug/L
G130L	CHLORINATED HERBICIDES - TCLP		
	2,4,5-TP [silvex]	< 0.50	ug/L
	2,4-D	< 5.0	ug/L
OTCLP	SEMIVOLATILES - TCLP		
	1,4-dichlorobenzene [p-dichlorobenzene]	< 0.01	mg/L
	2,4,5-trichlorophenol	< 0.05	mg/L
	2,4,6-trichlorophenol	< 0.01	mg/L
	2,4-dinitrotoluene	< 0.01	mg/L
	2-methylphenol [o-cresol]	< 0.01	mg/L
	3/4-methylphenol [m-cresol/p-cresol[B]	< 0.01	mg/L
	hexachlorobenzene	< 0.01	mg/L
	hexachlorobutadiene	< 0.01	mg/L
	hexachloroethane	< 0.01	mg/L
	nitrobenzene	< 0.01	mg/L
	pentachlorophenol	< 0.05	mg/L
	pyridine	< 0.01	mg/L
S903	TCLP Bottle Extraction		
	Begin Date/Time	12/21(1200)	
	End Date/Time	12/22(0715)	
	Extraction Fluid	2	
	Final Leachate pH	2.9	

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QUALITY CONTROL REPORT
LEACHATE BLANK DATA

BATCH: 387 SAMPLE ID: TCLP LEACHATE BLANK 387 NUS SAMPLE NO: P0332143

TEST CODE	DETERMINATION	RESULT	UNITS
AAGL	Silver, Leachable (Ag)	< 0.01	mg/L
AASL	Arsenic, Leachable (As)	< 0.1	mg/L
ABAL	Barium, Leachable (Ba)	0.048	mg/L
Re-analyzed to confirm result. Re-check result: Ba = 0.048 mg/L.			
ACDL	Cadmium, Leachable (Cd)	< 0.005	mg/L
ACRL	Chromium, Leachable (Cr)	< 0.02	mg/L
AHGL	Mercury, Leachable (Hg)	< 0.0001	mg/L
APBL	Lead, Leachable (Pb)	< 0.05	mg/L
ASEL	Selenium, Leachable (Se)	< 0.1	mg/L
G121L	ORGANOCHLORINE PESTICIDES - TCLP		
	chlordane	< 0.10	ug/L
	endrin	< 0.05	ug/L
	gamma-BHC [lindane]	< 0.02	ug/L
	heptachlor	< 0.02	ug/L
	methoxychlor	< 0.50	ug/L
	toxaphene	< 1.0	ug/L
G130L	CHLORINATED HERBICIDES - TCLP		
	2,4,5-TP [silvex]	< 0.50	ug/L
	2,4-D	< 5.0	ug/L
OTCLP	SEMIVOLATILES - TCLP		
	1,4-dichlorobenzene [p-dichlorobenzene]	< 0.01	mg/L
	2,4,5-trichlorophenol	< 0.05	mg/L
	2,4,6-trichlorophenol	< 0.01	mg/L
	2,4-dinitrotoluene	< 0.01	mg/L
	2-methylphenol [o-cresol]	< 0.01	mg/L
	3/4-methylphenol [m-cresol/p-cresol[B]	< 0.01	mg/L
	hexachlorobenzene	< 0.01	mg/L
	hexachlorobutadiene	< 0.01	mg/L
	hexachloroethane	< 0.01	mg/L
	nitrobenzene	< 0.01	mg/L
	pentachlorophenol	< 0.05	mg/L
	pyridine	< 0.01	mg/L
S903	TCLP Bottle Extraction		
	Begin Date/Time	12/26(1335)	
	End Date/Time	12/27(0700)	
	Extraction Fluid	2	
	Final Leachate pH	2.9	

REPORT DOCUMENTATION PAGE

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13. ABSTRACT (Maximum 200 words)
Many municipal waste combustion facilities are equipped with electrostatic precipitators (ESPs); few have acid gas control systems. A retrofit technology using water spray temperature reduction combined with dry acid gas control reagent and powdered activatedcarbon (PAC) injection was tested. 2000 mg/dsm^3 @ 7%O_2 (150 ib/hr) of trona (a natural sodium sesquicarbonate ore) injected through a rapid dispersion lance successfully controlled more than 50% of the acid gases. This should let facilities under 250 TPD meet the small plant guidelines for acid gas control. Various levels of PAC were injected along with the trona. 300 mg/dsm^3 @ 7% O_2 of PAC provides a comfortable margin between the emissions limitations achieved and both large and small plant regulatory guidelines for tetra-through octa-chlorinated dibenzo-p-dioxins and dibenzofurans and mercury, when ESP is operated below 350°F. Bi-fluid nozzles were used to spray finely atomized water between the economizer outlet and ESP inlet to maintain temperatures in the desired 300-350°F range. Particulate and metals emissios limitations were met by this 400 ft^2/1000acft^2 specific collector area (SCA)m 3-field ESP. Both the water sprays and PAC improved ESP performance. The proof-of-concept demonstration was successful.

14. SUBJECT TERMS
Municipal waste combustion, electrostatic precipitators, water spray, powdered activated carbon injection

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