Appendix E.4. Aldehyde/Ketone Calculations, Run Sheets and Analyses

CARB 430

DATE DATE ENTERED: 11/20/93

PLANT: Natural Gas ICE
TEST DATE: 10/27/93

CITY: Confidential
OPERATOR: Jon Kawaguchi

RUN #: 1, 2, 3
ENTERED BY: Dave Hansell

SAMPLE LOCATION: Uncontrolled
CHECKED BY:

DATA ENTRY	SYMBOL	UNITS		DATA		DATA		DATA			
RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
AVERAGE METER TEMPERATURE	Fm	degree F		105.00		108.50		112.10		108.53	3.27
BAROMETRIC PRESSURE	Pbar	in. Hg		29.91		29.91		29.91		29.91	0.00
AVG. DELTA H	dH	in. H20		1.30		1.30		1.20		1.27	4.56
GAS SAMPLE VOLUME	Vm	cubic ft.		0.87		0.88		0.88		0.88	0.66
METER CALIBRATION FACTOR	Y	-		1.00		1.00		1.00		1.00	0.00
TOTAL SAMPLING TIME	min	minutes		60.00		60.00		60.00		60.00	0.00
SAMPLE 1ST IMPINGER VOLUME	Siwt,1	ml		13.00		10.40		13.00		12.13	12.37
SAMPLE 2ND IMPINGER VOLUME	Siwt,2	ml		9.80		9.50		9.90		9.73	2.14
BLANK 1ST IMPINGER VOLUME	Biwt,1	ml		9.90		9.80		9.50		9.73	2.14
BLANK 2ND IMPINGER VOLUME	Biwt,2	ml		9.50		9.80		9.80		9.70	1.79
SAMPLE WEIGHTS (1ST IMPINGER)											
Formaldehyde	Swt,1	µg		330.00		410.00		400.00		380.00	11.47
Acetaldehyde	Swt,1	µg		6.80		8.40		8.40		7.87	11.74
Acrolein	Swt,1	µg		2.65		3.10		4.50		3.42	28.24
Propanal	Swt,1	µg	ND	1.10	ND	2.10	ND	2.10	ND	1.77	32.68
Acetone	Swt,1	µg		1.55	ND	2.10	ND	2.10	<	1.92	16.57
Crotonaldehyde	Swt,1	µg	ND	1.10	ND	2.10	ND	2.10	ND	1.77	32.68
Isobutyraldehyde	Swt,1	µg	ND	1.10	ND	2.10	ND	2.10	ND	1.77	32.68
Methyl Ethyl Ketone	Swt,1	µg	ND	1.10	ND	2.10	ND	2.10	ND	1.77	32.68
SAMPLE WEIGHTS (2ND IMPINGER)											
Formaldehyde	Swt,2	µg		1.50		0.64		2.10		1.41	51.92
Acetaldehyde	Swt,2	µg		3.90		1.20		3.30		2.80	50.63
Acrolein	Swt,2	µg		1.40	ND	0.10		2.20	<	1.23	85.94
Propanal	Swt,2	µg		0.12	ND	0.10		1.50	<	0.57	139.98
Acetone	Swt,2	µg		0.21		2.30		0.64		1.05	105.11
Crotonaldehyde	Swt,2	µg		0.21	ND	0.10		0.44	<	0.25	69.40
Isobutyraldehyde	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
BLANK WEIGHTS (1ST IMPINGER)											
Formaldehyde	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetaldehyde	Bwt,1	µg		0.14	ND	0.10	ND	0.10	<	0.11	20.38
Acrolein	Bwt,1	µg	ND	0.10	ND	0.10		0.14	<	0.11	20.38
Propanal	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Bwt,1	µg		0.18	ND	0.10	ND	0.10	<	0.13	36.46
Crotonaldehyde	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
BLANK WEIGHTS (2ND IMPINGER)											
Formaldehyde	Bwt,2	µg	ND	0.10	ND	0.10		0.15	<	0.12	24.74
Acetaldehyde	Bwt,2	µg		0.12		0.10		0.11		0.11	9.09
Acrolein	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Bwt,2	µg		0.34		0.63		0.72		0.56	35.25
Crotonaldehyde	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00

CARB 430

PLANT: Natural Gas ICE
CITY: Confidential
RUN #: 1, 2, 3
SAMPLE LOCATION: Uncontrolled

DATE DATE ENTERED: 11/20/93
TEST DATE: 10/27/93
OPERATOR: Jon Kawaguchi
ENTERED BY: Dave Hansell
CHECKED BY:

CALCULATED DATA	SYMBOL	UNITS	DATA		DATA		DATA			
RUN NUMBER	-	-	R1		R2		R3		AVE	RSD
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	565.00		568.50		572.10		568.53	0.62
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64Y (Vm/Tm) (Pbar + dH/13.6)	VmStd	dscm	0.023		0.023		0.023		0.023	0.35

SAMPLE IMPINGER CONCENTRATION (ng/ml), S or Bic= 1000*(S or Bwt,1+S or Bwt,2)/(S or Biwt,1+S or Biwt,2)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Sic	ng/ml		14539		20635		17559		17578	17.34
Acetaldehyde	Sic	ng/ml		469		482		511		488	4.36
Acrolein	Sic	ng/ml		178	<	161		293	<	210	34.10
Propanal	Sic	ng/ml	<	54	ND	111	<	157	<	107	48.50
Acetone	Sic	ng/ml		77	<	221	<	120	<	139	53.08
Crotonaldehyde	Sic	ng/ml	<	57	ND	111	<	111	<	93	33.09
Isobutyraldehyde	Sic	ng/ml	ND	53	ND	111	ND	96	ND	86	34.88
Methyl Ethyl Ketone	Sic	ng/ml	ND	53	ND	111	ND	96	ND	86	34.88
BLANK											
Formaldehyde	Bic	ng/ml	ND	10	ND	10	<	13	<	11	13.96
Acetaldehyde	Bic	ng/ml		13	<	10	<	11	<	11	14.66
Acrolein	Bic	ng/ml	ND	10	ND	10	<	12	<	11	11.46
Propanal	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	0.78
Acetone	Bic	ng/ml		27	<	37	<	42	<	36	22.48
Crotonaldehyde	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	0.78
Isobutyraldehyde	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	0.78
Methyl Ethyl Ketone	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	0.78

BLANK TO SAMPLE RATIO, Br=Sic/Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
RATIO											
Formaldehyde	Br		C	1303	C	1850	C	1574		1576	17.34
Acetaldehyde	Br		C	41	C	42	C	44		42	4.36
Acrolein	Br		C	16	C	15	C	27		19	34.10
Propanal	Br		NA	NA	NA	NA	NA	NA		NA	NA
Acetone	Br		RL	2	C	6	RL	3		4	53.08
Crotonaldehyde	Br		NA	NA	NA	NA	NA	NA		NA	NA
Isobutyraldehyde	Br		NA	NA	NA	NA	NA	NA		NA	NA
Methyl Ethyl Ketone	Br		NA	NA	NA	NA	NA	NA		NA	NA

CARB 430

	DATE DATE ENTERED: 11/20/93
PLANT: Natural Gas ICE	TEST DATE: 10/27/93
CITY: Confidential	OPERATOR: Jon Kawaguchi
RUN #: 1, 2, 3	ENTERED BY: Dave Hansell
SAMPLE LOCATION: Uncontrolled	CHECKED BY:

CORRECTED SAMPLE CONCENTRATION (ng/ml) Br>5 Cic=Sic-Average(Bic); Br<5 Cic=5*Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cic	ng/ml	C	14528	C	20624	C	17548	C	17567	17.35
Acetaldehyde	Cic	ng/ml	C	458	C	471	C	499	C	476	4.47
Acrolein	Cic	ng/ml	C	167	< C	150	C	282	< C	199	35.97
Propanal	Cic	ng/ml	< NA	54	ND NA	111	< NA	157	< NC	107	48.50
Acetone	Cic	ng/ml	RL	178	< C	186	RL	178	< C	180	2.57
Crotonaldehyde	Cic	ng/ml	< NA	57	ND NA	111	< NA	111	< NC	93	33.09
Isobutyraldehyde	Cic	ng/ml	ND NA	53	ND NA	111	ND NA	96	ND NC	86	34.88
Methyl Ethyl Ketone	Cic	ng/ml	ND NA	53	ND NA	111	ND NA	96	ND NC	86	34.88

CORRECTED SAMPLE CONCENTRATION 1 (mg/dscm), Cc,1=Cic*(Swt,1+Swt,2)/VmStd/1e06

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,1	mg/dscm	C	14.36	C	17.70	C	17.44	C	16.50	11.26
Acetaldehyde	Cc,1	mg/dscm	C	0.45	C	0.40	C	0.50	C	0.45	10.24
Acrolein	Cc,1	mg/dscm	C	0.16	< C	0.13	C	0.28	< C	0.19	41.37
Propanal	Cc,1	mg/dscm	< NA	0.05	ND NA	0.09	< NA	0.16	< NC	0.10	51.30
Acetone	Cc,1	mg/dscm	RL	0.18	< C	0.16	RL	0.18	< C	0.17	5.68
Crotonaldehyde	Cc,1	mg/dscm	< NA	0.06	ND NA	0.09	< NA	0.11	< NC	0.09	31.53
Isobutyraldehyde	Cc,1	mg/dscm	ND NA	0.05	ND NA	0.09	ND NA	0.10	ND NC	0.08	30.85
Methyl Ethyl Ketone	Cc,1	mg/dscm	ND NA	0.05	ND NA	0.09	ND NA	0.10	ND NC	0.08	30.85

CORRECTED SAMPLE CONCENTRATION 2 (ppbv), Cc,2=1000*24.05/Mw

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,2	ppbv	C	11513	C	14190	C	13985	C	13229	11.26
Acetaldehyde	Cc,2	ppbv	C	247	C	221	C	271	C	247	10.24
Acrolein	Cc,2	ppbv	C	71	< C	55	C	120	< C	82	41.37
Propanal	Cc,2	ppbv	< NA	22	ND NA	39	< NA	65	< NC	42	51.30
Acetone	Cc,2	ppbv	RL	73	< C	66	RL	73	< C	71	5.68
Crotonaldehyde	Cc,2	ppbv	< NA	20	ND NA	33	< NA	38	< NC	30	31.53
Isobutyraldehyde	Cc,2	ppbv	ND NA	17	ND NA	32	ND NA	32	ND NC	27	30.85
Methyl Ethyl Ketone	Cc,2	ppbv	ND NA	17	ND NA	32	ND NA	32	ND NC	27	30.85

ND - Sample value below detection limit

< - Some sample values below detection limit

C - Blank Corrected

RL - Reporting Limit

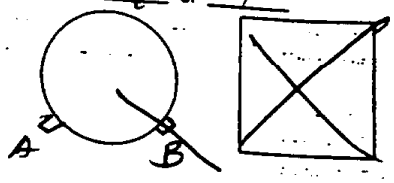
NA - Not Available

CARB 430 RUN SHEET

Plant
City
Location
Operators JE
Date 10/27/93
Run Number 1
Stack Diam. (in.) 9
Static Pressure (Pa) +3.1 (in. H2O)
Barometric Pressure (Pb) 29.91 (in. Hg)
Ambient Temperature (°F) 92

Sample Box Number
Meter Box Number V3
Meter Calibration (Y)
Meter dH @
Probe Length 3'
Probe Liner Material S/S
Pretest Leak Rate 0.000 cfm @ 7 (in. Hg)
Post Test Leak Rate 0.000 cfm @ 7 (in. Hg)

Sheet 1 of 1



Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH Probe Temp.	Comments
1	0	0900		824.90					
1	5	05	.5	827.50	.5	N/A	38	1.4	
	10	10	.5	830.16	.5		39	1.3	
	15	15	.5	832.66	.5		39	1.3	
	20	20	.5	835.31	.5		40	1.3	
	25	25	.5	837.77	.5		40	1.4	
	30	30	.5	840.33	.5		41	1.3	
	35	35	.5	842.80	.5		41	1.4	
	40	40	.5	845.43	.5		42	1.5	
	45	45	.5	847.01	.5		42	1.2	
	50	50	.5	850.56	.5		42	1.3	
	55	55	.5	853.19	.5		43	1.3	
	60	1000	.5	855.66	.5		43	1.3	
Average/Total									

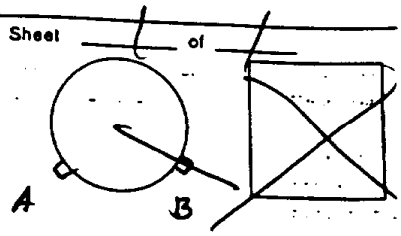
Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

CARB 430 RUN SHEET

Plant
City
Location
Operators JR
Date 10/27/93
Run Number 2
Stack Diam. (in.) 9
Static Pressure (Pa) +3.1 (in. H2O)
Barometric Pressure (Pb) 29.91 (in. Hg)
Ambient Temperature (°F) 104

Sample Box Number
Meter Box Number U3
Meter Calibration (Y)
Meter dH @
Probe Length 16"
Probe Liner Material S/S
Pretest Leak Rate 0.000 cfm @ 7 (in. Hg)
Post Test Leak Rate ___ cfm @ ___ (in. Hg)

Sheet 1 of 1



Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH Pitot Press. (in. H2O)	Comments
1	0	1045		855.72					
1	5	50	.5	858.35	.5	N/A	41	1.3	
	10	55	.5	860.94	.5		41	1.2	
	15	1100	.5	863.43	.5		41	1.3	
	20	05	.5	866.21	.5		42	1.3	
	25	10	.5	868.65	.5		42	1.3	
	30	15	.5	871.17	.5		42	1.2	
	35	20	.5	873.74	.5		43	1.3	
	40	25	.5	876.42	.5		43	1.4	
	45	30	.5	879.00	.5		44	1.3	
	50	35	.5	881.57	.5		44	1.3	
	55	40	.5	884.09	.5		44	1.3	
	60	45	.5	886.78	.5		44	1.3	
Average/Total									

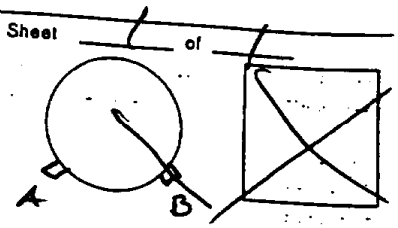
Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

CARB 430 RUN SHEET

Plant _____
City _____
Location _____
Operators JK
Date 10/27/93
Run Number 3
Stack Diam. (in.) 9
Static Pressure (Pa) +3.1 (in. H2O)
Barometric Pressure (Pb) 29.91 (in. Hg)
Ambient Temperature (°F) 106

Sample Box Number _____
Meter Box Number U3
Meter Calibration (Y) _____
Meter dH @ _____
Probe Length 16"
Probe Liner Material S/S
Pretest Leak Rate 0.000 cfm @ 7 (in. Hg)
Post Test Leak Rate ____ cfm @ ____ (in. Hg)

Sheet 1 of 1



Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH	Comments
1	0	1238		886.91					
1	5	43	.5	889.30	.5	N/A	42	1.3	4400 ~~cf~~
	10	48	.5	891.86	.5		42	1.2	
	15	53	.5	894.25	.5		43	1.2	4400 ~~cf~~
	20	58	.5	896.93	.5		43	1.2	
	25	1303	.5	899.50	.5		44	1.4	5000 ~~cf~~
	30	08	.5	901.97	.5		44	1.2	
	35	13	.5	904.74	.5		45	1.2	
	40	18	.5	907.28	.5		45	1.2	5000 ~~cf~~
	45	23	.5	910.05	.5		45	1.2	
	50	28	.5	912.62	.5		46	1.3	
	55	33	.5	915.41	.5		46	1.2	Fuel flows in reading X1000 (sq root cfh)
	60	38	.5	917.95	.5		46	1.3	5000
Average/Total									

Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

Energy and Environmental Research Corporation

18 Mason, Irvine, CA 92718
tel: (714) 859-8851
fax: (714) 859-3194

Laboratory Report Due by _____ to:

EER Contact: Jon Kawaguchi Address: 8001 Irvine Blvd
tel: (714) 552-1803 Santa Ana, CA 92705
fax: (714) 857-1943

Bill to: P.O. No.: _____
EER Corporation
18 Mason
Irvine, CA 92718

Sample Chain of Custody Record

page 1 of 2

EER Project No: 6373-020
Project Name: UKB VOC
Site Name:
Sampling System Prepared by: JK
Test Operator(s): JK
Samples Recovered by: JK

Laboratory I.D. No.	EER Label No.	FIELD SAMPLE IDENTIFICATION AND SAMPLING INFORMATION: Test ID / Location	Physical Description	Date	Time	No. of Containers	Analyses Required: Aldehydes C1-C4	Ketones C3-C4					ADDITIONAL INFORMATION (e.g. Volumes, TT, Holding Times, Sample Preparation, Add'l Instructions, etc.)
~~152484~~	152484	1/Stack	Aldehyde Blank 1 Front	10/27/93		1	✓	✓					
	152485	1/Stack	" Blank 1 Back			1	✓	✓					
	152486	1/Stack	" Front			1	✓	✓					
	152487	1/Stack	" Back			1	✓	✓					
	152488	2/Stack	" Blank 2 Front			1	✓	✓					
	152489	2/Stack	" Blank 2 Back			1	✓	✓					
	152490	2/Stack	" Front			1	✓	✓					
	152491	2/Stack	" Back			1	✓	✓					
	152492	3/Stack	" Blank 3 Front			1	✓	✓					
	152493	3/Stack	" Blank 3 Back			1	✓	✓					

Method of Shipment: Fed X
Shipment I.D.:
Date Shipped: 10/28/93
Samples Shipped to: Air Toxics
Attention:

Remarks (RUSH!, units: mg/L, ppm, etc.):

After analysis: ☐ Archive samples (Hold for ____ months, then dispose.)
☐ Return samples to: EER Corporation 8001 Irvine Blvd., Irvine, CA 92705

Relinquished by: (Sign & Print)	Date / Time:	Received by: (Sign & Print)	Date / Time:
Jon Kawaguchi	11/27/93 1701	Don Kelm L. Robinson	11/29/93 1500

TOP - ORIGINAL MUST STAY WITH SAMPLES MIDDLE - LABORATORY COPY BOTTOM - EER COPY RETAIN WITH FIELD LOG

Energy and Environmental Research Corporation

18 Mason, Irvine, CA 92718
tel: (714) 859-8851
fax: (714) 859-3194

Laboratory Report Due by _____ to:

EER Contact: Jon Kawaguchi Address: 8001 Irvine Blvd

tel: (714) 552-1803 Santa Ana, CA

fax: (714) 857-1943 92705

Bill to: P.O. No.: _____

EER Corporation

18 Mason

Irvine, CA 92718

Sample Chain of Custody Record

page 2 of 2

EER Project No:

Project Name:

Site Name:

Sampling System Prepared by:

Test Operator(s):

Samples Recovered by:

Laboratory I.D. No.	EER Label No.	FIELD SAMPLE IDENTIFICATION AND SAMPLING INFORMATION: Test ID / Location	Physical Description	Date	Time	No. of Containers	Analyses Required: Aldehyde C1-C4	Ketones C3-C4	List #1 Compounds				ADDITIONAL INFORMATION (e.g. Volumes, TT, Holding Times, Sample Preparation, Add'l Instructions, etc.)
	152494	3/Stack	Aldehyde Front	10/27/93		1	✓	✓					
	152495	3/Stack	" Back	"		1	✓	✓					
	152497		" Trip Spike	"		"	✓	✓					
	152500		" Trip Blank	"		"	✓	✓					
	152498	Fuel Inlet	Fuel Gas Sample	"		"							

Method of Shipment: Fed X

Shipment I.D.: Date Shipped: 10/28/93

Samples Shipped to: Air Toxics

Attention:

Remarks (RUSH!, units: mg/L, ppm, etc.):

After analysis: ☐ Archive samples (Hold for _____ months, then dispose.)

☐ Return samples to: EER Corporation 8001 Irvine Blvd., Irvine, CA 92705

Relinquished by: (Sign & Print)	Date / Time:	Received by: (Sign & Print)	Date / Time:
Jon Kawaguchi	10/27/93 1701	L. Robinson	10/27/93 1500

TOP - ORIGINAL MUST STAY WITH SAMPLES MIDDLE - LABORATORY COPY BOTTOM - EER COPY RETAIN WITH FIELD LOG

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9310267A

Work Order Summary

CLIENT: Mr. Jon Kawaguchi
Energy & Environmental Research
8001 Irvine Blvd.
Santa Ana, CA 92705

BILL TO: Accounts Payable
EER Corporation
18 Mason
Irvine, CA 92718

PHONE: 714-552-1803
FAX: 714-859-3194
DATE RECEIVED: 10/29/93
DATE COMPLETED: 11/18/93

INVOICE # 2295
P.O. #
PROJECT # 6373-020
AMOUNT$: $1,661.90

FRACTION #	NAME	TEST	PRICE
01A	152484	TO-5	$1575.00/set
01B	152485	TO-5	
01C	152486	TO-5	
01CC	152486 Duplicate	TO-5	
01D	152487	TO-5	
02A	152488	TO-5	
02B	152489	TO-5	
02C	152490	TO-5	
02CMS	152490 Matrix Spike	TO-5	
02D	152491	TO-5	
03A	152492	TO-5	
03B	152493	TO-5	
03C	152494	TO-5	
03D	152495	TO-5	
04A	152497 Trip Spike	TO-5	
05A	152500 Trip Blank	TO-5	
06A	Lab Blank	TO-5	
07A	Lab Spike	TO-5	
Misc. Charges	Shipping (11/1/93)		$86.90

LAB NARRATIVE:
g = Percent recovery could not be measured due to high level sample background.
B = Compound present in laboratory blank, background subtraction not performed.

CERTIFIED BY: Linda J. Freeman
Laboratory Director

DATE: 11/18/93

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: 152484

ID#: 9310267A-01A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110103**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**9.9**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.14
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.18 B
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: 152485

ID#: 9310267A-01B

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110104**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**9.5**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.12
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.34 B
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: 152486

ID#: 9310267A-01C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110113**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**11**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**13.0**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	1.1	330
Acetaldehyde	1.1	6.9
Acrolein	1.1	2.7
Propanal	1.1	Not Detected
Acetone	1.1	1.6 B
Crotonaldehyde	1.1	Not Detected
Isobutyraldehyde	1.1	Not Detected
Methyl Ethyl Ketone	1.1	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: 152486 Duplicate

ID#: 9310267A-01CC

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110114**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**11**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**13.0**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	1.1	330
Acetaldehyde	1.1	6.7
Acrolein	1.1	2.6
Propanal	1.1	Not Detected
Acetone	1.1	1.5 B
Crotonaldehyde	1.1	Not Detected
Isobutyraldehyde	1.1	Not Detected
Methyl Ethyl Ketone	1.1	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: 152487

ID#: 9310267A-01D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110115**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**9.8**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	1.5
Acetaldehyde	0.10	3.9
Acrolein	0.10	1.4
Propanal	0.10	0.12
Acetone	0.10	0.21 B
Crotonaldehyde	0.10	0.21
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: 152488

ID#: 9310267A-02A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110105**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**9.8**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 152489

ID#: 9310267A-02B

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110106**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**9.8**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.10
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.62 B
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: 152490

ID#: 9310267A-02C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110116**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**21**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**10.4**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	2.1	410
Acetaldehyde	2.1	8.4
Acrolein	2.1	3.1
Propanal	2.1	Not Detected
Acetone	2.1	Not Detected
Crotonaldehyde	2.1	Not Detected
Isobutyraldehyde	2.1	Not Detected
Methyl Ethyl Ketone	2.1	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 152490 Matrix Spike

ID#: 9310267A-02CMS

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110117**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**21**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**10.4**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	2.1	0 Q
Acetaldehyde	2.1	0 Q
Acrolein	2.1	0 Q
Propanal	2.1	Not Spiked
Acetone	2.1	Not Spiked
Crotonaldehyde	2.1	Not Spiked
Isobutyraldehyde	2.1	Not Spiked
Methyl Ethyl Ketone	2.1	Not Spiked

Q = Percent recovery could not be measured due to high level sample background.

AIR TOXICS LTD.

SAMPLE NAME: 152491

ID#: 9310267A-02D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110118**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**9.5**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.64
Acetaldehyde	0.10	1.2
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	2.3 B
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: 152492

ID#: 9310267A-03A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110107**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**9.5**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	0.14
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 152493

ID#: 9310267A-03B

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110108**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**9.8**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.15
Acetaldehyde	0.10	0.11
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.72 B
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: 152494

ID#: 9310267A-03C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110119**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**21**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**13.0**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	2.1	400
Acetaldehyde	2.1	8.4
Acrolein	2.1	4.5
Propanal	2.1	Not Detected
Acetone	2.1	Not Detected
Crotonaldehyde	2.1	Not Detected
Isobutyraldehyde	2.1	Not Detected
Methyl Ethyl Ketone	2.1	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 152495

ID#: 9310267A-03D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110120**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**9.9**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	2.1
Acetaldehyde	0.10	3.3
Acrolein	0.10	2.2
Propanal	0.10	1.5
Acetone	0.10	0.64 B
Crotonaldehyde	0.10	0.44
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: 152497 Trip Spike

ID#: 9310267A-04A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4110121**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**11.0**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	0.10	91
Acetaldehyde	0.10	95
Acrolein	0.10	Not Spiked
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

AIR TOXICS LTD.

SAMPLE NAME: 152500 Trip Blank

ID#: 9310267A-05A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110109**	**Date of Collection:**	**10/27/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	1.0
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.46 B
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

B = Compound present in laboratory blank, background subtraction not performed.

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9310267A-06A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4110110**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.16
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Spike

ID#: 9310267A-07A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4110122**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**10/30/93**
Sample Volume (mL):	**11.0**	**Date of Analysis:**	**11/1/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	0.10	107
Acetaldehyde	0.10	95
Acrolein	0.10	104
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

Appendix E.5. Fuel Analyses

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9310267B

Work Order Summary

CLIENT: Mr. Jon Kawaguchi
Energy & Environmental Research
8001 Irvine Blvd.
Santa Ana, CA 92705

BILL TO: Accounts Payable
EER Corporation
18 Mason
Irvine, CA 92718

PHONE: 714-552-1803
FAX: 714-859-3194
DATE RECEIVED: 10/29/93
DATE COMPLETED: 11/18/93

INVOICE # 2295
P.O. #
PROJECT # 6373-020
AMOUNT$: $175.00

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	152498	ASTM D-1945	Tedlar Bag	$175.00
02A	Lab Blank	ASTM D-1945	NA	NC

CERTIFIED BY: Andrew J. Freeman
Laboratory Director

DATE: 11/18/93

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: 152498
ID#: 9310267B-01A

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name: 3102904 **Date of Collection:** 10/27/93
Dil. Factor: 1.0 **Date of Analysis:** 10/29/93

Compound	Det. Limit (%)	Amount (%)
Oxygen	0.001	0.16
Nitrogen	0.001	1.2
Carbon Monoxide	0.001	Not Detected
Methane	0.001	95
Carbon Dioxide	0.001	1.4
Ethane	0.001	2.0
Propane	0.001	0.36
Isobutane	0.001	0.042
Butane	0.001	0.066
Neopentane	0.001	0.001
Isopentane	0.001	0.021
n-Pentane	0.001	0.018
Ethylene	0.001	Not Detected
Propene	0.001	Not Detected
1-Butene	0.001	Not Detected
cis-2-Butene	0.001	Not Detected
trans-2-Butene	0.001	Not Detected
Cyclopentane	0.001	Not Detected
Ethyne	0.001	Not Detected
C6+	0.010	0.069
	Total (%) =	100

BTU/Cu. Ft. = 1000
Specific Gravity (Air = 1.000) = 0.59

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank
ID#: 9310267B-02A

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name:	**3102903**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Analysis:**	**10/29/93**

Compound	Det. Limit (%)	Amount (%)
Oxygen	0.001	Not Detected
Nitrogen	0.001	100
Carbon Monoxide	0.001	Not Detected
Methane	0.001	Not Detected
Carbon Dioxide	0.001	Not Detected
Ethane	0.001	Not Detected
Propane	0.001	Not Detected
Isobutane	0.001	Not Detected
Butane	0.001	Not Detected
Neopentane	0.001	Not Detected
Isopentane	0.001	Not Detected
n-Pentane	0.001	Not Detected
Ethylene	0.001	Not Detected
Propene	0.001	Not Detected
1-Butene	0.001	Not Detected
cis-2-Butene	0.001	Not Detected
trans-2-Butene	0.001	Not Detected
Cyclopentane	0.001	Not Detected
Ethyne	0.001	Not Detected
C6+	0.010	Not Detected
	Total (%) =	100

BTU/Cu. Ft. = NA
Specific Gravity (Air = 1.000) = NA

Container Type: NA

APPENDIX F - NATURAL GAS TURBINE

Appendix F.1. CEM Calibrations and Calculations

CEM NO AND NOX CALIBRATIONS

PLANT: Natural Gas Turbine
CITY, STATE: Confidential
LOCATION: Stack

TEST DATE: 11/2/93

RUN NUMBER: NO,NO2
RUN START TIME: 10:33
RUN END TIME: 12:35
CEM OPERATOR: Rob Cambell

ANALYTE		O2	CO2	NOx
CONCENTRATION UNIT		%, dry	%, dry	ppmv, dry
HIGH-RANGE GAS FRACTION OF SPAN		1	1	1
SPAN		22.7	9	22
SPAN GAS CONCENTRATION, Cma	HIGH	22.7	9	22
	MID	13	4.5	12.5
	ZERO	0	0	0
INITIAL ANALYZER CALIBRATION CHECK, Cai	HIGH	22.7	9.02	22.12
	MID	13.08	4.5	12.78
	ZERO	0.0	0.0	0.9
INITIAL ANALYZER CALIBRATION ERROR, Ei	HIGH	0.0%	0.2%	0.5%
Ei = ((Cai - Cma)/Span)x100%	MID	0.4%	0.0%	1.3%
	ZERO	0.0%	0.1%	4.1%
INITIAL BIAS CHECK, Cbi	UPSCALE HIGH (H) OR MID (M)?	M	M	M
(SELECT UPSCALE CALIBRATION GAS CLOSEST TO EFFLUENT GAS CONCENTRATION)	UPSCALE	12.97	4.45	13.38
	ZERO	0.0	0.0	1.4
INITITAL SYSTEM CALIBRATION BIAS, Bi	UPSCALE	-0.5%	-0.6%	2.7%
Bi = ((Cbi-Cai)/Span)x100%	ZERO	0.0%	0.0%	2.1%
FINAL ANALYZER CALIBRATION CHECK, Caf	HIGH	22.7	9	21.99
	MID	13.1	4.5	13.18
	ZERO	0.0	0.0	0.9
FINAL ANALYZER CALIBRATION ERROR, Ef	HIGH	0.0%	0.0%	0.0%
Ef = ((Caf - Cma)/Span)x100%	MID	0.4%	0.0%	3.1%
	ZERO	0.0%	0.0%	4.0%
FINAL BIAS CHECK, Cbf	UPSCALE HIGH (H) OR MID (M)?	M	M	M
(SELECT UPSCALE CALIBRATION GAS CLOSEST TO EFFLUENT GAS CONCENTRATION)	UPSCALE	13.00	4.42	12.56
	ZERO	0.0	0.0	1.0
FINAL SYSTEM CALIBRATION BIAS, Bf	UPSCALE	-0.4%	-0.9%	-2.8%
Bf = ((Cbf-Caf)/Span)x100%	ZERO	0.1%	0.2%	0.5%
ANALYZER DRIFT	HIGH	0.0%	-0.2%	-0.6%
D = ((Caf - Cai)/(Span))x100%	MID	0.1%	0.0%	1.8%
	ZERO	0.0%	-0.1%	-0.1%
SYSTEM DRIFT	UPSCALE	0.1%	-0.3%	-3.7%
D = ((Cbf - Cbi)/(Span))x100%	ZERO	0.0%	0.1%	-1.8%

NG/RFG Gas Turbine						
11/2/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:10:33:45.000	14.02	3.98		8.09		16.23
00:10:34:44.992	14.03	3.99		8.11		16.29
00:10:35:44.988	14.03	4.00		8.14		16.35
00:10:36:44.984	14.03	4.01		8.25		16.57
00:10:37:44.977	14.04	4.00		8.54		17.18
00:10:38:45.027	14.04	4.00		8.26		16.61
00:10:39:44.965	14.04	4.01		9.58		19.27
00:10:40:44.961	14.04	4.01		9.40		18.91
00:10:41:44.953	14.04	4.01		9.30		18.71
00:10:42:45.000	14.04	4.01		9.65		19.41
00:10:43:44.992	14.03	4.01		9.53		19.14
00:10:44:44.988	14.04	4.01		9.91		19.93
00:10:45:44.984	14.03	4.01		10.35		20.79
00:10:46:44.977	14.03	4.01		9.67		19.42
00:10:47:44.969	14.03	4.01		9.75		19.58
00:10:48:44.965	14.03	4.01		10.48		21.05
00:10:49:44.961	14.02	4.01		10.51		21.08
00:10:50:44.953	14.03	4.01		10.54		21.17
00:10:51:45.004	14.03	4.01		10.80		21.69
00:10:52:44.992	14.03	4.01		10.52		21.13
00:10:53:44.988	14.03	4.01		10.53		21.15
00:10:54:44.984	14.03	4.01		10.48		21.05
00:10:55:44.977	14.03	4.01		10.42		20.93
00:10:56:44.973	14.03	4.01	10.42		20.93	
00:10:57:44.965	14.02	4.02	10.58		21.22	
00:10:58:44.961	14.03	4.01	10.20		20.49	
00:10:59:44.953	14.03	4.01	9.52		19.12	
00:11:00:45.000	14.03	4.01	8.21		16.49	
00:11:01:44.992	14.03	4.01	8.01		16.09	
00:11:02:44.988	14.02	4.02	7.79		15.62	
00:11:03:44.984	14.01	4.02	7.14		14.30	
00:11:04:44.977	14.01	4.02	6.76		13.54	
00:11:05:44.969	13.95	4.02		7.39		14.68

NG/RFG Gas Turbine						
11/2/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:11:06:44.965	14.00	4.02		7.71		15.42
00:11:07:44.961	14.01	4.02		8.36		16.74
00:11:08:44.953	14.00	4.02		8.62		17.24
00:11:09:45.000	14.00	4.03		8.21		16.42
00:11:10:45.109	14.01	4.02		8.29		16.60
00:11:11:44.988	14.00	4.03		8.38		16.76
00:11:12:44.984	14.01	4.02	8.18		16.38	
00:11:13:44.977	14.02	4.02	7.94		15.93	
00:11:14:44.969	14.02	4.02	6.21		12.46	
00:11:15:44.965	14.02	4.02	6.11		12.26	
00:11:16:44.961	14.02	4.02	6.00		12.03	
00:11:17:44.953	14.02	4.02	5.88		11.79	
00:11:32:12.004	14.03	4.00	6.21		12.47	
00:11:33:11.992	14.02	4.02	6.08		12.19	
00:11:34:11.988	14.02	4.03	6.06		12.15	
00:11:35:11.980	14.03	4.03	6.22		12.49	
00:11:36:11.977	14.03	4.03	6.24		12.53	
00:11:37:11.969	14.04	4.03	6.21		12.49	
00:11:38:11.965	14.04	4.03	6.07		12.21	
00:11:39:12.016	14.04	4.03		6.06		12.19
00:11:40:12.008	14.04	4.03		6.25		12.57
00:11:41:12.008	13.91	4.03		6.77		13.37
00:11:42:11.992	14.02	4.03		8.08		16.21
00:11:43:11.988	14.03	4.03		8.31		16.69
00:11:44:11.980	14.03	4.03		8.54		17.15
00:11:45:11.977	14.03	4.03		8.75		17.58
00:11:46:11.969	14.02	4.03	8.58		17.21	
00:11:47:11.965	14.03	4.03	7.36		14.78	
00:11:48:12.016	14.03	4.03	6.78		13.62	
00:11:49:12.016	14.03	4.03	6.86		13.78	
00:11:50:12.004	14.03	4.03	6.89		13.84	
00:11:51:11.992	14.03	4.02	7.01		14.08	
00:11:52:11.988	14.02	4.03	7.04		14.12	

NG/RFG Gas Turbine						
11/2/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:11:53:11.980	14.03	4.03		6.98		14.02
00:11:54:11.980	13.99	4.03		7.48		14.94
00:11:55:11.969	14.02	4.02		8.19		16.43
00:11:56:11.965	14.02	4.02		8.83		17.71
00:11:57:11.965	14.02	4.02		9.01		18.07
00:11:58:12.008	14.02	4.02		8.74		17.53
00:11:59:11.965	14.03	4.02		8.68		17.43
00:12:00:11.992	14.02	4.02	8.68		17.41	
00:12:01:11.988	14.03	4.03	7.52		15.10	
00:12:02:11.980	14.03	4.03	7.07		14.20	
00:12:03:11.977	14.03	4.03	7.34		14.74	
00:12:04:11.977	14.04	4.03	7.55		15.19	
00:12:05:11.965	14.05	4.01	7.45		15.01	
00:12:06:12.016	14.03	4.00	6.94		13.94	
00:12:07:12.008	14.03	4.01	6.92		13.90	
00:12:08:12.004	14.03	4.01	7.09		14.24	
00:12:09:11.992	14.03	4.01		7.20		14.46
00:12:10:11.988	14.02	4.01		7.87		15.79
00:12:11:11.980	14.03	4.01		9.17		18.42
00:12:12:11.977	14.03	4.02		9.21		18.50
00:12:13:11.969	14.03	4.01		9.22		18.52
00:12:14:11.965	14.03	4.02		9.11		18.30
00:12:15:12.016	14.03	4.01		9.07		18.22
00:12:16:12.008	14.04	4.01	9.16		18.43	
00:12:17:12.004	14.03	4.01	8.90		17.88	
00:12:18:11.992	14.04	4.01	7.52		15.13	
00:12:19:12.043	14.04	4.01	7.58		15.25	
00:12:20:11.980	14.03	4.01	7.65		15.37	
00:12:21:11.977	14.04	4.00	7.75		15.59	
00:12:22:11.969	14.04	4.00	7.86		15.81	
00:12:23:11.965	14.04	4.00		7.84		15.77
00:12:24:12.016	14.04	4.01		7.82		15.73
00:12:25:12.008	14.03	4.00		8.31		16.69

NG/RFG Gas Turbine						
11/2/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:12:26:12.004	14.03	4.01		8.18		16.43
00:12:27:11.992	14.03	4.01		8.22		16.51
00:12:28:11.988	14.04	4.01		8.20		16.49
00:12:29:11.980	14.03	4.01		8.08		16.23
00:12:30:11.980	14.03	4.01	8.02		16.11	
00:12:31:11.969	14.03	4.02	7.93		15.93	
00:12:32:11.965	14.03	4.02	8.01		16.09	
00:12:33:12.016	14.03	4.02	8.08		16.23	
00:12:34:12.008	14.03	4.02	8.10		16.27	
00:12:35:12.004	14.03	4.01	8.12		16.31	
AVERAGE	14.03	4.02	7.53	8.72	15.11	17.51

Appendix F.2. Flow Calculations and Run Sheets

FLOW RATE

PLANT: Gas Turbine
CITY: Confidential
RUN NO: 1,2,3
SAMPLE LOCATION: STACK

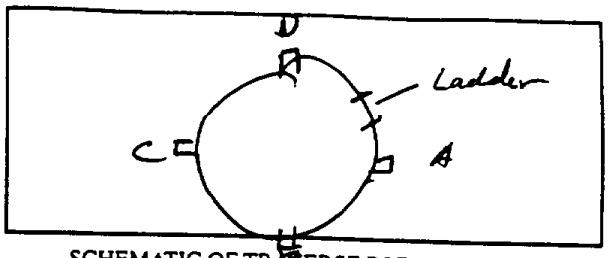
DATE ENTERED: 1/5/94
DATE: 2-Nov-93
OPERATOR: Jon Kawaguchi
ENTERED BY: David Hansell
CHECKED BY:

DATA ENTRY	SYMBOL	UNITS	DATA	DATA	DATA	DATA
RUN NUMBER	-	-	R1	R2	R3	Average
ROUND STACK, DIAMETER	ds	inches	180.0	180.0	180.0	180.00
RECTANGULAR STACK, LENGTH	L	inches				
WIDTH	W	inches				
AVERAGE STACK TEMPERATURE	Fs	degrees F	338.8	338.8	339.0	338.8
AVERAGE METER TEMPERATURE	Fm	degrees F	101.0	105.5	99.0	101.8
BAROMETRIC PRESSURE	Pbar	in. Hg	29.95	29.95	29.95	29.950
STACK STATIC PRESSURE	Pg	in. H20	-1.300	-1.300	-0.780	-1.127
AVG. DELTA H	dH	in. H20	1.900	1.900	1.900	1.900
AVG. VELOCITY HEAD	dP	in. H20	1.69	1.69	1.61	1.660
PITOT COEFFICIENT	Cp	-	0.840	0.840	0.840	0.840
GAS SAMPLE VOLUME	Vm	cubic ft.	29.5	29.8	29.5	29.607
METER CALIBRATION FACTOR	Y	-	1.011	1.011	1.011	1.011
TOTAL SAMPLING TIME	min	minutes	40	40	40	40.000
STACK GAS OXYGEN CONTENT	Co2,m	%	14.02	14.02	14.02	14.020
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	4.01	4.02	4.02	4.017
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	74.4	74.4	67.8	72.200

CALCULATED DATA	SYMBOL	UNITS	DATA	DATA	DATA	DATA
RUN NUMBER	-	-	R1	R2	R3	Average
STACK AREA, As = 3.14*(ds)**2/576 (ROUND)	As	sq. feet	176.714	176.714	176.714	176.714
= L * W/144 (RECTANGULAR)			0.000	0.000	0.000	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	798.8	798.8	799.0	798.8
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	561.0	565.5	559.0	561.8
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64Y (Vm/Tm) (Pbar + dH/13.6)	VmStd	cubic ft.	28.2	28.2	28.3	28.3
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	3.5	3.5	3.2	3.4
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	0.110	0.110	0.101	0.107
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28[100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	29.20	29.20	29.20	29.20
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	27.97	27.97	28.07	28.00
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	29.85	29.85	29.89	29.87
STACK GAS VELOCITY						
vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	91.2	91.2	88.8	90.4
vm = 0.3048 * vs	vsm	m/s	27.81	27.81	27.06	27.56
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	967280	967254	941448	958661
DRY GAS STACK FLOW RATE (DRY,STP)						
Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	567401	567392	558428	564407
Qsdm = Qsd/35.32	Qsdm	dscm/min	16065	16064	15811	15980

PRELIMINARY VELOCITY TRAVERSE

PLANT
DATE 11/2/93
LOCATION
STACK I.D. ~~165~~ 150
PITOT NO./Cp 162 / .84 TC# 50
BAROMETRIC PRESSURE, In Hg 29.95
STATIC GAUGE PRESSURE, In H20 — 1.3
OPERATORS RC, JR
PITOT PRE TEST LEAK CHECK Good
PITOT POST TEST LEAK CHECK Good



SCHEMATIC OF TRAVERSE POINT LAYOUT

	TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
A	1		1.7	343	-
	2		1.7	343	2
	3		1.3	342	2
B	1		2.1	332	
	2		1.6	338	2
	3		1.1	344	2
	AVERAGE				

	TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
C	1		2.5	330	
	2		2.1	332	1
	3		1.3	344	5
D	1		2.3	334	-
	2		1.6	335	0
	3		1.1	343	0
	AVERAGE				

SWIRL ACCEPTANCE LIMITS

Average(abs. value) less than 10°
No points with reverse flow
No more than 4 points above 30°

ΔP MINIMUM LIMITS

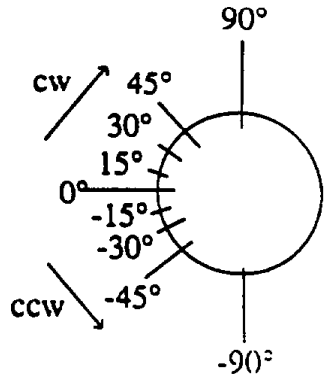
Conditions for more sensitive manometer
1. For 12 or more points on a velocity traverse: 10% of the points's $\Delta p < 0.05"$
2. For <12 points on a velocity traverse more than 1 point's $\Delta p < 0.05"$

Rt Mean Avg Δp =

$$\left[\frac{\sum_i (\Delta p_{si})^{1/2}}{N}\right]^2$$

Rt Mean Avg Ts =

$$\left[\frac{\sum_i (T_{si})^{1/2}}{N}\right]^2$$



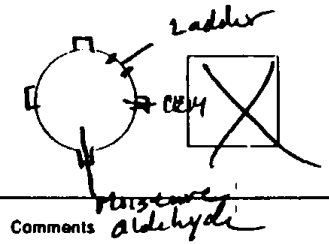
EPA METHOD 4

Plant
City
Location
Operators JB
Date 11/2/93
Run Number 1
Stack Diam. (in.) 18

Sample Box Number Orange
Meter Box Number H5
Meter Calibration (Y) 1.0111
Meter dH @ 1.9832
Pitot Tube No. 162 Cp .84
Probe Length 5' Tc No. 50

Probe Liner Material S/S
Static Pressure (Pa) (in. H2O)
Barometric Pressure (Pb) 29.95 (in. Hg)
Ambient Temperature (°F) 81
Pretest Leak Rate 0.000 cfm @ 15 (in. Hg)
Post Test Leak Rate 0.000 cfm @ 15 (in. Hg)

Sheet of 1



Sampling Time, (min)	Clock Time (24 h)	Vacuum (in. Hg)	Pressure Differential Across Orifice dH (in. H2O)	Gas Sample Volume, Vm (cf)	Dry Gas Meter Outlet Temp. Tm (°F)	Impinger Outlet Temp. (°F)	Comments
0	1000			42.000			
5	05	12	1.9	45.515	96	62	
10	10	12	1.9	49.225	98	58	
15	15	12	1.9	52.915	100	60	1016 Lost power
20	20	12	1.9	56.605	99	58	Personnel cut off power
25	34	12	1.9	60.475	101	57	by accident. Restart
30	39	12	1.9	64.160	103	56	1025
35	44	12	1.9	67.920	103	59	
40	49	12	1.9	71.530	103	59	
				29.530	100		

IMPINGER WEIGHT SHEET

Plant/city: _____

Location: _____

Train Set No. Orange

Run No.: 1

Operator: JR

Run Time: 40 min

Impinger No.	Solution Used	Solution (ml)	Configuration		Weight (grams)	Inspection Comments
1	DI	100	Mod	Final	706.5	
				Initial	642.9	
				Wt. gain	63.6	Clear
2	DI	100	GS	Final	712.6	
				Initial	708.6	
				Wt. gain	4.0	Clear
3	Empty	—	Mod	Final	487.2	
				Initial	487.0	
				Wt. gain	0.2	Some moisture
4	Silica	300g	Mod	Final	713.5	
				Initial	706.9	
				Wt. gain	6.6	¼ Spent
5				Final		
				Initial		
				Wt. gain		
6				Final		
				Initial		
				Wt. gain		
Flask				Final		
				Initial		
				Wt. gain		

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 74.4

V_{wstd} = 3.45

$V_{m\,std}$ = 27.883

Ratio 5.36 : 1

Train set up: Date: 11-2-93

Signature: [signature]

Train recovery: Date: 11-2-93

Signature: [signature]

EER

EPA METHOD 4

Plant
City
Location
Operators JK
Date 11/2/95
Run Number 2
Stack Diam. (in.) ~~145~~ 180

Sample Box Number Black
Meter Box Number NS
Meter Calibration (Y) 1.0211
Meter dH @ 1.9032
Pitot Tube No. 42 Cp .84
Probe Length 4' Tc No. 50

Probe Liner Material S/S
Static Pressure (Pa) – (in. H2O)
Barometric Pressure (Pb) 29.95 (in. Hg)
Ambient Temperature (°F) 82
Pretest Leak Rate 0.005 cfm @ 19 (in. Hg)
Post Test Leak Rate 0.080 cfm @ 10 (in. Hg)

Sheet 1 of 1

Sampling Time, (min)	Clock Time (24 h)	Vacuum (in. Hg)	Pressure Differential Across Orifice dH (in H2O)	Gas Sample Volume, Vm (cf)	Dry Gas Meter Outlet Temp. Tm (°F)	Impinger Outlet Temp. (°F)	Comments
0	1203			71.640			
5	08	6	1.9	75.160	101	55	
10	13	6	1.9	78.760	103	57	
15	18	6	1.9	82.700	102	57	
20	23	6	1.9	86.485	105	57	
25	28	6	1.9	90.185	106	57	
30	33	6	1.9	93.935	108	57	
35	38	6	1.9	97.665	109	55	
40	43	6	1.9	101.410	110	58	

IMPINGER WEIGHT SHEET

Train Set No. ~~Black~~ Orange

Plant/city: _____

Location: _____

Run No.: 2

Operator: JR

Run Time: 40 min

Impinger No.	Solution Used	Solution (ml)	Configuration		Weight (grams)	Inspection Comments
1	DI	100	Mod	Final	771.1	
				Initial	706.5	
				Wt. gain		Clear
2	DI	100	GS	Final	716.1	
				Initial	712.6	
				Wt. gain		Clear
3	Empty	—	Mod	Final	487.4	
				Initial	487.2	
				Wt. gain		Some moisture
4	Silica	Empty	Mod	Final	719.6	
				Initial	713.5	
				Wt. gain		1/2 Spent
5				Final		
				Initial		
				Wt. gain		
6				Final		
				Initial		
				Wt. gain		
Flask				Final		
				Initial		
				Wt. gain		

TOTAL WEIGHT GAIN OF IMPINGERS (grams) _____

Train set up: Date: 11-2-93

Signature: R. [illegible]

Train recovery: Date: _____

Signature: _____

EER

PLANT
DATE 4/2/93
LOCATION
STACK I.D. 180
PITOT NO./Cp 162/.84 TC# 50
BAROMETRIC PRESSURE, In Hg 29.95
STATIC GAUGE PRESSURE, In H20 -0.78
OPERATORS RC, JK
PITOT PRE TEST LEAK CHECK Good
PITOT POST TEST LEAK CHECK Good

SCHEMATIC OF TRAVERSE POINT LAYOUT

	TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
A	1		1.0	341	
	2		1.4	338	
	3		1.6	330	
B	1		2.2	342	
	2		1.6	340	
	3		1.1	335	
AVERAGE					

	TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
C	1		2.5	342	
	2		2.0	338	
	3		1.2	334	
D	1		2.3	342	
	2		1.7	343	
	3		1.1	343	
AVERAGE					

SWIRL ACCEPTANCE LIMITS

Average(abs. value) less than 10°
No points with reverse flow
No more than 4 points above 30°

ΔP MINIMUM LIMITS

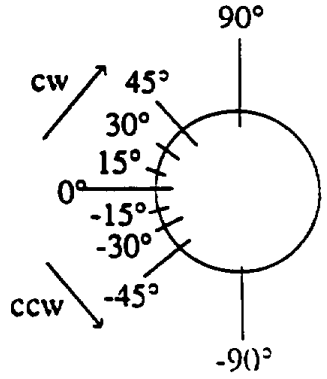
Conditions for more sensitive manometer
1. For 12 or more points on a velocity traverse: 10% of the points's $\Delta p < 0.05"$
2. For <12 points on a velocity traverse more than 1 point's $\Delta p < 0.05"$

Rt Mean Avg Δp =

$$\left[\frac{\sum_{i}(\Delta p_{si})^{1/2}}{N}\right]^2$$

Rt Mean Avg Ts =

$$\left[\frac{\sum_{i}(T_{si})^{1/2}}{N}\right]^2$$



EPA METHOD 4

Plant
City
Location
Operators JLC
Date 11/2/93
Run Number 3
Stack Diam. (in.) 18

Sample Box Number Orange
Meter Box Number N5
Meter Calibration (Y) 1.041
Meter dH @ 1.9082
Pitot Tube No. 162 Cp .84
Probe Length 4' Tc No. 50

Probe Liner Material S/S
Static Pressure (Ps) -0.78 (in. H2O)
Barometric Pressure (Pb) 29.95 (in. Hg)
Ambient Temperature (°F) 76
Pretest Leak Rate 0.000 cfm @ 15 (in. Hg)
Post Test Leak Rate 0.000 cfm @ 15 (in. Hg)

Sheet 1 of 1

Sampling Time, (min)	Clock Time (24 h)	Vacuum (in. Hg)	Pressure Differential Across Orifice dH (in. H2O)	Gas Sample Volume, Vm (cf)	Dry Gas Meter Outlet Temp. Tm (°F)	Impinger Outlet Temp. (°F)	Comments
0	1519			101.540			
5	24	13	1.9	105.140	96	52	
10	29	13	1.9	108.855	97	53	
15	34	13	1.9	112.550	98	54	
20	39	13	1.9	116.255	100	55	
25	44	13	1.9	119.945	100	55	
30	49	13	1.9	123.665	100	56	
35	54	13	1.9	127.385	100	57	
40	59	13	1.9	131.055	100	58	

IMPINGER WEIGHT SHEET

Train Set No. ~~Orange~~ Black

Plant/city: _____

Location: _____

Run No.: 7

Operator: JK

Run Time: 40 min

Impinger No.	Solution Used	Solution (ml)	Configuration		Weight (grams)	Inspection Comments
1	DI	100	Mod	Final	729.2	
				Initial	672.8	
				Wt. gain		Clear
2	DI	100	GS	Final	652.3	
				Initial	645.3	
				Wt. gain		Clear
3	Empty	—	Mod	Final	471.1	
				Initial	469.0	
				Wt. gain		Clear Moist.
4	Silica	300g	Mod	Final	607.6	
				Initial	605.3	
				Wt. gain		25% spent
5				Final		
				Initial		
				Wt. gain		
6				Final		
				Initial		
				Wt. gain		
Flask				Final		
				Initial		
				Wt. gain		

TOTAL WEIGHT GAIN OF IMPINGERS (grams) _____

Train set up: Date: 10/1/93
Signature: [signature]

Train recovery: Date: 10/2/93
Signature: [signature]

EER

Appendix F.3. Tedlar Bag Analyses

5.36 dilution Ratio
~~Target~~
ACT. Held at 6.4 Ratio

Energy and Environmental Research Corporation

CHAIN OF CUSTODY

Plant
Unit
Location Stack
Project No. 6373-020
Page 1 of 1
P.O No.

Sample No.	Test No.	Test Date	Description
154611	1	11-2-93	Diluted
154612	1	11-2-93	Undiluted
154614	2		Diluted
154615	2		Undiluted
154617	3		Diluted
154618	3		Undiluted
154620	4		Blank Na
135847	4A		Undiluted 5 liters fill gas
135846 Held	5		Undiluted 5 liter fill gas
JJ 16			

Sampling system prepared by R. Campbell
Test operator R. Campbell
Sample recovery by R. Campbell filled bags in field

Relinquished By	Recieved By	Time	Date	Reason
		11/03/93		

Laboratory analysis by _____ Date _____

F-18

4656

Ratio 5.76 dilution
6.4 Act. dilution ratio

Energy and
Environmental
Research Corporation

FIELD SAMPLE TRACKING REPORT

PROJECT NO. 6373-020 PAGE 1

PLANT/PROJECT

UNIT #.

SAMPLE NO.	RUN NO.	PROCESS STREAM/ LOCATION	SAMPLE DATA				SENT TO:		
			DESCRIPTION	DATE	TIME	SAMPLER	LABORATORY	DATE	
154611	1	Stack	Diluted	11-2-93	15:53 / 15:20	R Campbell			
154612	1	Stack	Undiluted	11-2-93	15:53 / 15:20	R Campbell			
154613	1	Stack	Condensate	11-2-93	15:53 / 15:20	R Campbell			Not enough sample
154614	2	Stack	Diluted	11-2-93	15:20 / 15:47	R Campbell			
154615	2	Stack	Undiluted	11-2-93	15:20 / 15:47	R Campbell			
154616	2	Stack	Condensate	11-2-93	15:20 / 15:47	R Campbell			
154617	3	Stack	Diluted	11-2-93	15:50 / 16:20	R Campbell			
154618	3	Stack	Undiluted	11-2-93	15:50 / 16:20	R Campbell			
154619	3	Stack	Condensate	11-2-93	15:50 / 16:20	R Campbell			
154620	4	Stack	Blank	11-2-93	18:29 / 18:55	R Campbell			
135847	4A	Stack	Undiluted	11-2-93	16:20 / 16:50	R Campbell			
135846	5	Stack	Undiluted	11-2-93	16:50 / 17:08	R Campbell			

Applied P & Ch Laboratory
4006 E. Mission Blvd., Pomona, CA 91766
Tel: (909) 622-5148 Fax: (909) 622-3199

APCL Analytical Report

Submitted to:
Energy and Environmental Research Corporation
Attention: Dave Hansell
8001 Irvine Blvd.
Santa Ana, CA 92706
Tel: (714)552-1803 Fax: (714)857-1943

Service ID #: 801-934656A
Collected by: R. Campbell
Collected on: 11/02/93
Sample description:
Air Bag Samples from Plant
Project 6373-020

Received : 11/03/93
Tested : 11/03/93
Reported : 11/24/93

Analysis of VOCs in Air

801-934656A Page 1 of 3

Component Analyzed	Method	Unit	PQL	Concentration 154611 Diluted 93-4656-01	154612 Undiluted 93-4656-02	154614 Diluted 93-4656-03	154615 Undiluted 93-4656-04	154617 Diluted 93-4656-05	154618 Undiluted 93-4656-06	154620 Blank 93-4656-07
Chlorinated Hydrocarbons										
Chloromethane	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Bromomethane	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Chloroethane	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,1-Dichloroethene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Methylene Chloride	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,1-Dichloroethene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
cis-1,2-Dichloroethene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Chloroform	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,1,1-Trichloroethane	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Carbon Tetrachloride	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,2-Dichloroethane	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Trichloroethene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,2-Dichloropropane	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
cis-1,3-Dichloropropene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
trans-1,3-Dichloropropene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,1,2-Trichloroethane	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Tetrachloroethene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Ethylene Dibromide	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Ethylene Dichloride	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Chlorobenzene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,1,2,2-Tetrachloroethane	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,3-Dichlorobenzene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,4-Dichlorobenzene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Chlorotoluene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,2-Dichlorobenzene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,2,4-Trichlorobenzene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Hexachlorobutadiene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
trans-1,2-Dichloroethene	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
1,1,1,2-Tetrachloroethane	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.
Carbon Disulfide	TO-14	ppbV	5	N.D.	—	N.D.	—	N.D.	—	N.D.

CADHS ELAP CERTIFICATION NUMBER 1431

Applied P & Ch Laboratory
4006 E. Mission Blvd., Pomona, CA 91766
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APCL Analytical Report

Analysis of VOCs in Air

801-934656A Page 2 of 3

Component Analyzed	Method	Unit	PQL	Concentration 154580 Diluted 93-4506-01	154581 Undiluted 93-4506-02	154583 Diluted 93-4506-03	154584 Undiluted 93-4506-04	154586 Diluted 93-4506-05	154587 Undiluted 93-4506-06	154589 Blank 93-4506-07
Paraffins (C4-C6)										
n-Butane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Isobutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
n-Pentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Isopentane [2-methylbutane]*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Neopetane [2,2-dimethylpropane]*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
n-Hexane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Methylpentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
3-Methylpentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2,2-Dimethylbutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2,3-Dimethylbutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Aromatics										
Benzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Toluene	TO-14	ppbV	5	12	–	N.D.	–	12	–	N.D.
Ethyl Benzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
m,p-Xylenes	TO-14	ppbV	5	N.D.	–	N.D.	–	6	–	N.D.
o-Xylene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Styrene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,3,5-Trimethylbenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2,4-Trimethylbenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Phenol	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Naphthalene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Naphthenes										
Cyclopropane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Cyclobutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Cyclopentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Cyclohexane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ketones										
Acetone	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Butanone	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,3-Butadiene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Propadiene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Olefins										
1-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-2-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-2-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Methylpropene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1-Pentene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-2-Pentene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-2-Pentene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-methyl-2-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-methyl-1-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
3-methyl-1-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.

CADHS ELAP CERTIFICATION NUMBER 1431

Applied P & Ch Laboratory
4086 E. Mission Blvd., Pomona, CA 91766
Tel: (909) 622-5148 Fax: (909) 622-3199

APCL Analytical Report

Analysis of VOCs in Air

Component Analyzed	Method	Unit	PQL	Concentration 154580 Diluted 93-4506-01	154581 Undiluted 93-4506-02	154583 Diluted 93-4506-03	154584 Undiluted 93-4506-04	154586 Diluted 93-4506-05	154587 Undiluted 93-4506-06	154589 Blank 93-4506-07
Acetylenes (C4-C5)										
1-Butyne*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Butyne	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1-Pentyne	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Pentyne	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethers										
MTBE	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Dimethyl Ether	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethyl Methyl Ether*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Diethyl Ether	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethyl Propyl Ether*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Dipropyl Ether	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
VOCs by GC/FIDs										
Methane	TO-14/FID	ppbV	500	–	7,500	–	7,400	–	6,600	–
Ethane	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	–
Propane	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	–
Ethene	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	–
Propene	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	–
Ethyne	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	–
Propyne*	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	–

PQL : Practical Quantitation Limit
N.D. : Not Detected or Less Than The Quantitation Limit.
* Standards not available

Respectfully submitted,

Shu-Teh Pan
Lab Manager
Applied P & Ch Laboratory

Applied P & Ch Laboratory
4066 E. Mission Blvd., Pomona, CA 91766
Tel: (909) 623-6148 Fax: (909) 622-3199

APCL Analytical Report

Analysis of VOCs in Air

Component Analyzed	Method	Unit	PQL	Concentration JJ 26234 93-4656-09
Paraffins (C4-C6)				
n-Butane	TO-14	ppbV	5	N.D.
Isobutane	TO-14	ppbV	5	N.D.
n-Pentane	TO-14	ppbV	5	N.D.
Isopentane [2-methylbutane]*	TO-14	ppbV	5	N.D.
Neopetane [2,2-dimethylpropane]*	TO-14	ppbV	5	N.D.
n-Hexane	TO-14	ppbV	5	N.D.
2-Methylpentane	TO-14	ppbV	5	N.D.
3-Methylpentane	TO-14	ppbV	5	N.D.
2,2-Dimethylbutane	TO-14	ppbV	5	N.D.
2,3-Dimethylbutane	TO-14	ppbV	5	7
Aromatics				
Benzene	TO-14	ppbV	5	N.D.
Toluene	TO-14	ppbV	5	N.D.
Ethyl Benzene	TO-14	ppbV	5	N.D.
m,p-Xylenes	TO-14	ppbV	5	N.D.
o-Xylene	TO-14	ppbV	5	N.D.
Styrene	TO-14	ppbV	5	N.D.
1,3,5-Trimethylbenzene	TO-14	ppbV	5	N.D.
1,2,4-Trimethylbenzene	TO-14	ppbV	5	N.D.
Phenol	TO-14	ppbV	5	N.D.
Naphthalene	TO-14	ppbV	5	N.D.
Naphthenes				
Cyclopropane	TO-14	ppbV	5	N.D.
Cyclobutane	TO-14	ppbV	5	N.D.
Cyclopentane	TO-14	ppbV	5	N.D.
Cyclohexane	TO-14	ppbV	5	N.D.
Ketones				
Acetone	TO-14	ppbV	5	N.D.
Butanone	TO-14	ppbV	5	N.D.
1,3-Butadiene	TO-14	ppbV	5	11
Propadiene	TO-14	ppbV	5	N.D.
Olefins				
1-Butene	TO-14	ppbV	5	16
cis-2-Butene	TO-14	ppbV	5	68
trans-2-Butene	TO-14	ppbV	5	28
2-Methylpropene	TO-14	ppbV	5	N.D.
1-Pentene	TO-14	ppbV	5	7
cis-2-Pentene	TO-14	ppbV	5	N.D.
trans-2-Pentene	TO-14	ppbV	5	~4
2-methyl-2-Butene	TO-14	ppbV	5	7
2-methyl-1-Butene	TO-14	ppbV	5	6
3-methyl-1-Butene	TO-14	ppbV	5	18

CADHS ELAP CERTIFICATION NUMBER 1431

Applied P & Ch Laboratory
4006 E. Mission Blvd., Pomona, CA 91766
Tel: (909) 622-5145 Fax: (909) 622-3199

APCL Analytical Report

Submitted to:
Energy and Environmental Research Corporation
Attention: Dave Hansell
8001 Irvine Blvd.
Santa Ana, CA 92706
Tel: (714)552-1803 Fax: (714)857-1943

Service ID #: 801-934656B
Collected by: R. Campbell
Collected on: 11/02/93
Sample description:
Air Bag Samples from Plant
Project: 6373-020

Received : 11/03/93
Tested : 11/03-22/93
Reported : 11/24/93

Analysis of VOCs in Air

801-934656B Page 1 of 3

Component Analyzed	Method	Unit	PQL	Concentration JJ 26234 93-4656-09
Chlorinated Hydrocarbons				
Chloromethane	TO-14	ppbV	5	N.D.
Bromomethane	TO-14	ppbV	5	N.D.
Chloroethane	TO-14	ppbV	5	N.D.
1,1-Dichloroethene	TO-14	ppbV	5	N.D.
Methylene Chloride	TO-14	ppbV	5	N.D.
1,1-Dichloroethene	TO-14	ppbV	5	N.D.
cis-1,2-Dichloroethene	TO-14	ppbV	5	N.D.
Chloroform	TO-14	ppbV	5	N.D.
1,1,1-Trichloroethane	TO-14	ppbV	5	N.D.
Carbon Tetrachloride	TO-14	ppbV	5	N.D.
1,2-Dichloroethane	TO-14	ppbV	5	N.D.
Trichloroethene	TO-14	ppbV	5	N.D.
1,2-Dichloropropane	TO-14	ppbV	5	N.D.
cis-1,3-Dichloropropene	TO-14	ppbV	5	N.D.
trans-1,3-Dichloropropene	TO-14	ppbV	5	N.D.
1,1,2-Trichloroethane	TO-14	ppbV	5	N.D.
Tetrachloroethene	TO-14	ppbV	5	N.D.
Ethylene Dibromide	TO-14	ppbV	5	N.D.
Ethylene Dichloride	TO-14	ppbV	5	N.D.
Chlorobenzene	TO-14	ppbV	5	N.D.
1,1,2,2-Tetrachloroethane	TO-14	ppbV	5	N.D.
1,3-Dichlorobenzene	TO-14	ppbV	5	N.D.
1,4-Dichlorobenzene	TO-14	ppbV	5	N.D.
Chlorotoluene	TO-14	ppbV	5	N.D.
1,2-Dichlorobenzene	TO-14	ppbV	5	N.D.
1,2,4-Trichlorobenzene	TO-14	ppbV	5	N.D.
Hexachlorobutadiene	TO-14	ppbV	5	N.D.
trans-1,2-Dichloroethene	TO-14	ppbV	5	N.D.
1,1,1,2-Tetrachloroethane	TO-14	ppbV	5	N.D.
Vinyl Chloride	TO-14	ppbV	5	N.D.
Carbon Disulfide	TO-14	ppbV	5	N.D.

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APCL Analytical Report

Analysis of VOCs in Air

Component Analyzed	Method	Unit	PQL	Concentration JJ 26234 93-4656-09
Acetylenes (C4-C5)				
1-Butyne*	TO-14	ppbV	5	N.D.
2-Butyne	TO-14	ppbV	5	N.D.
1-Pentyne	TO-14	ppbV	5	N.D.
2-Pentyne	TO-14	ppbV	5	N.D.
Ethers				
Methyl Ether	TO-14	ppbV	5	6
MTBE	TO-14	ppbV	5	N.D.
Dimethyl Ether	TO-14	ppbV	5	N.D.
Ethyl Methyl Ether*	TO-14	ppbV	5	N.D.
Diethyl Ether	TO-14	ppbV	5	N.D.
Ethyl Propyl Ether*	TO-14	ppbV	5	N.D.
Dipropyl Ether	TO-14	ppbV	5	N.D.
VOCs by GC/FIDs				
Methane	TO-14/FID	ppbV	500	4,400
Ethane	TO-14/FID	ppbV	500	N.D.
Propane	TO-14/FID	ppbV	500	N.D.
Ethene	TO-14/FID	ppbV	500	N.D.
Propene	TO-14/FID	ppbV	500	N.D.
Ethyne	TO-14/FID	ppbV	500	N.D.
Propyne*	TO-14/FID	ppbV	500	N.D.

PQL : Practical Quantitation Limit
N.D. : Not Detected or Less Than The Quantitation Limit.
* Standards not available

Respectfully submitted,

Shu-Teh Pan
Lab Manager
Applied P & Ch Laboratory

CADHS ELAP CERTIFICATION NUMBER 1431

Appendix F.4. Aldehyde/Ketone Calculations, Run Sheets and Analyses

CARB 430

PLANT: NG Gas Turbine
CITY: Confidential
RUN #: 1, 2, 3
SAMPLE LOCATION: Stack

DATE DATE ENTERED: 11/20/93
TEST DATE: 11/2/93
OPERATOR: Jon Kawaguchi
ENTERED BY: Dave Hansell
CHECKED BY:

DATA ENTRY	SYMBOL	UNITS		DATA		DATA		DATA			
RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
AVERAGE METER TEMPERATURE	Fm	degree F		111.20		118.40		102.20		110.60	7.34
BAROMETRIC PRESSURE	Pbar	in. Hg		29.95		29.95		29.95		29.95	0.00
AVG. DELTA H	dH	in. H20		1.20		1.30		1.30		1.27	4.56
GAS SAMPLE VOLUME	Vm	cubic ft.		0.87		0.86		0.85		0.86	1.16
METER CALIBRATION FACTOR	Y	-		1.00		1.00		1.00		1.00	0.00
TOTAL SAMPLING TIME	min	minutes		60.00		60.00		60.00		60.00	0.00
SAMPLE 1ST IMPINGER VOLUME	Siwt,1	ml		11.40		11.40		11.20		11.33	1.02
SAMPLE 2ND IMPINGER VOLUME	Siwt,2	ml		10.00		9.90		9.80		9.90	1.01
BLANK 1ST IMPINGER VOLUME	Biwt,1	ml		10.20		9.80		9.60		9.87	3.10
BLANK 2ND IMPINGER VOLUME	Biwt,2	ml		9.80		10.00		9.80		9.87	1.17
SAMPLE WEIGHTS (1ST IMPINGER)											
Formaldehyde	Swt,1	µg		0.10		0.10		0.24		0.15	55.11
Acetaldehyde	Swt,1	µg		0.15		0.28		0.30		0.24	33.47
Acrolein	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Swt,1	µg	ND	0.10	ND	0.10		0.14	<	0.11	20.38
Crotonaldehyde	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
SAMPLE WEIGHTS (2ND IMPINGER)											
Formaldehyde	Swt,2	µg		0.10		0.63	ND	0.10	<	0.28	110.60
Acetaldehyde	Swt,2	µg		0.16		0.23	ND	0.10	<	0.16	39.84
Acrolein	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Crotonaldehyde	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
BLANK WEIGHTS (1ST IMPINGER)											
Formaldehyde	Bwt,1	µg		0.23	ND	0.10	ND	0.10	<	0.14	52.36
Acetaldehyde	Bwt,1	µg	ND	0.10	ND	0.10		0.10	<	0.10	0.00
Acrolein	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Crotonaldehyde	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
BLANK WEIGHTS (2ND IMPINGER)											
Formaldehyde	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetaldehyde	Bwt,2	µg		0.13	ND	0.10	ND	0.10	<	0.11	15.75
Acrolein	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Bwt,2	µg	ND	0.10		0.15	ND	0.10	<	0.12	24.74
Crotonaldehyde	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00

CARB 430

	DATE DATE ENTERED: 11/20/93
PLANT: NG Gas Turbine	TEST DATE: 11/2/93
CITY: Confidential	OPERATOR: Jon Kawaguchi
RUN #: 1, 2, 3	ENTERED BY: Dave Hansell
SAMPLE LOCATION: Stack	CHECKED BY:

CALCULATED DATA	SYMBOL	UNITS	DATA		DATA		DATA			
RUN NUMBER	-	-	R1		R2		R3		AVE	RSD
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	571.20		578.40		562.20		570.60	1.42
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64Y (Vm/Tm) (Pbar + dH/13.6)	VmStd	dscm	0.023		0.022		0.023		0.023	1.22

SAMPLE IMPINGER CONCENTRATION (ng/ml), S or Bic= 1000*(S or Bwt,1+S or Bwt,2)/(S or Biwt,1+S or Biwt,2)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Sic	ng/ml		9		34	<	16	<	20	64.60
Acetaldehyde	Sic	ng/ml		14		24	<	19	<	19	24.69
Acrolein	Sic	ng/ml	ND	9	ND	9	ND	10	ND	9	0.98
Propanal	Sic	ng/ml	ND	9	ND	9	ND	10	ND	9	0.98
Acetone	Sic	ng/ml	ND	9	ND	9	<	11	<	10	11.84
Crotonaldehyde	Sic	ng/ml	ND	9	ND	9	ND	10	ND	9	0.98
Isobutyraldehyde	Sic	ng/ml	ND	9	ND	9	ND	10	ND	9	0.98
Methyl Ethyl Ketone	Sic	ng/ml	ND	9	ND	9	ND	10	ND	9	0.98
BLANK											
Formaldehyde	Bic	ng/ml	<	17	ND	10	ND	10	<	12	29.55
Acetaldehyde	Bic	ng/ml	<	12	ND	10	<	10	<	11	7.10
Acrolein	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.56
Propanal	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.56
Acetone	Bic	ng/ml	ND	10	<	13	ND	10	<	11	13.07
Crotonaldehyde	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.56
Isobutyraldehyde	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.56
Methyl Ethyl Ketone	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.56

BLANK TO SAMPLE RATIO, Br=Sic/Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
RATIO											
Formaldehyde	Br		RL	1	RL	3	RL	1		2	64.60
Acetaldehyde	Br		RL	1	RL	2	RL	2		2	24.69
Acrolein	Br		NA	NA	NA	NA	NA	NA		NA	NA
Propanal	Br		NA	NA	NA	NA	NA	NA		NA	NA
Acetone	Br		NA	NA	NA	NA	RL	1		1	#DIV/0!
Crotonaldehyde	Br		NA	NA	NA	NA	NA	NA		NA	NA
Isobutyraldehyde	Br		NA	NA	NA	NA	NA	NA		NA	NA
Methyl Ethyl Ketone	Br		NA	NA	NA	NA	NA	NA		NA	NA

CARB 430

	DATE DATE ENTERED: 11/20/93
PLANT: NG Gas Turbine	TEST DATE: 11/2/93
CITY: Confidential	OPERATOR: Jon Kawaguchi
RUN #: 1, 2, 3	ENTERED BY: Dave Hansell
SAMPLE LOCATION: Stack	CHECKED BY:

CORRECTED SAMPLE CONCENTRATION (ng/ml) Br>5 Cic=Sic-Average(Bic); Br<5 Cic=5*Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cic	ng/ml	RL	62	RL	62	RL	62	NC	62	0.00
Acetaldehyde	Cic	ng/ml	RL	53	RL	53	RL	53	NC	53	0.00
Acrolein	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	10	ND NC	9	0.98
Propanal	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	10	ND NC	9	0.98
Acetone	Cic	ng/ml	ND NA	9	ND NA	9	RL	55	< NC	25	107.09
Crotonaldehyde	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	10	ND NC	9	0.98
Isobutyraldehyde	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	10	ND NC	9	0.98
Methyl Ethyl Ketone	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	10	ND NC	9	0.98

CORRECTED SAMPLE CONCENTRATION 1 (mg/dscm), Cc,1=Cic*(Swt,1+Swt,2)/VmStd/1e06

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,1	mg/dscm	RL	0.06	RL	0.06	RL	0.06	NC	0.06	1.56
Acetaldehyde	Cc,1	mg/dscm	RL	0.05	RL	0.05	RL	0.05	NC	0.05	1.56
Acrolein	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	1.23
Propanal	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	1.23
Acetone	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	RL	0.05	< NC	0.02	106.04
Crotonaldehyde	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	1.23
Isobutyraldehyde	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	1.23
Methyl Ethyl Ketone	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	1.23

CORRECTED SAMPLE CONCENTRATION 2 (ppbv), Cc,2=1000*24.05/Mw

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,2	ppbv	RL	46	RL	47	RL	46	NC	46	1.56
Acetaldehyde	Cc,2	ppbv	RL	27	RL	28	RL	27	NC	27	1.56
Acrolein	Cc,2	ppbv	ND NA	4	ND NA	4	ND NA	4	ND NC	4	1.23
Propanal	Cc,2	ppbv	ND NA	4	ND NA	4	ND NA	4	ND NC	4	1.23
Acetone	Cc,2	ppbv	ND NA	4	ND NA	4	RL	21	< NC	9	106.04
Crotonaldehyde	Cc,2	ppbv	ND NA	3	ND NA	3	ND NA	3	ND NC	3	1.23
Isobutyraldehyde	Cc,2	ppbv	ND NA	3	ND NA	3	ND NA	3	ND NC	3	1.23
Methyl Ethyl Ketone	Cc,2	ppbv	ND NA	3	ND NA	3	ND NA	3	ND NC	3	1.23

ND - Sample value below detection limit

< - Some sample values below detection limit

C - Blank Corrected

RL - Reporting Limit

NA - Not Available

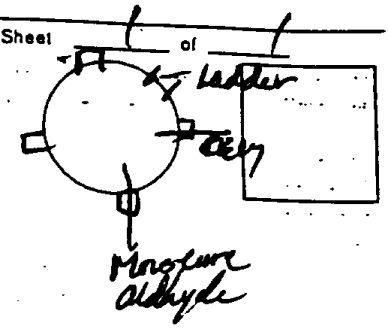
#39-5600
227

CARB 430 RUN SHEET

Plant
City
Location
Operators JD
Date 11/2/93
Run Number 1
Stack Diam. (in.) 180
Static Pressure (Pa) -1.3 (in. H2O)
Barometric Pressure (Pb) 29.95 (in. Hg)
Ambient Temperature (°F) 81

Sample Box Number
Meter Box Number V3
Meter Calibration (Y)
Meter dH @
Probe Length 4'
Probe Liner Material GLS
Pretest Leak Rate 0.000 cfm @ 7 (in. Hg)
Post Test Leak Rate ____ cfm @ ____ (in. Hg)

Sheet 1 of 1



Traverse Point No.	Sampling Time (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH Probe Temp.	Comments
1	0	0958		917.54					
1	5	1003	.5	920.66	.5	N/A	40	1.2	
	10	08	.5	923.21	.5		40	1.2	
	15	13	.5	925.82	.5		41	1.4	
	20	[illegible]	.5	928.46	.5		43	1.2	
	25	[illegible]	.5	931.17	.5		43	1.2	
	30	[illegible]	.5	933.88	.5		44	1.1	
	35	[illegible]	.5	936.28	.5		45	1.2	
	40	[illegible]	.5	938.75	.5		45	1.1	
	45	[illegible]	.5	940.60	.5		46	1.2	
	50	[illegible]	.5	943.17	.5		46	1.4	
	55	[illegible]	.5	945.85	.5		46	1.3	
	60	[illegible]	.5	948.65	.5		46	1.2	
Average/Total									

Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

CARB 430 RUN SHEET

Plant
City
Location
Operators JC
Date 11/2/93
Run Number 2
Stack Diam. (in.) 180
Static Pressure (Pa) (in. H2O)
Barometric Pressure (Pb) 29.95 (in. Hg)
Ambient Temperature (°F) 89

Sample Box Number
Meter Box Number V3
Meter Calibration (Y)
Meter dH @
Probe Length 4
Probe Liner Material S/S
Pretest Leak Rate 0.000 cfm @ 7 (in. Hg)
Post Test Leak Rate 0.000 cfm @ 7 (in. Hg)

Sheet 1 of 1

Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔP (in. H2O)	Comments
1	0	1202		949.80					
1	5	07	.5	951.21	.5	N/A	44	1.3	
	10	12	.5	953.80	.5		45	1.3	
	15	17	.5	956.35	.5		45	1.2	
	20	22	.5	958.77	.5		46	1.4	
	25	27	.5	961.34	.5		47	1.2	
	30	32	.5	963.93	.5		47	1.2	
	35	37	.5	966.72	.5		48	1.2	
	40	42	.5	969.80	.5		48	1.4	
	45	47	.5	971.31	.5		49	1.2	
	50	52	.5	974.00	.5		49	1.4	
	55	57	.5	976.54	.5		50	1.1	
	60	1302	.5	979.21	.5		50	1.2	
Average/Total									

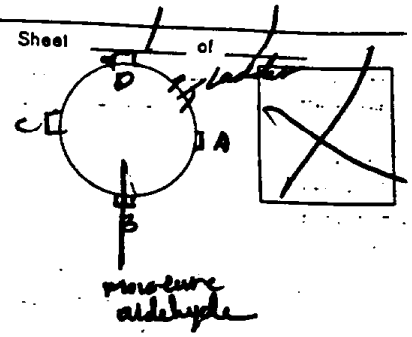
Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

CARB 430 RUN SHEET

Plant
City
Location
Operators JR
Date 11/2/93
Run Number 3
Stack Diam. (in.) [illegible]
Static Pressure (Pa) -0.78 (in. H2O)
Barometric Pressure (Pb) 29.95 (in. Hg)
Ambient Temperature (°F) 81

Sample Box Number
Meter Box Number V3
Meter Calibration (Y)
Meter dH @
Probe Length 4'
Probe Liner Material S/S
Pretest Leak Rate 0.000 cfm @ 7 (in. Hg)
Post Test Leak Rate ____ cfm @ ____ (in. Hg)

Sheet 1 of 1



Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH Probe Temp.	Comments
	0								
	5	23	.5	981.77	.5	N/A	39	1.4	
	10	28	.5	984.31	.5		39	1.2	
	15	33	.5	986.71	.5		39	1.2	
	20	38	.5	989.11	.5		39	1.4	
	25	43	.5	991.65	.5		39	1.3	
	30	48	.5	994.15	.5		39	1.4	
	35	53	.5	996.73	.5		39	1.2	
	40	58	.5	999.20	.5		39	1.3	
	45	1603	.5	1001.76	.5		39	1.3	
	50	08	.5	1004.34	.5		39	1.4	
	55	13	.5	1006.78	.5		39	1.4	
	60	18	.5	1009.40	.5		39	1.4	
Average/Total									

Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

Energy and Environmental Research Corporation

18 Mason, Irvine, CA 92718
tel: (714) 859-8851
fax: (714) 859-3194

Laboratory Report Due by _____ to:

EER Contact: Jon Kawaguchi Address: EER

tel: (714) 552-1803 8001 Irvine Blvd

fax: (714) 857-1943 Santa Ana, CA 92705

Bill to: P.O. No.: _____

EER Corporation

18 Mason

Irvine, CA 92718

Sample Chain of Custody Record

page 1 of 2

EER Project No: 6373-020

Project Name: CARB VOC

Site Name:

Sampling System Prepared by: Jon Kawaguchi

Test Operator(s): Jon Kawaguchi

Samples Recovered by: Jon Kawaguchi

Laboratory I.D. No.	EER Label No.	FIELD SAMPLE IDENTIFICATION AND SAMPLING INFORMATION: Test ID / Location	Physical Description	Date	Time	No. of Containers	Analyses Required: Aldehydes (1-C4)	Ketones (3-C4)					ADDITIONAL INFORMATION (e.g. Volumes, TT, Holding Times, Sample Preparation, Add'l Instructions, etc.)
	154513	1/Stack	Aldehyde Blank 1 Front	11/2/93		1	/	/					
	154514	1/Stack	" " Back				/	/					
	154515	1/Stack	" Front				/	/					
	154516	1/Stack	" Back				/	/					
	154511	2/Stack	" Blank 2 Front				/	/					
	154512	2/Stack	" " Back				/	/					
	154510	2/Stack	" Front				/	/					
	15533	2/Stack	" Back				/	/					
	135849	3/Stack	" Blank 3 Front				/	/					
	135034	3/Stack	" " Back				/	/					

Method of Shipment: Fed X

Shipment I.D.:

Date Shipped: 11/3/93

Samples Shipped to: Air Toxics

Attention:

Remarks (RUSH!, units: mg/L, ppm, etc.):

After analysis: ☐ Archive samples (Hold for _____ months, then dispose.)

☐ Return samples to: EER Corporation 8001 Irvine Blvd., Irvine, CA 92705

Relinquished by: (Sign & Print)	Date / Time:	Received by: (Sign & Print)	Date / Time:
Jon Kawaguchi	11/2/93 5:42	L Robinson L. Robinson	11/4/93 0950

TOP - ORIGINAL MUST STAY WITH SAMPLES MIDDLE - LABORATORY COPY BOTTOM - EER COPY RETAIN WITH FIELD LOG

Energy and Environmental Research Corporation

18 Mason, Irvine, CA 92718
tel: (714) 859-8851
fax: (714) 859-3194

Laboratory Report Due by _____ to:

EER Contact: Jon Kawaguchi Address: EER

tel: (714) 552-1863 8001 Irvine Blvd

fax: (714) 857-1943 Santa Ana, CA 92705

Bill to: P.O. No.: _____

EER Corporation

18 Mason

Irvine, CA 92718

Sample Chain of Custody Record

page 2 of 2

EER Project No: 6373-020

Project Name: CARB VOC

Site Name:

Sampling System Prepared by: Jon Kawaguchi

Test Operator(s): Jon Kawaguchi

Samples Recovered by: Jon Kawaguchi

Laboratory I.D. No.	EER Label No.	Test ID / Location	Physical Description	Date	Time	No. of Containers	Aldehyde C1-C4	Ketone C3-C4	List of Compounds				ADDITIONAL INFORMATION (e.g. Volumes, TT, Holding Times, Sample Preparation, Add'l Instructions, etc.)
	135041	3/Stack	Aldehyde Front	11/2/93		1							
	135035	3/Stack	Aldehyde Back										
	135045		Trip Spike										
	135848		Trip Blank										
01A	135036	1/Inlet	Fuel Gas Sample										

Method of Shipment: Fed X

Shipment I.D.: Date Shipped: 11/3/93

Samples Shipped to: Air Toxics

Attention:

Remarks (RUSH!, units: mg/L, ppm, etc.):

After analysis: ☐ Archive samples (Hold for _____ months, then dispose.)

☐ Return samples to: EER Corporation 8001 Irvine Blvd., Irvine, CA 92705

Relinquished by: (Sign & Print)	Date / Time:	Received by: (Sign & Print)	Date / Time:
Jon Kawaguchi	11/2/93 5:42	L Robinson	11/4/93 0955

TOP - ORIGINAL MUST STAY WITH SAMPLES MIDDLE - LABORATORY COPY BOTTOM - EER COPY RETAIN WITH FIELD LOG

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9311039

Work Order Summary

CLIENT: Mr. Jon Kawaguchi
Energy & Environmental Research
8001 Irvine Blvd.
Santa Ana, CA 92705

BILL TO: Accounts Payable
EER Corporation
18 Mason
Irvine, CA 92718

PHONE: 714-552-1803
FAX: 714-857-1943
DATE RECEIVED: 11/4/93
DATE COMPLETED: 11/18/93

INVOICE # 2288
P.O. #
PROJECT # 6373-020
AMOUNT$: $1,575.00

FRACTION #	NAME	TEST	PRICE
01A	154513	TO-5	$1575.00 /set
01B	154514	TO-5	
01C	154515	TO-5	
01CC	154515 Duplicate	TO-5	
01D	154516	TO-5	
02A	154511	TO-5	
02B	154512	TO-5	
02C	154510	TO-5	
02CMS	154510 Matrix Spike	TO-5	
02D	135533	TO-5	
03A	135849	TO-5	
03B	135034	TO-5	
03C	135041	TO-5	
03D	135035	TO-5	
04A	135045 Trip Spike	TO-5	
05A	135848 Trip Blank	TO-5	
06A	Lab Blank	TO-5	
07A	Lab Spike	TO-5	

CERTIFIED BY: Linda J. Freeman
Laboratory Director

DATE: 11/18/93

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: 154513

ID#: 9311039-01A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111107**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**10.2**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.23
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154514

ID#: 9311039-01B

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111108**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**9.8**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.13
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154515

ID#: 9311039-01C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111109**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**11.4**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.10
Acetaldehyde	0.10	0.15
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154515 Duplicate

ID#: 9311039-01CC

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111114**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**11.4**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.10
Acetaldehyde	0.10	0.15
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154516

ID#: 9311039-01D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111115**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.10
Acetaldehyde	0.10	0.16
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154511

ID#: 9311039-02A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111116**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**9.8**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154512

ID#: 9311039-02B

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111117**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.15
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154510

ID#: 9311039-02C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111118**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**11.4**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.10
Acetaldehyde	0.10	0.28
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154510 Matrix Spike

ID#: 9311039-02CMS

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111119**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**11.4**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	0.10	95
Acetaldehyde	0.10	87
Acrolein	0.10	109
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

AIR TOXICS LTD.

SAMPLE NAME: 135533

ID#: 9311039-02D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111120**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**9.9**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.63
Acetaldehyde	0.10	0.23
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 135849

ID#: 9311039-03A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111121**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**9.6**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.10
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 135034

ID#: 9311039-03B

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111122**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**9.8**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 135041

ID#: 9311039-03C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111123**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**11.2**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.24
Acetaldehyde	0.10	0.30
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.14
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 135035

ID#: 9311039-03D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111128**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**9.8**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 135045 Trip Spike

ID#: 9311039-04A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111129**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**11.0**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	0.10	112
Acetaldehyde	0.10	105
Acrolein	0.10	Not Spiked
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

AIR TOXICS LTD.

SAMPLE NAME: 135848 Trip Blank

ID#: 9311039-05A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111130**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.17
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9311039-06A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111131**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/11/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Spike

ID#: 9311039-07A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111132**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/7/93**
Sample Volume (mL):	**11.0**	**Date of Analysis:**	**11/11/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	0.10	107
Acetaldehyde	0.10	93
Acrolein	0.10	109
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

Appendix F.5. Fuel Analyses

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9311040

Work Order Summary

CLIENT:	Mr. Jon Kawaguchi Energy & Environmental Research 8001 Irvine Blvd. Santa Ana, CA 92705	**BILL TO:**	Accounts Payable EER Corporation 18 Mason Irvine, CA 92718
PHONE:	714-552-1803	**INVOICE #**	2296
FAX:	714-857-1943	**P.O. #**	
DATE RECEIVED:	11/4/93	**PROJECT #**	6373-020
DATE COMPLETED:	11/18/93	**AMOUNT$:**	$175.00
DATE RE-ISSUED:	11/24/93 To correct results.		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	135036	ASTM D-1945	NA	$175.00
02A	Lab Blank	ASTM D-1945	NA	NC

LAB NARRATIVE:
The report is being re-issued to correct the Nitrogen and C6+ results. The BTU value remains the same .

CERTIFIED BY: Linda L. Freeman
Laboratory Director

DATE: 11/24/93

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: 135036
ID#: 9311040-01A

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name:	**3110505**	**Date of Collection:**	**11/2/93**
Dil. Factor:	**1.0**	**Date of Analysis:**	**11/5/93**

Compound	**Det. Limit (%)**	**Amount (%)**
Oxygen	0.001	0.015
Nitrogen	0.001	1.3
Carbon Monoxide	0.001	Not Detected
Methane	0.001	89
Carbon Dioxide	0.001	1.0
Ethane	0.001	3.5
Propane	0.001	1.9
Isobutane	0.001	0.27
Butane	0.001	1.6
Neopentane	0.001	0.002
Isopentane	0.001	0.11
n-Pentane	0.001	0.095
Ethylene	0.001	0.57
Propene	0.001	Not Detected
1-Butene	0.001	Not Detected
cis-2-Butene	0.001	0.036
trans-2-Butene	0.001	Not Detected
Cyclopentane	0.001	Not Detected
Ethyne	0.001	Not Detected
C6+	0.010	0.14
Unknown C5	0.001	0.025
	Total (%) =	100

BTU/Cu. Ft. = 1100
Specific Gravity (Air = 1.000) = 0.64

Container Type: Sample Bomb

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank
ID#: 9311040-02A

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name: **3110503** **Date of Collection: NA**
Dil. Factor: **1.0** **Date of Analysis: 11/5/93**

Compound	Det. Limit (%)	Amount (%)
Oxygen	0.001	Not Detected
Nitrogen	0.001	100
Carbon Monoxide	0.001	Not Detected
Methane	0.001	Not Detected
Carbon Dioxide	0.001	Not Detected
Ethane	0.001	Not Detected
Propane	0.001	Not Detected
Isobutane	0.001	Not Detected
Butane	0.001	Not Detected
Neopentane	0.001	Not Detected
Isopentane	0.001	Not Detected
n-Pentane	0.001	Not Detected
Ethylene	0.001	Not Detected
Propene	0.001	Not Detected
1-Butene	0.001	Not Detected
cis-2-Butene	0.001	Not Detected
trans-2-Butene	0.001	Not Detected
Cyclopentane	0.001	Not Detected
Ethyne	0.001	Not Detected
C6+	0.010	Not Detected
Unknown C5	0.001	Not Detected
	Total (%) =	100

BTU/Cu. Ft. = NA
Specific Gravity (Air = 1.000) = NA

Container Type: NA

APPENDIX G - REFINERY GAS PROCESS HEATER

Appendix G.1. CEM Calibrations and Calculations

CEM NO AND NOX CALIBRATIONS

PLANT: Refinery Gas Process Heater
CITY, STATE: Confidential
LOCATION: Stack

TEST DATE: 11/3/93

RUN NUMBER: NO,NO2
RUN START TIME: 12:19
RUN END TIME: 13:50
CEM OPERATOR: Rob Cambell

ANALYTE		O2	CO2	NOx
CONCENTRATION UNIT		%, dry	%, dry	ppmv, dry
HIGH-RANGE GAS FRACTION OF SPAN		1	1	1
SPAN		4.5	19.96	22
SPAN GAS CONCENTRATION, Cma	HIGH	4.5	19.96	22
	MID	2	9	12.5
	ZERO	0	0	0
INITIAL ANALYZER CALIBRATION CHECK, Cai	HIGH	4.5	19.93	21.82
	MID	1.98	9.18	12.73
	ZERO	0.0	0.0	0.9
INITIAL ANALYZER CALIBRATION ERROR, Ei	HIGH	0.0%	-0.2%	-0.8%
Ei = ((Cai - Cma)/Span)x100%	MID	-0.4%	0.9%	1.0%
	ZERO	0.0%	0.0%	3.9%
INITIAL BIAS CHECK, Cbi	UPSCALE HIGH (H) OR MID (M)?	M	M	M
(SELECT UPSCALE CALIBRATION GAS CLOSEST TO EFFLUENT GAS CONCENTRATION)	UPSCALE	2.01	9.08	12.43
	ZERO	0.0	0.1	1.1
INITITAL SYSTEM CALIBRATION BIAS, Bi	UPSCALE	0.7%	-0.5%	-1.4%
Bi = ((Cbi-Cai)/Span)x100%	ZERO	0.2%	0.3%	1.1%
FINAL ANALYZER CALIBRATION CHECK, Caf	HIGH	4.5	19.85	22.09
	MID	2	9.15	13.31
	ZERO	0.0	0.0	0.9
FINAL ANALYZER CALIBRATION ERROR, Ef	HIGH	0.0%	-0.6%	0.4%
Ef = ((Caf - Cma)/Span)x100%	MID	0.0%	0.8%	3.7%
	ZERO	0.4%	0.1%	4.0%
FINAL BIAS CHECK, Cbf	UPSCALE HIGH (H) OR MID (M)?	M	M	M
(SELECT UPSCALE CALIBRATION GAS CLOSEST TO EFFLUENT GAS CONCENTRATION)	UPSCALE	2.00	9.04	13.08
	ZERO	0.0	0.1	1.0
FINAL SYSTEM CALIBRATION BIAS, Bf	UPSCALE	0.0%	-0.6%	-1.0%
Bf = ((Cbf-Caf)/Span)x100%	ZERO	-0.2%	0.2%	0.4%
ANALYZER DRIFT	HIGH	0.0%	-0.4%	1.2%
D = ((Caf - Cai)/(Span))x100%	MID	0.4%	-0.2%	2.6%
	ZERO	0.4%	0.1%	0.1%
SYSTEM DRIFT	UPSCALE	-0.2%	-0.2%	3.0%
D = ((Cbf - Cbi)/(Span))x100%	ZERO	0.0%	-0.1%	-0.6%

RFG Process Heater						
11/3/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:12:19:12.004	1.86	11.99		13.71		10.03
00:12:20:11.992	2.00	11.88		13.93		10.26
00:12:21:12.004	2.01	11.90		13.82		10.19
00:12:22:11.984	2.22	11.72		14.06		10.48
00:12:23:11.977	2.27	11.72		14.47		10.82
00:12:24:11.969	1.99	11.93		14.41		10.61
00:12:25:11.965	1.51	12.16		12.50		8.98
00:12:26:11.961	2.07	11.51	11.79		8.72	
00:12:27:12.012	1.87	11.72	11.98		8.77	
00:12:28:12.004	1.86	11.80	11.80		8.63	
00:12:29:11.992	1.90	11.83	12.18		8.93	
00:12:30:11.988	2.00	11.76	12.58		9.27	
00:12:31:11.984	2.23	11.58	12.82		9.56	
00:12:32:11.977	2.13	11.69	13.11		9.73	
00:12:33:11.969	2.08	11.74		13.43		9.94
00:12:34:11.965	1.78	11.96		13.14		9.57
00:12:35:11.961	2.01	11.78		13.20		9.73
00:12:36:11.953	2.18	11.70		13.85		10.30
00:12:37:12.004	1.97	11.96		14.06		10.34
00:12:38:12.004	1.93	12.04		14.51		10.65
00:12:39:11.988	1.87	12.10		14.31		10.47
00:12:40:11.988	1.88	12.11	14.63		10.71	
00:12:41:11.977	1.81	12.15	14.48		10.56	
00:12:42:11.969	1.79	12.16	13.87		10.11	
00:12:43:11.965	1.68	12.25	13.51		9.79	
00:12:44:11.961	1.13	12.62	12.53		8.83	
00:12:45:11.953	1.16	12.53	11.77		8.31	
00:12:46:12.004	1.15	12.55	11.58		8.17	
00:12:47:11.996	1.18	12.52	11.45		8.09	
00:12:48:11.988	1.29	12.44		11.46		8.14
00:12:49:11.984	1.36	12.39		11.91		8.49
00:12:50:11.977	1.41	12.35		12.16		8.69
00:12:51:11.980	1.65	12.14		12.96		9.38

RFG Process Heater						
11/3/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:12:52:11.965	1.75	12.06		13.71		9.97
00:12:53:11.961	1.94	11.93		14.18		10.42
00:12:54:11.953	1.89	11.98		14.14		10.36
00:12:55:12.004	1.73	12.10		14.37		10.44
00:12:56:11.996	1.33	12.40		13.90		9.89
00:12:57:11.988	1.27	12.42		13.19		9.36
00:12:58:11.984	1.22	12.46		12.71		9.00
00:12:59:11.977	1.35	12.36	11.74		8.36	
00:13:00:11.973	1.32	12.42	10.73		7.63	
00:13:01:11.965	1.35	12.39	10.61		7.56	
00:13:02:11.961	1.27	12.46	10.97		7.78	
00:13:03:11.953	0.91	12.71	10.75		7.49	
00:13:04:12.004	1.19	12.43	10.94		7.73	
00:13:05:11.996	1.28	12.37	11.16		7.92	
00:13:06:11.992	1.52	12.18		11.90		8.55
00:13:07:11.984	1.49	12.24		12.47		8.95
00:13:08:11.977	1.62	12.15		12.91		9.33
00:13:09:11.969	1.51	12.24		13.33		9.58
00:13:10:11.965	1.57	12.18		13.15		9.48
00:13:11:11.961	1.51	12.23		13.10		9.41
00:13:12:11.953	1.65	12.10		13.19		9.54
00:13:13:12.004	1.56	12.17	13.11		9.44	
00:13:14:11.996	1.68	12.08	12.77		9.25	
00:13:15:11.992	1.61	12.18	12.53		9.05	
00:13:16:11.984	1.55	12.24	12.49		8.99	
00:13:17:11.977	1.56	12.21	12.30		8.86	
00:13:18:11.969	1.50	12.24	12.07		8.67	
00:13:19:11.965	1.54	12.16	11.75		8.45	
00:13:20:11.961	1.52	12.19		10.86		7.80
00:13:21:11.953	1.39	12.31		10.34		7.38
00:13:22:12.008	1.47	12.27		10.15		7.28
00:13:23:12.004	1.44	12.32		9.79		7.01
00:13:24:11.992	1.43	12.34		9.43		6.75

RFG Process Heater						
11/3/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:13:25:11.984	1.33	12.41		9.13		6.50
00:13:26:11.977	1.09	12.52		8.66		6.09
00:13:27:11.969	1.23	12.36		8.57		6.07
00:13:28:11.965	0.99	12.56	8.15		5.70	
00:13:29:12.020	1.00	12.57	8.29		5.80	
00:13:30:11.953	0.91	12.64	8.26		5.76	
00:13:31:12.004	0.95	12.61	8.27		5.77	
00:13:32:11.996	1.05	12.55	8.32		5.84	
00:13:33:11.996	1.00	12.58	8.39		5.87	
00:13:34:11.984	1.26	12.35	8.54		6.06	
00:13:35:11.977	1.42	12.25		8.93		6.39
00:13:36:11.969	1.49	12.21		9.52		6.83
00:13:37:11.965	1.33	12.38		10.51		7.48
00:13:38:11.961	1.47	12.27		11.17		8.01
00:13:39:11.953	1.32	12.40		11.05		7.86
00:13:40:12.004	1.43	12.28		11.42		8.17
00:13:41:12.004	1.47	12.22		11.68		8.37
00:13:42:11.992	1.57	12.14	11.62		8.37	
00:13:43:11.988	1.49	12.22	11.44		8.21	
00:13:44:11.977	1.60	12.13	11.78		8.50	
00:13:45:11.969	1.61	12.14	12.22		8.82	
00:13:46:11.965	1.72	12.06	12.72		9.24	
00:13:47:11.961	1.56	12.19	12.72		9.16	
00:13:48:11.953	1.68	12.08	12.73		9.22	
00:13:49:12.004	1.63	12.12	12.86		9.29	
00:13:50:11.996	1.62	12.15	12.90		9.32	
AVERAGE	1.56	12.19	11.63	12.33	8.36	8.92

Appendix G.2. Flow Calculations and Run Sheets

FLOW RATE

PLANT: RFG Process Heater
CITY: Confidential
RUN NO: 1,2,3
SAMPLE LOCATION: STACK

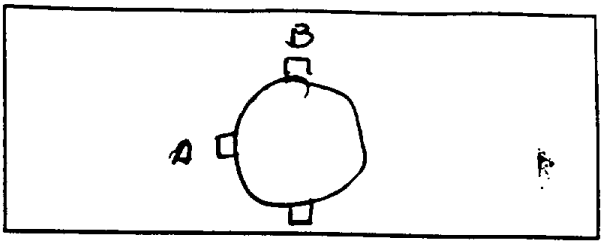
DATE ENTERED: 1/5/94
DATE: 4-Nov-93
OPERATOR: Jon Kawaguchi
ENTERED BY: David Hansell
CHECKED BY:

DATA ENTRY	SYMBOL	UNITS	DATA	DATA	DATA	DATA
RUN NUMBER	-	-	R1	R2	R3	Average
ROUND STACK, DIAMETER	ds	inches	72.0	72.0	72.0	72.00
RECTANGULAR STACK, LENGTH	L	inches				
WIDTH	W	inches				
AVERAGE STACK TEMPERATURE	Fs	degrees F	339.1	329.8	333.4	334.1
AVERAGE METER TEMPERATURE	Fm	degrees F	91.3	84.0	93.0	89.4
BAROMETRIC PRESSURE	Pbar	in. Hg	30.01	30.01	30.01	30.010
STACK STATIC PRESSURE	Pg	in. H20	-0.200	-0.210	-0.200	-0.203
AVG. DELTA H	dH	in. H20	1.900	1.900	1.900	1.900
AVG. VELOCITY HEAD	dP	in. H20	0.32	0.25	0.25	0.270
PITOT COEFFICIENT	Cp	-	0.840	0.840	0.840	0.840
GAS SAMPLE VOLUME	Vm	cubic ft.	29.0	28.8	29.1	28.970
METER CALIBRATION FACTOR	Y	-	1.011	1.011	1.011	1.011
TOTAL SAMPLING TIME	min	minutes	40	40	40	40.000
STACK GAS OXYGEN CONTENT	Co2,m	%	1.13	1.13	1.13	1.130
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	12.43	12.43	12.43	12.430
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	107.7	125.0	125.1	119.267

CALCULATED DATA	SYMBOL	UNITS	DATA	DATA	DATA	DATA
RUN NUMBER	-	-	R1	R2	R3	Average
STACK AREA, As = 3.14*(ds)**2/576 (ROUND)	As	sq. feet	28.274	28.274	28.274	28.274
= L * W/144 (RECTANGULAR)			0.000	0.000	0.000	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	799.1	789.8	793.4	794.1
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	551.3	544.0	553.0	549.4
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64Y (Vm/Tm) (Pbar + dH/13.6)	VmStd	cubic ft.	28.3	28.5	28.3	28.4
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	5.1	5.9	5.9	5.6
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	0.152	0.171	0.172	0.165
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28[100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	30.03	30.03	30.03	30.03
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	28.21	27.97	27.96	28.05
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	30.00	29.99	30.00	30.00
STACK GAS VELOCITY vs = 85.49 Cp [sqrt[(dP*Ts) /(Ps*Mw)]]	vs	ft/s	39.2	34.6	34.8	36.2
vm = 0.3048 * vs	vsm	m/s	11.96	10.55	10.61	11.04
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	66560	58719	59026	61435
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	37377	32601	32582	34187
Qsdm = Qsd/35.32	Qsdm	dscm/min	1058	923	922	968

PRELIMINARY VELOCITY TRAVERSE

PLANT
DATE 11/4/93
LOCATION
STACK I.D. 72
PITOT NO./Cp 31 TC#
BAROMETRIC PRESSURE, In Hg 30.01
STATIC GAUGE PRESSURE, In H20 -0.20
OPERATORS RC, JR
PITOT PRE TEST LEAK CHECK Good
PITOT POST TEST LEAK CHECK



SCHEMATIC OF TRAVERSE POINT LAYOUT

A

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
1	0930	.65	331	
2		.68	338	
3		.56	341	
4		.29	341	
5		.20	341	
6		.25	339	
7		.31	339	
8		.42	339	
AVERAGE				

B

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
1		.48	337	
2		.49	338	
3		.36	340	
4		.22	340	
5		.11	340	
6		.1	340	
7		.12	340	
8		.22	341	
AVERAGE				

SWIRL ACCEPTANCE LIMITS

Average(abs. value) less than 10°
No points with reverse flow
No more than 4 points above 30°

ΔP MINIMUM LIMITS

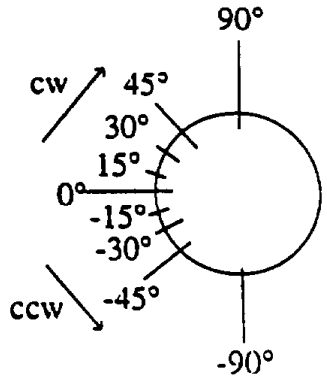
Conditions for more sensitive manometer
1. For 12 or more points on a velocity traverse: 10% of the points's Δp < 0.05"
2. For <12 points on a velocity traverse more than 1 point's Δp <0.05"

Rt Mean Avg Δp =

$$\left[\frac{\sum_{1}(\Delta p_{si})^{1/2}}{N}\right]^2$$

Rt Mean Avg Ts =

$$\left[\frac{\sum_{1}(T_{si})^{1/2}}{N}\right]^2$$



EEI

B/EPA METHOD 4

Plant
City
Location
Operators JB
Date 11/4/93
Run Number 2
Stack Diam. (in.) 72"

Sample Box Number
Meter Box Number 115
Meter Calibration (Y) 1.0111
Meter dH @ 1.9032
Pitot Tube No. 3 Cp
Probe Length 10 Tc No.

Probe Liner Material S/S
Static Pressure (Pa) (in. H2O)
Barometric Pressure (Pb) 30.01 (in. Hg)
Ambient Temperature (°F) 80
Pretest Leak Rate 0.01 cfm @ 15 (in. Hg)
Post Test Leak Rate 0.008 cfm @ 10 (in. Hg)

Sheet 1 of 1

Sampling Time, (min)	Clock Time (24 h)	Vacuum (in. Hg)	Pressure Differential Across Orifice dH (in. H2O)	Gas Sample Volume, Vm (cf)	Dry Gas Meter Outlet Temp. Tm (°F)	Impinger Outlet Temp. (°F)	Comments
0	0952			162.910			
5	57	4	1.9	166.025	80	57	
10	1002	5	1.9	169.665	86	56	
15	07	5	1.9	173.380	90	57	
20	12	5	1.9	177.035	93	59	
25	17	5	1.9	180.725	97	58	
30	22	5	1.9	184.445	95	59	
35	27	5	1.9	188.175	93	60	
40	32	5	1.9	191.920	92	60	

IMPINGER WEIGHT SHEET

Plant/city:

Location:

Train Set No. BLACK

Run No.: 2

Operator: JON K

Run Time:

Impinger No.	Solution Used	Solution (ml)	Configuration		Weight (grams)	Inspection Comments
1	H_2O	100 ml	MOD	Final	709.7	
				Initial	611.4	
				Wt. gain	98.3	Clear
2	H_2O	100 ml	STD	Final	578.3	
				Initial	576.0	
				Wt. gain	2.3	Clear
3	MT	Ø	½ Stem	Final	462.0	
				Initial	461.3	
				Wt. gain	0.7	Some Moisture
4	SiO_2	300g	MOD	Final	648.2	
				Initial	641.8	
				Wt. gain	6.4	Dry
5				Final		
				Initial		
				Wt. gain		
6				Final		
				Initial		
				Wt. gain		
Flask				Final		
				Initial		
				Wt. gain		

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 107.7

Train set up: Date: 3 Nov 1993

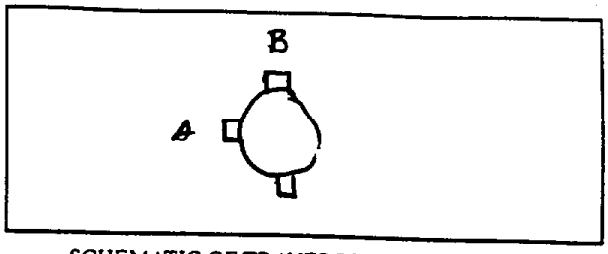
Signature: [illegible]

Train recovery: Date: 11-4-93

Signature: R. Cagle @12:00

EER

PLANT
DATE 11/4/93
LOCATION
STACK I.D. 72"
PITOT NO./Cp 3 TC#
BAROMETRIC PRESSURE, In Hg 30.01
STATIC GAUGE PRESSURE, In H20 -0.21
OPERATORS RC, JK
PITOT PRE TEST LEAK CHECK Good
PITOT POST TEST LEAK CHECK



SCHEMATIC OF TRAVERSE POINT LAYOUT

A

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
1	1130	.55	329	
2		.55	333	
3		.42	334	
4		.22	335	
5		.14	334	
6		.19	333	
7		.29	331	
8		.29	331	
AVERAGE				

B

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
1		.25	329	
2		.34	298	
3		.27	327	
4		.17	331	
5		.09	332	
6		.09	332	
7		.12	333	
8		.25	334	
AVERAGE				

SWIRL ACCEPTANCE LIMITS

Average(abs. value) less than 10°
No points with reverse flow
No more than 4 points above 30°

ΔP MINIMUM LIMITS

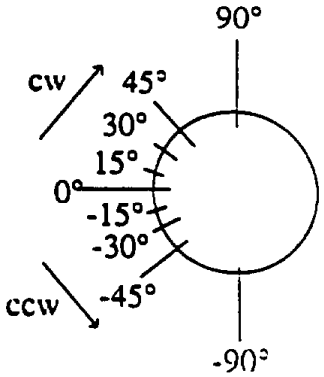
Conditions for more sensitive manometer
1. For 12 or more points on a velocity traverse: 10% of the points's Δp < 0.05"
2. For <12 points on a velocity traverse more than 1 point's Δp <0.05"

Rt Mean Avg Δp =

$$\left[\frac{\sum_i (\Delta p_{si})^{1/2}}{N}\right]^2$$

Rt Mean Avg Ts =

$$\left[\frac{\sum_i (Ts_i)^{1/2}}{N}\right]^2$$



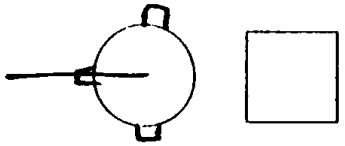
EPA METHOD 4

Plant ____
City ____
Location ____
Operators JK
Date 11/4/93
Run Number 3
Stack Diam. (in.) 72

Sample Box Number Orange
Meter Box Number N5
Meter Calibration (Y) 1.0111
Meter dH @ 1.9032
Pilot Tube No. 3 Cp ____
Probe Length 5' Tc No. ____

Probe Liner Material S/S
Static Pressure (Pa) ____ (in. H2O)
Barometric Pressure (Pb) 30.01 (in. Hg)
Ambient Temperature (°F) 82
Pretest Leak Rate 0.000 cfm @ 15 (in. Hg)
Post Test Leak Rate 0.000 cfm @ 14 (in. Hg)

Sheet 1 of 1



Sampling Time, (min)	Clock Time (24 h)	Vacuum (in. Hg)	Pressure Differential Across Orifice dH (in. H2O)	Gas Sample Volume, Vm (cf)	Dry Gas Meter Outlet Temp, Tm (°F)	Impinger Outlet Temp. (°F)	Comments
0	1152			192.020			
5	57	11	1.9	195.765	83	52	
10	1202	11	1.9	199.245	83	54	
15	07	11	1.9	202.870	84	54	
20	12	11	1.9	206.475	85	56	
25	17	11	1.9	210.095	85	56	
30	22	11	1.9	213.700	84	56	
35	27	11	1.9	217.290	84	56	
40	32	11	1.9	220.885	85	87	

IMPINGER WEIGHT SHEET

Plant/city: _____

Location: _____

Train Set No. Orange

Run No.: 3

Operator: JR

Run Time: 40 min

Impinger No.	Solution Used	Solution (ml)	Configuration		Weight (grams)	Inspection Comments
1	DI	100	Mod	Final	696.5	
				Initial	580.7	
				Wt. gain	115.8	Clear
2	DI	100	GS	Final	611.1	
				Initial	608.4	
				Wt. gain	2.7	Clear
3	Empty	—	Mod	Final	483.2	
				Initial	482.7	
				Wt. gain	0.5	Some moisture
4	Silica	300g	Mod	Final	706.0	
				Initial	700.0	
				Wt. gain	6.0	3/4 spent
5				Final		
				Initial		
				Wt. gain		
6				Final		
				Initial		
				Wt. gain		
Flask				Final		
				Initial		
				Wt. gain		

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 125

Train set up: Date: 11-4-93

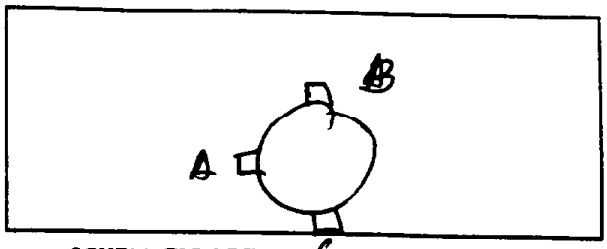
Signature: R. Campbell

Train recovery: Date: 11-4-93

Signature: R Campbell 15:15

EER

PLANT
DATE 11/4/92
LOCATION
STACK I.D.
PITOT NO./Cp 3 TC# 6
BAROMETRIC PRESSURE, In Hg 30.01
STATIC GAUGE PRESSURE, In H20 -0.20
OPERATORS RC, JR
PITOT PRE TEST LEAK CHECK Good
PITOT POST TEST LEAK CHECK Good



SCHEMATIC OF TRAVERSE POINT LAYOUT

A

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
1	1330	.60	334	
2		.64	335	
3		.44	336	
4		.21	336	
5		.15	333	
6		.20	333	
7		.21	333	
8		.25	332	
AVERAGE				

B

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
1		.32	331	
2		.35	329	
3		.29	332	
4		.16	333	
5		.10	334	
6		.07	334	
7		.12	335	
8		.21	335	
AVERAGE				

SWIRL ACCEPTANCE LIMITS

Average(abs. value) less than 10°
No points with reverse flow
No more than 4 points above 30°

ΔP MINIMUM LIMITS

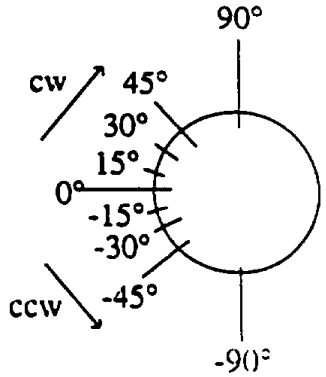
Conditions for more sensitive manometer
1. For 12 or more points on a velocity traverse: 10% of the points's Δp < 0.05"
2. For <12 points on a velocity traverse more than 1 point's Δp <0.05"

Rt Mean Avg Δp =

$$\left[\frac{\sum_i (\Delta p_{si})^{1/2}}{N}\right]^2$$

Rt Mean Avg Ts =

$$\left[\frac{\sum_i (T_{si})^{1/2}}{N}\right]^2$$



EEI

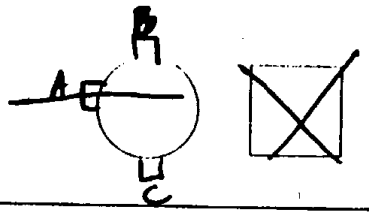
EPA METHOD 4

Plant
City
Location
Operators JLO
Date 11/4/93
Run Number 4
Stack Diam. (in.) 72A

Sample Box Number Black
Meter Box Number N/5
Meter Calibration (Y) 1.0111
Meter dH @ 1.9032
Pitot Tube No. 3 Cp
Probe Length 5 Tc No.

Probe Liner Material S/S
Static Pressure (Pa) (in. H2O)
Barometric Pressure (Pb) 30.01 (in. Hg)
Ambient Temperature (°F) 96
Pretest Leak Rate 0.002 cfm @ 14 (in. Hg)
Post Test Leak Rate 0.00 cfm @ 10 (in. Hg)

Sheet 1 of 1



Sampling Time, (min)	Clock Time (24 h)	Vacuum (in. Hg)	Pressure Differential Across Orifice dH (in. H2O)	Gas Sample Volume, Vm (cf)	Dry Gas Meter Outlet Temp. Tm (°F)	Impinger Outlet Temp. (°F)	Comments
0	1357			221.050			
5	1402	5	1.9	224.655	90	54	
10	07	5	1.9	228.230	90	54	
15	12	5	1.9	231.880	93	57	
20	17	5	1.9	235.525	94	57	
25	22	5	1.9	239.165	94	57	
30	27	5	1.9	242.925	94	56	
35	32	5	1.9	246.455	95	57	
40	37	5	1.9	250.145	95	58	

IMPINGER WEIGHT SHEET

Train Set No. Black

Plant/city:

Location:

Run No.: 4

Operator: Jon K

Run Time:

Impinger No.	Solution Used	Solution (ml)	Configuration		Weight (grams)	Inspection Comments
1	H_2O	100ml	Mod	Final	825.5	
				Initial	709.7	
				Wt. gain	115.8	Clean
2	H_2O	100ml	STD	Final	582.5	
				Initial	578.3	
				Wt. gain	4.2	Clean
3	EMT		½ Stem	Final	463.1	
				Initial	462.0	
				Wt. gain	1.1	Some moisture
4	Silica Gel	300G	Mod	Final	652.2	
				Initial	648.2	
				Wt. gain	4.0	¾ Spent
5				Final		
				Initial		
				Wt. gain		
6				Final		
				Initial		
				Wt. gain		
Flask				Final		
				Initial		
				Wt. gain		

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 125.1

Train set up: Date:
Signature:

Train recovery: Date: 11-4-93
Signature: R. Campbell

EER

Appendix G.3. Tedlar Bag Analyses

8.02 dil. ratio

Energy and
Environmental
Research Corporation

CHAIN OF CUSTODY

Plant
Unit
Location Stack

Project No. 6573-020

Page 1 of 1

P.O No.

Sample No.	Test No.	Test Date	Description
154552	1	11-4-93	Diluted
154551	1	11-4-93	Undiluted
154554	2	11-4-93	Diluted
154555	2	11-4-93	Undiluted
139622	3	11-4-93	Diluted
139620	3	11-4-93	Undiluted
154534	4	11-4-93	Blank

Sampling system prepared by R Campbell
Test operator R. Campbell
Sample recovery by R Campbell filled bag in field

Relinquished By	Recieved By	Time	Date	Reason
[signature]	[signature]	11/5	11:45	

Laboratory analysis by

Date

4700

Applied P & Ch Laboratory
4066 E. Mission Blvd., Pomona, CA 91766
Tel: (909) 622-5148 Fax: (909) 622-3199

APCL Analytical Report

Submitted to:
Energy and Environmental Research Corporation
Attention: Dave Hansell
8001 Irvine Blvd.
Santa Ana, CA 92706
Tel: (714)552-1803 Fax: (714)857-1943

Service ID #: 801-934700
Collected by: R. Campbell
Collected on: 11/04/93
Sample description:
Plant
Project 6373-020

Received : 11/05/93
Tested : 11/06/93
Reported : 12/02/93

Analysis of VOCs in Air

801-93700 Page 1 of 3

Component Analyzed	Method	Unit	PQL	Concentration 154552 Diluted 93-4700-01	154551 Undiluted 93-4700-02	154554 Diluted 93-4700-03	154555 Undiluted 93-4700-04	139622 Diluted 93-4700-05	139620 Undiluted 93-4700-06	154539 Blank 93-4700-07
Chlorinated Hydrocarbons										
Chloromethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Bromomethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Chloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1-Dichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Methylene Chloride	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1-Dichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-1,2-Dichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Chloroform	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1,1-Trichloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Carbon Tetrachloride	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2-Dichloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Trichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2-Dichloropropane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-1,3-Dichloropropene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-1,3-Dichloropropene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1,2-Trichloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Tetrachloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethylene Dibromide	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethylene Dichloride	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Chlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1,2,2-Tetrachloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,3-Dichlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,4-Dichlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Chlorotoluene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2-Dichlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2,4-Trichlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Hexachlorobutadiene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-1,2-Dichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1,1,2-Tetrachloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Carbon Disulfide	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.

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APCL Analytical Report

Analysis of VOCs in Air

Component Analyzed	Method	Unit	PQL	Concentration 154552 Diluted 93-4700-01	154551 Undiluted 93-4700-02	154554 Diluted 93-4700-03	154555 Undiluted 93-4700-04	139622 Diluted 93-4700-05	139620 Undiluted 93-4700-06	154539 Blank 93-4700-07
Paraffins (C4-C6)										
n-Butane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Isobutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
n-Pentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Isopentane [2-methylbutane]*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Neopetane [2,2-dimethylpropane]*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
n-Hexane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Methylpentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
3-Methylpentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2,2-Dimethylbutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2,3-Dimethylbutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Aromatics										
Benzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Toluene	TO-14	ppbV	5	15	–	14	–	7	–	6
Ethyl Benzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
m,p-Xylenes	TO-14	ppbV	5	9	–	8	–	N.D.	–	N.D.
o-Xylene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Styrene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,3,5-Trimethylbenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2,4-Trimethylbenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Phenol	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Naphthalene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Naphthenes										
Cyclopropane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Cyclobutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Cyclopentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Cyclohexane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ketones										
Acetone	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Butanone	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,3-Butadiene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Propadiene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Olefins										
1-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-2-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-2-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Methylpropene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1-Pentene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-2-Pentene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-2-Pentene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-methyl-2-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-methyl-1-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
3-methyl-1-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.

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APCL Analytical Report

Analysis of VOCs in Air

Component Analyzed	Method	Unit	PQL	Concentration 154552 Diluted 93-4700-01	154551 Undiluted 93-4700-02	154554 Diluted 93-4700-03	154555 Undiluted 93-4700-04	139622 Diluted 93-4700-05	139620 Undiluted 93-4700-06	154539 Blank 93-4700-07
Acetylenes (C4-C5)										
1-Butyne*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Butyne	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1-Pentyne	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Pentyne	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethers										
MTBE	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Dimethyl Ether	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethyl Methyl Ether*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Diethyl Ether	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethyl Propyl Ether*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Dipropyl Ether	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
VOCs by GC/FIDs										
Methane	TO-14/FID	ppbV	500	–	3,400	–	4,300	–	3,800	1,400
Ethane	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Propane	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Ethene	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Propene	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Ethyne	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Propyne*	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.

PQL : Practical Quantitation Limit
N.D. : Not Detected or Less Than The Quantitation Limit.
* Standards not available –: Not Analyzed

Respectfully submitted,

Shu-Teh Pan
Lab Manager
Applied P & Ch Laboratory

Appendix G.4. Aldehyde/Ketone Calculations, Run Sheets and Analyses

CARB 430

PLANT: RFG Process Heater
CITY: Confidential
RUN #: 1, 2, 3
SAMPLE LOCATION: Stack

DATE DATE ENTERED: 1/4/93
TEST DATE: 11/4/93
OPERATOR: Jon Kawaguchi
ENTERED BY: Dave Hansell
CHECKED BY:

DATA ENTRY	SYMBOL	UNITS		DATA		DATA		DATA			
RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
AVERAGE METER TEMPERATURE	Fm	degree F		82.40		87.80		100.40		90.20	10.24
BAROMETRIC PRESSURE	Pbar	in. Hg		30.01		30.01		30.01		30.01	0.00
AVG. DELTA H	dH	in. H20		1.30		1.35		1.40		1.35	3.70
GAS SAMPLE VOLUME	Vm	cubic ft.		1.11		1.11		0.90		1.04	11.58
METER CALIBRATION FACTOR	Y	-		1.01		1.00		1.00		1.00	0.64
TOTAL SAMPLING TIME	min	minutes		60.00		60.00		60.00		60.00	0.00
SAMPLE 1ST IMPINGER VOLUME	Siwt,1	ml		12.80		12.00		10.00		11.60	12.43
SAMPLE 2ND IMPINGER VOLUME	Siwt,2	ml		10.00		9.60		10.60		10.07	5.00
BLANK 1ST IMPINGER VOLUME	Biwt,1	ml		10.00		10.20		10.30		10.17	1.50
BLANK 2ND IMPINGER VOLUME	Biwt,2	ml		11.20		10.20		10.10		10.50	5.79
SAMPLE WEIGHTS (1ST IMPINGER)											
Formaldehyde	Swt,1	µg		0.12		0.13	ND	0.10	<	0.12	13.04
Acetaldehyde	Swt,1	µg		0.21		0.34		0.11		0.22	52.42
Acrolein	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Swt,1	µg	ND	0.10		0.13	ND	0.10	<	0.11	15.75
Crotonaldehyde	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Swt,1	µg	ND	0.10		0.12	ND	0.10	<	0.11	10.83
Methyl Ethyl Ketone	Swt,1	µg	ND	0.10		0.10	ND	0.10	<	0.10	0.00
SAMPLE WEIGHTS (2ND IMPINGER)											
Formaldehyde	Swt,2	µg		0.60		0.22		0.28		0.37	55.71
Acetaldehyde	Swt,2	µg		0.23		0.16		0.18		0.19	18.98
Acrolein	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Crotonaldehyde	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
BLANK WEIGHTS (1ST IMPINGER)											
Formaldehyde	Bwt,1	µg	ND	0.10		0.34	ND	0.10	<	0.18	76.98
Acetaldehyde	Bwt,1	µg		0.18		0.16		0.15		0.16	9.35
Acrolein	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Crotonaldehyde	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
BLANK WEIGHTS (2ND IMPINGER)											
Formaldehyde	Bwt,2	µg		0.68	ND	0.10	ND	0.10	<	0.29	114.16
Acetaldehyde	Bwt,2	µg	ND	0.10		0.19		0.12	<	0.14	34.58
Acrolein	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Bwt,2	µg	ND	0.10		0.12	ND	0.10	<	0.11	10.83
Crotonaldehyde	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00

CARB 430

	DATE DATE ENTERED: 1/4/93
PLANT: RFG Process Heater	TEST DATE: 11/4/93
CITY: Confidential	OPERATOR: Jon Kawaguchi
RUN #: 1, 2, 3	ENTERED BY: Dave Hansell
SAMPLE LOCATION: Stack	CHECKED BY:

CALCULATED DATA	SYMBOL	UNITS	DATA		DATA		DATA			
RUN NUMBER	-	-	R1		R2		R3		AVE	RSD
AVG. METER TEMPERATURE. Tm = Fm + 460	Tm	degrees R	542.40		547.80		560.40		550.20	1.68
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64Y (Vm/Tm) (Pbar + dH/13.6)	VmStd	dscm	0.031		0.030		0.024		0.029	13.40

SAMPLE IMPINGER CONCENTRATION (ng/ml), S or Bic= 1000*(S or Bwt,1+S or Bwt,2)/(S or Biwt,1+S or Biwt,2)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Sic	ng/ml		31		16	<	18	<	22	37.18
Acetaldehyde	Sic	ng/ml		19		23		14		19	24.16
Acrolein	Sic	ng/ml	ND	9	ND	9	ND	10	ND	9	5.07
Propanal	Sic	ng/ml	ND	9	ND	9	ND	10	ND	9	5.07
Acetone	Sic	ng/ml	ND	9	<	11	ND	10	<	10	9.66
Crotonaldehyde	Sic	ng/ml	ND	9	ND	9	ND	10	ND	9	5.07
Isobutyraldehyde	Sic	ng/ml	ND	9	<	10	ND	10	<	10	7.52
Methyl Ethyl Ketone	Sic	ng/ml	ND	9	<	9	ND	10	<	9	5.07
BLANK											
Formaldehyde	Bic	ng/ml	<	37	<	22	ND	10	<	23	59.55
Acetaldehyde	Bic	ng/ml	<	13		17		13	<	15	15.63
Acrolein	Bic	ng/ml	ND	9	ND	10	ND	10	ND	10	2.21
Propanal	Bic	ng/ml	ND	9	ND	10	ND	10	ND	10	2.21
Acetone	Bic	ng/ml	ND	9	<	11	ND	10	<	10	6.97
Crotonaldehyde	Bic	ng/ml	ND	9	ND	10	ND	10	ND	10	2.21
Isobutyraldehyde	Bic	ng/ml	ND	9	ND	10	ND	10	ND	10	2.21
Methyl Ethyl Ketone	Bic	ng/ml	ND	9	ND	10	ND	10	ND	10	2.21

BLANK TO SAMPLE RATIO, Br=Sic/Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
RATIO											
Formaldehyde	Br		RL	1	RL	1	RL	1		1	37.18
Acetaldehyde	Br		RL	1	RL	2	RL	1		1	24.16
Acrolein	Br	.	NA	NA	NA	NA	NA	NA		NA	NA
Propanal	Br		NA	NA	NA	NA	NA	NA		NA	NA
Acetone	Br		NA	NA	RL	1	NA	NA		1	#DIV/0!
Crotonaldehyde	Br		NA	NA	NA	NA	NA	NA		NA	NA
Isobutyraldehyde	Br		NA	NA	NA	NA	NA	NA		NA	NA
Methyl Ethyl Ketone	Br		NA	NA	NA	NA	NA	NA		NA	NA

CARB 430

PLANT: RFG Process Heater
CITY: Confidential
RUN #: 1, 2, 3
SAMPLE LOCATION: Stack

DATE DATE ENTERED: 1/4/93
TEST DATE: 11/4/93
OPERATOR: Jon Kawaguchi
ENTERED BY: Dave Hansell
CHECKED BY:

CORRECTED SAMPLE CONCENTRATION (ng/ml) Br>5 Cic=Sic-Average(Bic); Br<5 Cic=5*Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cic	ng/ml	RL	114	RL	114	RL	114	NC	114	0.00
Acetaldehyde	Cic	ng/ml	RL	73	RL	73	RL	73	NC	73	0.00
Acrolein	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	10	ND NC	9	5.07
Propanal	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	10	ND NC	9	5.07
Acetone	Cic	ng/ml	ND NA	9	RL	50	ND NA	10	< NC	23	103.15
Crotonaldehyde	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	10	ND NC	9	5.07
Isobutyraldehyde	Cic	ng/ml	ND NA	9	< NA	10	ND NA	10	< NC	10	7.52
Methyl Ethyl Ketone	Cic	ng/ml	ND NA	9	< NA	9	ND NA	10	< NC	9	5.07

CORRECTED SAMPLE CONCENTRATION 1 (mg/dscm), Cc,1=Cic*(Swt,1+Swt,2)/VmStd/1e06

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,1	mg/dscm	RL	0.08	RL	0.08	RL	0.10	NC	0.09	9.98
Acetaldehyde	Cc,1	mg/dscm	RL	0.05	RL	0.05	RL	0.06	NC	0.06	9.98
Acrolein	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	14.48
Propanal	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	14.48
Acetone	Cc,1	mg/dscm	ND NA	0.01	RL	0.04	ND NA	0.01	< NC	0.02	97.36
Crotonaldehyde	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	14.48
Isobutyraldehyde	Cc,1	mg/dscm	ND NA	0.01	< NA	0.01	ND NA	0.01	< NC	0.01	12.69
Methyl Ethyl Ketone	Cc,1	mg/dscm	ND NA	0.01	< NA	0.01	ND NA	0.01	< NC	0.01	14.48

CORRECTED SAMPLE CONCENTRATION 2 (ppbv), Cc,2=1000*24.05/Mw

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,2	ppbv	RL	67	RL	65	RL	78	NC	70	9.98
Acetaldehyde	Cc,2	ppbv	RL	29	RL	28	RL	34	NC	30	9.98
Acrolein	Cc,2	ppbv	ND NA	3	ND NA	3	ND NA	4	ND NC	3	14.48
Propanal	Cc,2	ppbv	ND NA	3	ND NA	3	ND NA	3	ND NC	3	14.48
Acetone	Cc,2	ppbv	ND NA	3	RL	15	ND NA	3	< NC	7	97.36
Crotonaldehyde	Cc,2	ppbv	ND NA	2	ND NA	2	ND NA	3	ND NC	2	14.48
Isobutyraldehyde	Cc,2	ppbv	ND NA	2	< NA	2	ND NA	3	< NC	2	12.69
Methyl Ethyl Ketone	Cc,2	ppbv	ND NA	2	< NA	2	ND NA	3	< NC	2	14.48

ND - Sample value below detection limit
< - Some sample values below detection limit
C - Blank Corrected
RL - Reporting Limit
NA - Not Available

CARB 430 RUN SHEET

Plant
City
Location
Operators
Date 11/10/93
Run Number 1
Stack Diam. (in.) 72"
Static Pressure (Pa) -0.2 (in. H2O)
Barometric Pressure (Pb) 30.01 (in. Hg)
Ambient Temperature (°F) 80

Sample Box Number Black
Meter Box Number N5
Meter Calibration (Y) 1.0141
Meter dH @ 1.9032
Probe Length 5
Probe Liner Material S/S
Pretest Leak Rate 0.000 cfm @ [illegible] (in. Hg)
Post Test Leak Rate ____ cfm @ ____ (in. Hg)

Sheet 1 of 1

Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH (in. H2O)	Comments
1	0	0950		1009.45					
1	5	55	0.5	1012.10	0.5	N/A	26	1.3	
	10	1000	0.5	1014.70	0.5		27	1.3	
	15	05	.5	1017.33	.5		27	1.3	
	20	10	.5	1019.93	.5		27	1.3	
	25	15	.5	1022.51	.5		28	1.3	
	30	20	.5	1025.12	.5		28	1.3	
	35	25	.5	1027.72	.5		29	1.3	
	40	30	.5	1030.34	.5		29	1.3	
	45	35	.5	1032.95	.5		29	1.3	
	50	40	.5	1035.54	.5		29	1.2	
	55	45	.5	1039.16	.5		29	1.2	
	60	50	.5	1040.77	.5		29	1.3	
Average/Total									

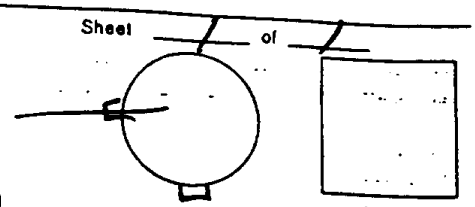
Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

CARB 430 RUN SHEET

Plant ____
City ____
Location ____
Operators JIO
Date 11/4/93
Run Number 2
Stack Diam. (in.) 72"
Static Pressure (Pa) ____ (in. H2O)
Barometric Pressure (Pb) 30.01 (in. Hg)
Ambient Temperature (°F) 82

Sample Box Number ____
Meter Box Number V3
Meter Calibration (Y) ____
Meter dH @ ____
Probe Length 4'
Probe Liner Material S/S
Pretest Leak Rate 0.000 cfm @ 7 (in. Hg)
Post Test Leak Rate ____ cfm @ ____ (in. Hg)

Sheet 1 of 1



Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp. Tm (°C)	ΔH (in. H2O)	Comments
1	0	1150		1041.12					
1	5	55	.5	1043.73	.5	N/A	27	1.4	
	10	1200	.5	1046.32	.5		28	1.4	
	15	05	.5	1048.95	.5		29	1.4	
	20	10	.5	1051.58	.5		30	1.2	
	25	15	.5	[illegible]	.5		30	1.3	1054.17
	30	20	.5	1056.78	.5		31	1.3	
	35	25	.5	1059.40	.5		31	1.3	
	40	30	.5	1062.01	.5		33	1.4	
	45	35	.5	1064.64	.5		33	1.4	
	50	40	.5	1067.24	.5		33	1.3	
	55	45	.5	1069.85	.5		33	1.3	
	60	50	.5	1072.46	.5	↓	33	1.3	
Average/Total									

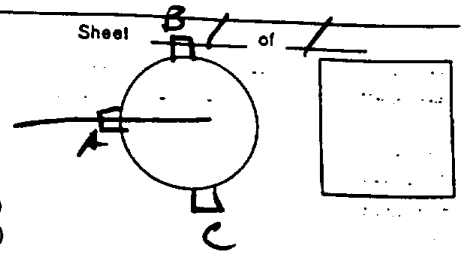
Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

CARB 430 RUN SHEET

Plant ____
City ____
Location ____
Operators JR
Date 11/4/93
Run Number 3
Stack Diam. (in.) 72"
Static Pressure (Pa) - (in. H2O)
Barometric Pressure (Pb) 30.01 (in. Hg)
Ambient Temperature (°F) 96

Sample Box Number ____
Meter Box Number V3
Meter Calibration (Y) ____
Meter dH @ ____
Probe Length 5'
Probe Liner Material S/S
Pretest Leak Rate 0.000 cfm @ 7 (in. Hg)
Post Test Leak Rate ____ cfm @ ____ (in. Hg)

Sheet B 1 of 1



Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH Probe Temp.	Comments
1	0	1355		1072.96					
1	5	1400	.5	1075.52	.5	N/A	41	1.4	
	10	05	.5	1079.13	.5		39	1.4	
	15	10	.5	1080.75	.5		39	1.4	
	20	15	.5	1083.36	.5		38	1.4	
	25	20	.5	1085.96	.5		36	1.4	
	30	25	.5	1088.58	.5		35	1.4	
	35	30	.5	1091.17	.5		36	1.4	
	40	35	.5	1093.85	.5		35	1.4	
	45	40	.5	1096.45	.5		37	1.4	
	50	45	.5	1099.45	.5		36	1.4	
	55	50							Stop test, dry gas meter break down 1449-1450
	60	55							
Average, Total									

Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

Energy and Environmental Research Corporation

18 Mason, Irvine, CA 92718
tel: (714) 859-8851
fax: (714) 859-3194

Laboratory Report Due by _____ to:

EER Contact: Jon Kawaguchi Address: EER
tel: (714) 552-1803 8001 Irvine Blvd.
fax: (714) 857-1943 Santa Ana, CA 92705

Bill to: P.O. No.: _____
EER Corporation
18 Mason
Irvine, CA 92718

Sample Chain of Custody Record

page 1 of 1

EER Project No: 6373-020
Project Name: CARB VOC
Site Na

Sampling System Prepared by: Jon K
Test Operator(s): Jon K
Samples Recovered by: Jon K

Laboratory I.D. No.	EER Label No.	FIELD SAMPLE IDENTIFICATION AND SAMPLING INFORMATION: Test ID / Location	Physical Description	Date	Time	No. of Containers	Analyses Required: Aldehydes C1-C4	Ketones C3-C4					ADDITIONAL INFORMATION (e.g. Volumes, TT, Holding Times, Sample Preparation, Add'l Instructions, etc.)
	154535	1 / East Stack	Aldehyde Blank Front	11/4/93		1	✓	✓					
	154536	1 / "	" " Back				✓	✓					
	154537	1 / "	" Front				✓	✓					
	154538	1 / "	" Back				✓	✓					
	154539	2 / "	" Blank Front				✓	✓					
	154540	2 / "	" " Back				✓	✓					
	154541	2 / "	" Front				✓	✓					
	154542	2 / "	" Back				✓	✓					
	154543	3 / "	" Blank Front				✓	✓					
	154544	3 / "	" " Back				✓	✓					

Method of Shipment: Fed X
Shipment I.D.:
Date Shipped: 11/5/93
Samples Shipped to: Air Toxics
Attention:

Remarks (RUSH!, units: mg/L, ppm, etc.):

After analysis: ☐ Archive samples (Hold for ____ months, then dispose.)
☐ Return samples to: EER Corporation 8001 Irvine Blvd., Irvine, CA 92705

Relinquished by: (Sign & Print)	Date / Time:	Received by: (Sign & Print)	Date / Time:
Jon Kawaguchi	11/5/93 0800	Becky Munks	11/5/93 1100

BOTTOM - EER COPY RETAIN WITH FIELD LOG
MIDDLE - LABORATORY COPY
TOP - ORIGINAL MUST STAY WITH SAMPLES

Energy and Environmental Research Corporation

18 Mason, Irvine, CA 92718
tel: (714) 859-8851
fax: (714) 859-3194

Laboratory Report Due by _____ to:

EER Contact: Jon Kawaguchi Address: EER
tel: (714) 552-1863 8001 Irvine Blvd
fax: (714) 857-1943 Santa Ana, CA 92705

Bill to: P.O. No.: _____
EER Corporation
18 Mason
Irvine, CA 92718

Sample Chain of Custody Record

page 2 of 2

EER Project No: 6373-020

Project Name: CARB VOC

Site Name:

Sampling System Prepared by: Jon K

Test Operator(s): Jon K

Samples Recovered by: Jon K

Laboratory I.D. No.	EER Label No.	Test ID / Location	Physical Description	Date	Time	No. of Containers	Aldehyde C1-C4	Ketones C3-C4	List #1 Compounds				Additional Information
	154545	3/East Stack	Aldehyde Front	11/4/93		1	✓	✓					
	154546	"	" Back				✓	✓					
	154547		Trip Blank				✓	✓					
	154548		Trip Spike				✓	✓					
			Fuel Gas Sample						✓		7:30		
											7:35		

Method of Shipment: Fed X
Shipment I.D.:
Date Shipped: 11/5/93
Samples Shipped to: Air Toxics
Attention:

Remarks (RUSH!, units: mg/L, ppm, etc.):

After analysis: ☐ Archive samples (Hold for ____ months, then dispose.)
☐ Return samples to: EER Corporation 8001 Irvine Blvd., Irvine, CA 92705

Relinquished by: (Sign & Print)	Date / Time:	Received by: (Sign & Print)	Date / Time:
Jon Kawaguchi	11/5/93 0800	Bertin Minnis	11/5/93 [illegible]

TOP - ORIGINAL MUST STAY WITH SAMPLES MIDDLE - LABORATORY COPY BOTTOM - EER COPY RETAIN WITH FIELD LOG

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9311062

Work Order Summary

CLIENT: Mr. Jon Kawaguchi
Energy & Environmental Research
8001 Irvine Blvd.
Santa Ana, CA 92705

BILL TO: Accounts Payable
EER Corporation
18 Mason
Irvine, CA 92718

PHONE: 714-552-1803
FAX: 714-857-1943
DATE RECEIVED: 11/6/93
DATE COMPLETED: 11/24/93

INVOICE # 2334
P.O. #
PROJECT # 6373-020
AMOUNT$: $1,615.97

FRACTION #	NAME	TEST	PRICE
01A	154535	TO-5	$1575.00/set
01B	154536	TO-5	
01C	154537	TO-5	
01CC	154537 Duplicate	TO-5	
01D	154538	TO-5	
02A	154539	TO-5	
02B	154540	TO-5	
02C	154541	TO-5	
02CMS	154541 Matrix Spike	TO-5	
02D	154542	TO-5	
03A	154543	TO-5	
03B	154544	TO-5	
03C	154545	TO-5	
03D	154546	TO-5	
04A	154547 Trip Blank	TO-5	
05A	154548 Trip Spike	TO-5	
06A	Lab Blank	TO-5	
07A	Lab Spike	TO-5	
Misc. Charges	Shipping (11/2/93)		$40.97

LAB NARRATIVE:
g = Exceeds Quality Control limits of 70% to 130%.

CERTIFIED BY: [signature]
Laboratory Director

DATE: 11/24/93

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: 154535 B1 I1

ID#: 9311062-01A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111005**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/10/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.18
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154536 GT2

ID#: 9311062-01B

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111006**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**11.2**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.68
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154537 T1I1

ID#: 9311062-01C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111007**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**12.8**	**Date of Analysis:**	**11/10/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	0.11
Acetaldehyde	0.10	0.23
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154537 Duplicate T1I1

ID#: 9311062-01CC

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111012**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**12.8**	**Date of Analysis:**	**11/10/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	0.12
Acetaldehyde	0.10	0.19
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154538

ID#: 9311062-01D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111013**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/10/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	0.60
Acetaldehyde	0.10	0.23
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154539

ID#: 9311062-02A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111014**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.2**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.34
Acetaldehyde	0.10	0.16
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154540 G2I2

ID#: 9311062-02B

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111015**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.2**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.19
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.12
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154541

ID#: 9311062-02C

T2-I1

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111016**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**12.0**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.13
Acetaldehyde	0.10	0.34
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	0.13
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	0.12
Methyl Ethyl Ketone	0.10	0.10

AIR TOXICS LTD.

SAMPLE NAME: 154541 Matrix Spike

ID#: 9311062-02CMS

T2I

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111017**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**12.0**	**Date of Analysis:**	**11/10/93**

Compound	**Det. Limit (uG)**	**% Recovery**
Formaldehyde	0.10	79
Acetaldehyde	0.10	67 Q
Acrolein	0.10	97
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

Q = Exceeds Quality Control limits of 70% to 130%.

AIR TOXICS LTD.

SAMPLE NAME: 154542

ID#: 9311062-02D

T212

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111018**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**9.6**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.22
Acetaldehyde	0.10	0.16
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154543

ID#: 9311062-03A

B3I1

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111019**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.3**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.15
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154544

ID#: 9311062-03B

G312

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111020**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.1**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.12
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154545

ID#: 9311062-03C T351

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111021**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/10/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.11
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154546

ID#: 9311062-03D T3I2

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4111024**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.6**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.28
Acetaldehyde	0.10	0.18
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154547 Trip Blank

ID#: 9311062-04A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111025**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.38
Acetaldehyde	0.10	0.14
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154548 Trip Spike

ID#: 9311062-05A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111026**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**11.0**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	0.10	96
Acetaldehyde	0.10	91
Acrolein	0.10	Not Spiked
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9311062-06A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111027**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/10/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Spike

ID#: 9311062-07A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4111028**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/9/93**
Sample Volume (mL):	**11.0**	**Date of Analysis:**	**11/10/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	0.10	102
Acetaldehyde	0.10	91
Acrolein	0.10	106
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

Appendix G.5. Fuel Analyses

Energy and Environmental Research Corporation

18 Mason, Irvine, CA 92718
tel: (714) 859-8851
fax: (714) 859-3194

Laboratory Report Due by _____ to:

EER Contact: Jon Kawaguchi Address: EER
tel: (714) 552-1863 8001 Irvine Blvd
fax: (714) 857-1943 Santa Ana, CA 92705

Bill to: P.O. No.: _____
EER Corporation
18 Mason
Irvine, CA 92718

Sample Chain of Custody Record

page 2 of 2

EER Project No: 6373-020
Project Name: CARB VOC
Site Name:

Sampling System Prepared by: Jon K
Test Operator(s): Jon K
Samples Recovered by: Jon K

Laboratory I.D. No.	EER Label No.	FIELD SAMPLE IDENTIFICATION AND SAMPLING INFORMATION: Test ID / Location	Physical Description	Date	Time	No. of Containers	Aldehyde C1-C4	Ketones C3-C4	List #1 Compounds				ADDITIONAL INFORMATION (e.g. Volumes, TT, Holding Times, Sample Preparation, Add'l Instructions, etc
	154545	3/East Stack	Aldehyde Front	11/4/93		1	/	/					
	154546	"	" Back	↓		↓	/	/					
	154547		Trip Blank	↓		↓	/	/					
	154548		Trip Spike	↓		↓	/	/					
01A/B	139631	Pic J. Lawaugh 11/8/93	Fuel Gas Sample	↓		↓			/				

Method of Shipment: Fed X
Shipment I.D.: Date Shipped: 11/5/93
Samples Shipped to: Air Toxics
Attention:

Remarks (RUSH!, units: mg/L, ppm, etc.):

After analysis: ☐ Archive samples (Hold for _____ months, then dispose.)
☐ Return samples to: EER Corporation 8001 Irvine Blvd., Irvine, CA 92705

Relinquished by: (Sign & Print)	Date / Time:	Received by: (Sign & Print)	Date / Time:
Jon Kawaguchi	11/5/93 0800	Becky Munds Becky Munds	11/5/93 10:00

TOP - ORIGINAL MUST STAY WITH SAMPLES MIDDLE - LABORATORY COPY BOTTOM - EER COPY

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9311063

Work Order Summary

CLIENT: Mr. Jon Kawaguchi
Energy & Environmental Research
8001 Irvine Blvd.
Santa Ana, CA 92705

BILL TO: Accounts Payable
EER Corporation
18 Mason
Irvine, CA 92718

PHONE: 714-552-1803
FAX: 714-857-1943
DATE RECEIVED: 11/6/93
DATE COMPLETED: 11/29/93

INVOICE # 2362
P.O. #
PROJECT # 6373-020
AMOUNT$: $175.00

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	139631	ASTM D-1945	NA	$175.00
01B	139631 Duplicate	ASTM D-1945	NA	NC
02A	Method Spike	ASTM D-1945	NA	NC
03A	Lab Blank	ASTM D-1945	NA	NC

CERTIFIED BY: Linda J. Freeman
Laboratory Director

DATE: 11/29/93

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: 139631
ID#: 9311063-01A

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name: **3111106** **Date of Collection: 11/4/93**
Dil. Factor: **1.0** **Date of Analysis: 11/11/93**

Compound	Det. Limit (%)	Amount (%)
Oxygen	0.001	0.044
Nitrogen	0.001	3.3
Carbon Monoxide	0.001	1.0
Methane	0.001	42
Carbon Dioxide	0.001	0.15
Ethane	0.001	17
Propane	0.001	19
Isobutane	0.001	2.4
Butane	0.001	5.1
Neopentane	0.001	0.005
Isopentane	0.001	1.0
n-Pentane	0.001	0.93
Ethylene	0.001	6.2
Propene	0.001	Not Detected
1-Butene	0.001	Not Detected
cis-2-Butene	0.001	0.35
trans-2-Butene	0.001	Not Detected
Cyclopentane	0.001	Not Detected
Ethyne	0.001	Not Detected
C6+	0.010	0.86
C5 Unknown	0.001	0.45
	Total (%) =	100

BTU/Cu. Ft. = 1400
Specific Gravity (Air = 1.000) = 0.89

Container Type: Sample Bomb

AIR TOXICS LTD.

SAMPLE NAME: 139631 Duplicate
ID#: 9311063-01B

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name:	**3111107**	**Date of Collection:**	**11/4/93**
Dil. Factor:	**1.0**	**Date of Analysis:**	**11/11/93**

Compound	**Det. Limit (%)**	**Amount (%)**
Oxygen	0.001	0.044
Nitrogen	0.001	3.3
Carbon Monoxide	0.001	1.0
Methane	0.001	42
Carbon Dioxide	0.001	0.15
Ethane	0.001	17
Propane	0.001	19
Isobutane	0.001	2.4
Butane	0.001	5.1
Neopentane	0.001	0.004
Isopentane	0.001	1.0
n-Pentane	0.001	0.93
Ethylene	0.001	6.2
Propene	0.001	Not Detected
1-Butene	0.001	Not Detected
cis-2-Butene	0.001	0.35
trans-2-Butene	0.001	Not Detected
Cyclopentane	0.001	Not Detected
Ethyne	0.001	Not Detected
C6+	0.010	0.85
C5 Unknown	0.001	0.44
	Total (%) =	100

BTU/Cu. Ft. = 1400
Specific Gravity (Air = 1.000) = 0.85

Container Type: Sample Bomb

AIR TOXICS LTD.

SAMPLE NAME: Method Spike
ID#: 9311063-02A

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name: **3111101** **Date of Collection: NA**
Dil. Factor: **1.0** **Date of Analysis: 11/11/93**

Compound	Det. Limit (%)	% Recovery
Oxygen	0.001	101
Nitrogen	0.001	100
Carbon Monoxide	0.001	78
Methane	0.001	91
Carbon Dioxide	0.001	91
Ethane	0.001	90
Propane	0.001	91
Isobutane	0.001	91
Butane	0.001	92
Neopentane	0.001	92
Isopentane	0.001	91
n-Pentane	0.001	91
Ethylene	0.001	100
Propene	0.001	100
1-Butene	0.001	100
cis-2-Butene	0.001	100
trans-2-Butene	0.001	100
Cyclopentane	0.001	100
Ethyne	0.001	100
C6+	0.010	100
C5 Unknown	0.001	NA

BTU/Cu. Ft. = NA
Specific Gravity (Air = 1.000) = NA

Container Type: NA

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank
ID#: 9311063-03A

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name: **3111104** **Date of Collection: NA**
Dil. Factor: **1.0** **Date of Analysis: 11/11/93**

Compound	Det. Limit (%)	Amount (%)
Oxygen	0.001	Not Detected
Nitrogen	0.001	100
Carbon Monoxide	0.001	Not Detected
Methane	0.001	Not Detected
Carbon Dioxide	0.001	Not Detected
Ethane	0.001	Not Detected
Propane	0.001	Not Detected
Isobutane	0.001	Not Detected
Butane	0.001	Not Detected
Neopentane	0.001	Not Detected
Isopentane	0.001	Not Detected
n-Pentane	0.001	Not Detected
Ethylene	0.001	Not Detected
Propene	0.001	Not Detected
1-Butene	0.001	Not Detected
cis-2-Butene	0.001	Not Detected
trans-2-Butene	0.001	Not Detected
Cyclopentane	0.001	Not Detected
Ethyne	0.001	Not Detected
C6+	0.010	Not Detected
C5 Unknown	0.001	Not Detected
	Total (%) =	100

BTU/Cu. Ft. = NA
Specific Gravity (Air = 1.000) = NA

Container Type: NA

APPENDIX H - NATURAL GAS UTILITY BOILER

Appendix H.1. CEM Calibrations and Calculations

CEM NO AND NOX CALIBRATIONS

PLANT: Natural Gas Utility Boiler
CITY, STATE: Confidential
LOCATION: Stack

TEST DATE: 11/16/93

RUN NUMBER: NO,NO2
RUN START TIME: 13:29
RUN END TIME: 15:00
CEM OPERATOR: Rob Cambell

ANALYTE		O2	CO2	NOx
CONCENTRATION UNIT		%, dry	%, dry	ppmv, dry
HIGH-RANGE GAS FRACTION OF SPAN		1	1	1
SPAN		9	19.96	230
SPAN GAS CONCENTRATION, Cma	HIGH	9	19.96	230
	MID	4.5	9	100
	ZERO	0	0	0
INITIAL ANALYZER CALIBRATION CHECK, Cai	HIGH	9	19.9	229.89
	MID	4.53	9.07	102.06
	ZERO	0.0	0.0	2.1
INITIAL ANALYZER CALIBRATION ERROR, Ei	HIGH	0.0%	-0.3%	0.0%
Ei = ((Cai - Cma)/Span)x100%	MID	0.3%	0.4%	0.9%
	ZERO	0.1%	0.1%	0.9%
INITIAL BIAS CHECK, Cbi UPSCALE HIGH (H) OR MID (M)?		M	M	M
(SELECT UPSCALE CALIBRATION GAS CLOSEST TO EFFLUENT GAS CONCENTRATION)	UPSCALE	4.46	9.01	100.80
	ZERO	0.0	0.0	2.2
INITITAL SYSTEM CALIBRATION BIAS, Bi	UPSCALE	-0.8%	-0.3%	-0.5%
Bi = ((Cbi-Cai)/Span)x100%	ZERO	0.0%	0.1%	0.1%
FINAL ANALYZER CALIBRATION CHECK, Caf	HIGH	9	19.93	224.95
	MID	4.52	9.07	99.84
	ZERO	0.0	0.0	2.1
FINAL ANALYZER CALIBRATION ERROR, Ef	HIGH	0.0%	-0.2%	-2.2%
Ef = ((Caf - Cma)/Span)x100%	MID	0.2%	0.4%	-0.1%
	ZERO	0.2%	0.1%	0.9%
FINAL BIAS CHECK, Cbf UPSCALE HIGH (H) OR MID (M)?		M	M	M
(SELECT UPSCALE CALIBRATION GAS CLOSEST TO EFFLUENT GAS CONCENTRATION)	UPSCALE	4.48	9.01	98.73
	ZERO	0.0	0.0	2.2
FINAL SYSTEM CALIBRATION BIAS, Bf	UPSCALE	-0.4%	-0.3%	-0.5%
Bf = ((Cbf-Caf)/Span)x100%	ZERO	0.0%	0.1%	0.0%
ANALYZER DRIFT	HIGH	0.0%	0.2%	-2.1%
D = ((Caf - Cai)/(Span))x100%	MID	-0.1%	0.0%	-1.0%
	ZERO	0.1%	0.0%	0.0%
SYSTEM DRIFT	UPSCALE	0.2%	0.0%	-0.9%
D = ((Cbf - Cbi)/(Span))x100%	ZERO	0.1%	-0.1%	0.0%

NG Utility Boiler						
11/16/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:13:29:34.004	4.99	9.15		103.77		90.74
00:13:30:34.039	5.03	9.14		104.51		91.62
00:13:31:34.031	5.00	9.16		105.27		92.11
00:13:32:34.027	4.90	9.22		104.58		90.94
00:13:33:34.020	5.00	9.18		104.10		91.09
00:13:34:34.016	5.05	9.15		103.13		90.52
00:13:35:34.012	5.02	9.17	103.91		91.04	
00:13:36:34.004	5.07	9.14	103.95		91.36	
00:13:37:33.996	5.10	9.12	104.00		91.57	
00:13:38:33.992	5.01	9.17	102.84		90.04	
00:13:39:34.039	4.92	9.22	103.43		90.05	
00:13:40:34.031	5.01	9.17	103.03		90.21	
00:13:41:34.031	5.07	9.14		103.31		90.79
00:13:42:34.020	5.01	9.17		104.57		91.56
00:13:43:34.016	4.90	9.23		103.12		89.67
00:13:44:34.008	5.03	9.16		102.44		89.80
00:13:45:34.004	5.13	9.11		104.05		91.79
00:13:46:33.996	5.03	9.16		104.14		91.29
00:13:47:33.992	5.06	9.15	103.79		91.16	
00:13:48:34.039	5.05	9.15	103.81		91.12	
00:13:49:34.031	5.14	9.11	103.12		91.03	
00:13:50:34.035	5.17	9.09	103.60		91.62	
00:13:51:34.020	5.08	9.14	104.23		91.66	
00:13:52:34.016	4.98	9.19	104.03		90.91	
00:13:53:34.008	5.00	9.18		103.55		90.61
00:13:54:34.004	5.01	9.17		103.73		90.82
00:13:55:33.996	5.02	9.17		102.97		90.21
00:13:56:33.992	5.03	9.16		102.17		89.57
00:13:57:34.039	5.10	9.12		102.58		90.32
00:13:58:34.031	5.15	9.10		103.35		91.29
00:13:59:34.039	5.13	9.11	102.77		90.66	
00:14:00:34.020	5.06	9.15	103.39		90.81	
00:14:01:34.016	5.06	9.15	102.63		90.14	

NG Utility Boiler						
11/16/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:14:02:34.008	5.10	9.12	103.41		91.05	
00:14:03:34.004	5.07	9.14	102.79		90.34	
00:14:04:33.996	5.02	9.17	103.94		91.06	
00:14:05:34.043	5.01	9.17	104.54		91.53	
00:14:06:34.047	5.01	9.17		103.34		90.48
00:14:07:34.031	5.11	9.12		103.07		90.81
00:14:08:34.027	5.05	9.15		104.31		91.56
00:14:09:34.020	5.03	9.17		104.05		91.21
00:14:10:34.016	4.90	9.23		103.63		90.11
00:14:11:34.016	4.90	9.23		102.58		89.20
00:14:12:34.012	4.93	9.22	102.69		89.46	
00:14:13:33.996	4.96	9.20	102.30		89.29	
00:14:14:33.992	5.03	9.17	103.50		90.73	
00:14:15:34.039	5.07	9.14	102.88		90.42	
00:14:16:34.031	5.02	9.18	104.14		91.24	
00:14:17:34.027	5.03	9.16	104.07		91.23	
00:14:18:34.020	5.06	9.15		104.79		92.04
00:14:19:34.016	4.94	9.22		103.00		89.79
00:14:20:34.008	4.89	9.24		103.77		90.18
00:14:21:34.004	4.90	9.23		103.20		89.74
00:14:22:33.996	5.08	9.14		103.66		91.16
00:14:23:33.992	5.02	9.17		103.53		90.70
00:14:24:34.039	4.99	9.19	103.61		90.60	
00:14:25:34.043	4.93	9.22	102.85		89.60	
00:14:26:34.027	4.96	9.20	103.00		89.90	
00:14:27:34.020	4.98	9.19	101.24		88.47	
00:14:28:34.016	5.06	9.15	101.92		89.52	
00:14:29:34.012	5.07	9.15	102.31		89.91	
00:14:30:34.004	4.94	9.22		103.53		90.25
00:14:31:33.996	4.99	9.19		102.16		89.33
00:14:32:33.992	5.03	9.17		102.23		89.62
00:14:33:34.039	4.99	9.19		102.32		89.47
00:14:34:34.031	4.95	9.21		103.55		90.32

NG Utility Boiler						
11/16/93						
Time	O2	CO2	NO	NOx	NO	NOx
	%, Dry	%, Dry	ppmv, Dry	ppmv, Dry	ppmv, Dry 7%O2	ppmv, Dry 7%O2
00:14:35:34.027	4.98	9.19		102.38		89.47
00:14:36:34.020	5.01	9.18	103.03		90.21	
00:14:37:34.016	5.01	9.18	104.20		91.23	
00:14:38:34.008	4.97	9.20	102.90		89.87	
00:14:39:34.004	4.94	9.22	102.17		89.06	
00:14:40:33.996	4.90	9.23	102.31		88.97	
00:14:41:33.992	4.96	9.21	102.43		89.40	
00:14:42:34.039	4.94	9.22		102.91		89.71
00:14:43:34.031	4.87	9.25		102.18		88.69
00:14:44:34.027	4.80	9.29		102.52		88.60
00:14:45:34.020	4.83	9.27		101.01		87.45
00:14:46:34.016	5.04	9.16		100.86		88.47
00:14:47:34.008	5.00	9.19		102.48		89.67
00:14:48:34.004	4.95	9.21	101.75		88.75	
00:14:49:33.996	4.98	9.19	102.67		89.72	
00:14:50:33.992	4.96	9.20	102.43		89.40	
00:14:51:34.039	4.88	9.25	103.18		89.61	
00:14:52:34.031	4.86	9.25	102.60		89.00	
00:14:53:34.027	4.91	9.23	103.60		90.14	
00:14:54:34.020	4.98	9.19		102.19		89.30
00:14:55:34.016	4.99	9.19		102.91		89.99
00:14:56:34.008	4.87	9.25		103.67		89.98
00:14:57:34.004	4.87	9.25		102.44		88.91
00:14:58:33.996	4.88	9.25		102.49		89.01
00:14:59:33.992	4.97	9.20		103.89		90.73
00:15:00:34.039	4.97	9.20	103.77		90.63	
AVERAGE	5.00	9.18	103.15	103.21	90.31	90.22

Appendix H.2. Flow Calculations and Run Sheets

FLOW RATE

PLANT: NG Utility Boiler
CITY: Confidential
RUN NO: 1,2,3
SAMPLE LOCATION: STACK

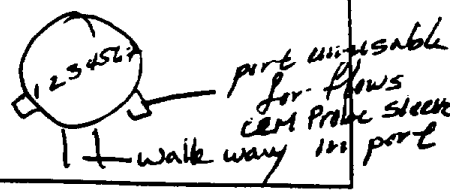
DATE ENTERED: 1/5/94
DATE: 11/17/93
OPERATOR: Jon Kawaguchi
ENTERED BY: David Hansell
CHECKED BY:

DATA ENTRY	SYMBOL	UNITS	DATA	DATA	DATA	DATA
RUN NUMBER	-	-	R1	R2	R3	Average
ROUND STACK, DIAMETER	ds	inches	96.0	96.0	96.0	96.00
RECTANGULAR STACK, LENGTH	L	inches				
WIDTH	W	inches				
AVERAGE STACK TEMPERATURE	Fs	degrees F	223.4	223.3	223.8	223.5
AVERAGE METER TEMPERATURE	Fm	degrees F	76.0	87.0	89.0	84.0
BAROMETRIC PRESSURE	Pbar	in. Hg	30.09	30.09	30.09	30.090
STACK STATIC PRESSURE	Pg	in. H20	-0.100	-0.100	-0.100	-0.100
AVG. DELTA H	dH	in. H20	1.900	1.900	1.900	1.900
AVG. VELOCITY HEAD	dP	in. H20	0.06	0.06	0.06	0.060
PITOT COEFFICIENT	Cp	-	0.840	0.840	0.840	0.840
GAS SAMPLE VOLUME	Vm	cubic ft.	28.7	29.0	28.9	28.833
METER CALIBRATION FACTOR	Y	-	1.000	1.000	1.000	1.000
TOTAL SAMPLING TIME	min	minutes	40	40	40	40.000
STACK GAS OXYGEN CONTENT	Co2,m	%	5.00	5.00	5.00	5.000
STACK GAS CARBON DIOXIDE CONTENT	Cco2,m	%	9.20	9.20	9.20	9.200
TOTAL IMPINGER GAIN (WATER & PARTICULATE)	Ww	grams	91.6	90.0	83.5	88.367

CALCULATED DATA	SYMBOL	UNITS	DATA	DATA	DATA	DATA
RUN NUMBER	-	-	R1	R2	R3	Average
STACK AREA, As = 3.14*(ds)**2/576 (ROUND)	As	sq. feet	50.265	50.265	50.265	50.265
= L * W/144 (RECTANGULAR)			0.000	0.000	0.000	0.000
AVG. STACK TEMPERATURE, Ts = Fs + 460	Ts	degrees R	683.4	683.3	683.8	683.5
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	536.0	547.0	549.0	544.0
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64Y (Vm/Tm) (Pbar + dH/13.6)	VmStd	cubic ft.	28.5	28.2	28.0	28.3
VOLUME OF WATER VAPOR, VwStd = 0.04707*Ww	VwStd	cubic ft.	4.3	4.2	3.9	4.2
MOISTURE FRACTION, Bws = VwStd/(VmStd + VwStd)	Bws	-	0.131	0.130	0.123	0.128
DRY STACK GAS MOL. WEIGHT, Md = 0.32(Co2,m)+ 0.44(Cco2,m)+0.28[100-(Co2,m)-(Cco2,m)]	Md	g/g-mole	29.67	29.67	29.67	29.67
WET STACK GAS MOLECULAR WEIGHT, Mw = Md(1-Bws)+18.0(Bws)	Mw	g/g-mole	28.14	28.15	28.24	28.18
ABSOLUTE STACK PRESSURE, Ps = Pbar + Pg/13.6	Ps	in. Hg	30.08	30.08	30.08	30.08
STACK GAS VELOCITY vs = 85.49 Cp { sqrt[(dP*Ts) /(Ps*Mw)] }	vs	ft/s	15.9	15.8	15.6	15.8
vm = 0.3048 * vs	vsm	m/s	4.85	4.82	4.74	4.80
ACTUAL STACK GAS FLOW RATE, Q = 60*vs*As	Q	acf/min	47957	47653	46905	47505
DRY GAS STACK FLOW RATE (DRY,STP) Qsd = 17.64*Q*(1-Bws)*(Ps/Ts)	Qsd	dscf/min	32350	32181	31929	32153
Qsdm = Qsd/35.32	Qsdm	dscm/min	916	911	904	910

PRELIMINARY VELOCITY TRAVERSE

PLANT _____
DATE 4/17/93
LOCATION _____
STACK I.D. 96
PITOT NO./Cp 3 TC# _____
BAROMETRIC PRESSURE, In Hg 30.09
STATIC GAUGE PRESSURE, In H20 -0.10
OPERATORS JK
PITOT PRE TEST LEAK CHECK Good
PITOT POST TEST LEAK CHECK Good



TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
1	0826	.07	223	
2		.06	225	
3		.06	226	
4		.06	226	
5		.05	225	
6		.06	225	
7		.06	225	
8		.06	222	
9		.06	221	
10		.06	221	
11	Cannot Reach			
12				
AVERAGE				

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
AVERAGE				

SWIRL ACCEPTANCE LIMITS

Average(abs. value) less than 10°
No points with reverse flow
No more than 4 points above 30°

ΔP MINIMUM LIMITS

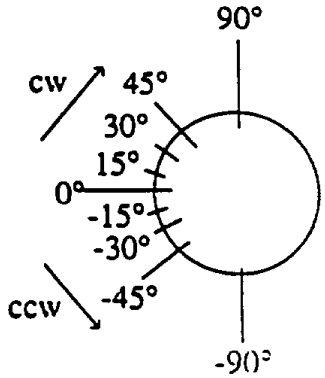
Conditions for more sensitive manometer
1. For 12 or more points on a velocity traverse: 10% of the points's Δp < 0.05"
2. For <12 points on a velocity traverse more than 1 point's Δp <0.05"

Rt Mean Avg Δp =

$$\left[\frac{\sum_{1}(\Delta p_{si})^{1/2}}{N}\right]^2$$

Rt Mean Avg Ts =

$$\left[\frac{\sum_{1}(Ts_i)^{1/2}}{N}\right]^2$$



EPA METHOD 4

Plant
City
Location
Operators JK
Date 11/17/93
Run Number 2
Stack Diam. (in.) 96

Sample Box Number Black
Meter Box Number M1
Meter Calibration (Y) 1.0002
Meter dH @ 1.9512
Pitot Tube No. 3 Cp
Probe Length 5' Tc No. 6

Probe Liner Material S/S
Static Pressure (Pa) -0.10 (in. H2O)
Barometric Pressure (Pb) 30.09 (in. Hg)
Ambient Temperature (°F) 60
Pretest Leak Rate 0.01 cfm @ 14 (in. Hg)
Post Test Leak Rate 0.008 cfm @ 10 (in. Hg)

Sheet 1 of 1

Sampling Time, (min)	Clock Time (24 h)	Vacuum (in. Hg)	Pressure Differential Across Orifice dH (in. H2O)	Gas Sample Volume, Vm (cf)	Dry Gas Meter Outlet Temp. Tm (°F)	Impinger Outlet Temp. (°F)	Comments
0	0913			211.690			0880 - 465630 cf, Vi
5	18	8.5	1.9	215.280	67	48	Integ. Factor 4000
10	23	8.5	1.9	218.890	71	50	
15	28	8.5	1.9	222.460	74	51	1500 - 465744 / Vf
20	33	8.5	1.9	226.025	75	51	
25	38	8.5	1.9	229.630	77	51	
30	43	8.5	1.9	233.165	79	50	
35	48	8.5	1.9	236.765	81	51	
40	53	8.5	1.9	240.365	84	52	

IMPINGER WEIGHT SHEET

Plant/city: _____

Location: _____

Train Set No. Black

Run No.: 2

Operator: JR

Run Time: 40 min

Impinger No.	Solution Used	Solution (ml)	Configuration		Weight (grams)	Inspection Comments
1	DI	100	Mod	Final	783.5	
				Initial	700.2	
				Wt. gain	83.3	Clear
2	DI	100	GS	Final	587.4	
				Initial	586.2	
				Wt. gain	1.2	Clear
3	Empty	—	Mod	Final	461.5	
				Initial	461.5	
				Wt. gain	0	Clear
4	Silica	300g	Mod	Final	652.9	
				Initial	645.8	
				Wt. gain	7.1	25% spent
5				Final		
				Initial		
				Wt. gain		
6				Final		
				Initial		
				Wt. gain		
Flask				Final		
				Initial		
				Wt. gain		

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 91.6

Train set up: Date: 11/17/93

Signature: [signature]

Train recovery: Date: 11/19/93

Signature: [signature]

EER

PRELIMINARY VELOCITY TRAVERSE

PLANT
DATE 11/12/93
LOCATION
STACK I.D. 96
PITOT NO./Cp 3 TC# 6
BAROMETRIC PRESSURE, In Hg 30.07
STATIC GAUGE PRESSURE, In H20 -0.1
OPERATORS JB
PITOT PRE TEST LEAK CHECK Good
PITOT POST TEST LEAK CHECK Good

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
1	1035	.06	224	
2		.06	225	
3		.06	225	
4		.06	226	
5		.06	225	
6		.06	225	
7		.06	223	
8		.06	221	
9		.06	222	
10		.06	221	
11				
12				
AVERAGE				

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
AVERAGE				

SWIRL ACCEPTANCE LIMITS

Average(abs. value) less than 10°
No points with reverse flow
No more than 4 points above 30°

ΔP MINIMUM LIMITS

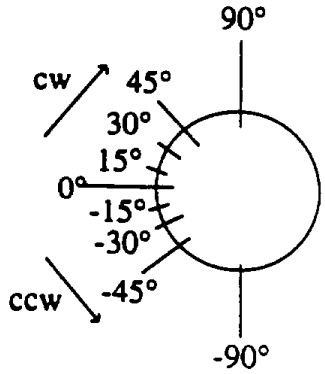
Conditions for more sensitive manometer
1. For 12 or more points on a velocity traverse: 10% of the points's Δp < 0.05"
2. For <12 points on a velocity traverse more than 1 point's Δp <0.05"

Pt Mean Avg Δp =

$$\left[\frac{\sum_{i}(\Delta p_{si})^{1/2}}{N}\right]^2$$

Pt Mean Avg Ts =

$$\left[\frac{\sum_{i}(Ts_i)^{1/2}}{N}\right]^2$$



EER

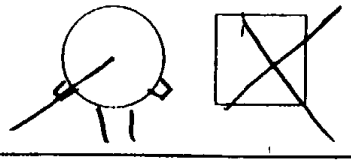
EPA METHOD 4

Plant _____
City _____
Location _____
Operators JLC
Date 11/17/93
Run Number 3
Stack Diam. (in.) 96

Sample Box Number Orange
Meter Box Number N/1 0
Meter Calibration (Y) 1.0002
Meter dH @ 1.9512
Pitot Tube No. 3 Cp _____
Probe Length 5 Tc No. 6

Probe Liner Material S/S
Static Pressure (Ps) -0.1 (in. H2O)
Barometric Pressure (Pb) 30.09 (in. Hg)
Ambient Temperature (°F) 66
Pretest Leak Rate 0.012 cfm @ 15 (in. Hg)
Post Test Leak Rate _____ cfm @ _____ (in. Hg)

Sheet 1 of 1



Sampling Time, (min)	Clock Time (24 h)	Vacuum (in. Hg)	Pressure Differential Across Orifice dH (in. H2O)	Gas Sample Volume, Vm (cf)	Dry Gas Meter Outlet Temp. Tm (°F)	Impinger Outlet Temp. (°F)	Comments
0	1050			240.775			
5	55	13	1.9	244.395	88	50	
10	1100	13	1.9	248.035	87	50	
15	05	13	1.9	251.740	87	50	
20	10	13	1.9	255.285	86	51	
25	15	13	1.9	258.910	87	51	
30	20	13	1.9	262.505	85	52	
35	25	13	1.9	266.085	86	52	
40	30	13	1.9	269.730	87	53	

IMPINGER WEIGHT SHEET

Plant/city: _____

Location: _____

Train Set No. Orange

Run No.: 3

Operator: JR

Run Time: 40 min

Impinger No.	Solution Used	Solution (ml)	Configuration		Weight (grams)	Inspection Comments
1	DI	100	Mod	Final	695.7	
				Initial	613.0	
				Wt. gain	82.7	Clear
2	DI	100	GS ~~Mod~~	Final	608.7	
				Initial	607.3	
				Wt. gain	1.4	Clear
3	Empty	—	Mod	Final	435.7	
				Initial	435.1	
				Wt. gain	0.6	Clear
4	Silica	300g	Mod	Final	680.5	
				Initial	675.2	
				Wt. gain	5.3	Good
5				Final		
				Initial		
				Wt. gain		
6				Final		
				Initial		
				Wt. gain		
Flask				Final		
				Initial		
				Wt. gain		

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 90

Train set up: Date: 11/17/93

Signature: [signature]

Train recovery: Date: 11/17/93

Signature: [signature]

EER

SCHEMATIC VELOCITY TRAVERSE

PLANT
DATE 11/17/93
LOCATION
STACK I.D. 96
PITOT NO./Cp 3 TC# 6
BAROMETRIC PRESSURE, In Hg 30.09
STATIC GAUGE PRESSURE, In H20 -0.1
OPERATORS JR
PITOT PRE TEST LEAK CHECK Good
PITOT POST TEST LEAK CHECK Good

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
1	1209	.05	226	
2		.06	226	
3		.06	225	
4		.06	226	
5		.06	226	
6		.06	226	
7		.06	224	
8		.06	222	
9		.06	221	
10		.06	221	
11				
12				
AVERAGE				

SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	CLOCK 24 HR TIME	VELOCITY HEAD (Ps) In. H20	STACK TEMP (Ts)°F	SWIRL ANGLE
AVERAGE				

SWIRL ACCEPTANCE LIMITS

Average(abs. value) less than 10°
No points with reverse flow
No more than 4 points above 30°

ΔP MINIMUM LIMITS

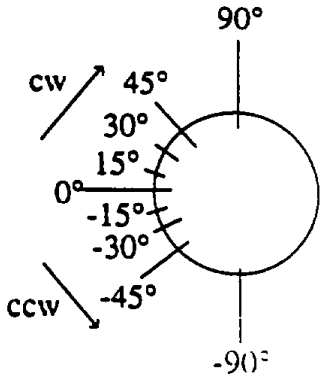
Conditions for more sensitive manometer
1. For 12 or more points on a velocity traverse: 10% of the points's $\Delta p < 0.05$"
2. For <12 points on a velocity traverse more than 1 point's $\Delta p < 0.05$"

Rt Mean Avg Δp =

$$\left[\frac{\sum_{i}(\Delta p_{si})^{1/2}}{N}\right]^2$$

Rt Mean Avg Ts =

$$\left[\frac{\sum_{i}(T_{si})^{1/2}}{N}\right]^2$$



EPA METHOD 4

Plant
City
Location
Operators 180
Date 11/17/93
Run Number 2
Stack Diam. (in.) 96

Sample Box Number Black
Meter Box Number N1
Meter Calibration (Y) 1.0002
Meter dH @ 1.9512
Pitot Tube No. 3 Cp
Probe Length 5' Tc No. 4

Probe Liner Material S/S
Static Pressure (Pa) -0.1 (in. H2O)
Barometric Pressure (Pb) 30.09 (in. Hg)
Ambient Temperature (°F) 74
Pretest Leak Rate 0.007 cfm @ 16 (in. Hg)
Post Test Leak Rate 0.002 cfm @ 12 (in. Hg)

Sheet 1 of 1

Sampling Time, (min)	Clock Time (24 h)	Vacuum (in. Hg)	Pressure Differential Across Orifice dH (in. H2O)	Gas Sample Volume, Vm (cf)	Dry Gas Meter Outlet Temp, Tm (°F)	Impinger Outlet Temp. (°F)	Comments
0	1244			269.830			
5	49	9	1.9	273.470	86	52	
10	54	9	1.9	277.080	87	53	
15	59	9	1.9	280.810	89	54	
20	1304	9	1.9	284.285	89	54	
25	09	9	1.9	287.895	89	54	
30	14	9	1.9	291.450	89	55	
35	19	9	1.9	295.065	90	55	
40	24	9	1.9	298.705	90	56	

IMPINGER WEIGHT SHEET

Plant/city: _____

Location: _____

Train Set No. Black

Run No.: 4

Operator: JK

Run Time: 40 min

Impinger No.	Solution Used	Solution (ml)	Configuration		Weight (grams)	Inspection Comments
1	DI	100	Mod	Final	863.0	
				Initial	783.5	
				Wt. gain	79.5	
2	DI	100	GS	Final	589.1	
				Initial	587.4	
				Wt. gain	1.7	
3	Empty	—	Mod	Final	462.1	
				Initial	461.5	
				Wt. gain	0.6	
4	Silica	300g	Mod	Final	1,654.6	
				Initial	652.9	
				Wt. gain	1.7	
5				Final		
				Initial		
				Wt. gain		
6				Final		
				Initial		
				Wt. gain		
Flask				Final		
				Initial		
				Wt. gain		

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 83.5

Train set up: Date: 11/17/93

Signature: [signature]

Train recovery: Date: 11/17/93

Signature: [signature]

EER

Appendix H.3. Tedlar Bag Analyses

Energy and
Environmental
Research Corporation

CHAIN OF CUSTODY

Plant
Unit
Location Stack

Project No. 6373-020

Page 1 of 1

P.O No.

Sample No.	Test No.	Test Date	Description
139617	1	11-17-93	Diluted
139624	1	11-17-93	Undiluted
139625	2	11-17-93	Diluted
139673	2	11-17-93	Undiluted
139676	3	11-17-93	Diluted
139675	3	11-17-93	Undiluted
139678	4	11-17-93	Blank

Sampling system prepared by R. Campbell 7.72 dil ratio
Test operator R. Campbell
Sample recovery by R. Campbell in field

Relinquished By	Recieved By	Time	Date	Reason
[signature]	[signature]	1:00 pm	11/18	

Laboratory analysis by _____ Date _____

H-18

4836

Energy and
Environmental
Research Corporation

7.72
Dil. Ratio

FIELD SAMPLE TRACKING REPORT

PROJECT NO. 6373-020 PAGE 1

PLANT/PROJECT _____

UNIT # _

SAMPLE NO.	RUN NO.	PROCESS STREAM/ LOCATION	SAMPLE DATA				SENT TO:	
			DESCRIPTION	DATE	TIME	SAMPLER	LABORATORY	DATE
139617	1	Stack	Diluted	11-17-93	10:08 / 10:38	R Campbell		
139624	1	Stack	Undiluted	11-17-93	10:08 / 10:38	R Campbell		
139621	1	Stack	Condensate	11-17-93	10:08 / 10:38	R Campbell		
139625	2	Stack	Diluted	11-17-93	10:38 / 11:05	R Campbell		
139673	2	Stack	Undiluted	11-17-93	10:38 / 11:05	R Campbell		
139674	2	Stack	Condensate	11-17-93	10:38 / 11:05	R Campbell		
139676	3	Stack	Diluted	11-17-93	11:07 / 11:37	R Campbell		
139675	3	Stack	Undiluted	11-17-93	11:07 / 11:37	R Campbell		
139677	3	Stack	Condensate	11-17-93	11:07 / 11:37	R Campbell		
139678	4	Sys. Stack	Blank	11-17-93	11:45 / 12:23	R. Campbell		

Applied P & Ch Laboratory
4086 E. Mission Blvd., Pomona, CA 91766
Tel: (909) 622-5148 Fax: (909) 622-3199

APCL Analytical Report

Submitted to:
Energy and Environmental Research Corporation
Attention: Dave Hansell
8001 Irvine Blvd.
Santa Ana, CA 92706
Tel: (714)552-1803 Fax: (714)857-1943

Service ID #: 801-934866
Collected by: R. Campbell
Collected on: 11/17/93
Sample description:
Air Bag Samples from Stuck,
Project 6373-020

Received : 11/18/93
Tested : 11/19-12/09/93
Reported : 12/10/93

Analysis of VOCs in Air

801-934866 Page 1 of 3

Component Analyzed	Method	Unit	PQL	Concentration 139617 Diluted 93-4866-1	139624 Undiluted 93-4866-2	139625 Diluted 93-4866-3	139673 Undiluted 93-4866-4	139676 Diluted 93-4866-5	139675 Undiluted 93-4866-6	139678 Blank 93-4866-7
Chlorinated Hydrocarbons										
Chloromethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Bromomethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Chloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1-Dichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Methylene Chloride	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1-Dichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-1,2-Dichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Chloroform	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1,1-Trichloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Carbon Tetrachloride	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2-Dichloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Trichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2-Dichloropropane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-1,3-Dichloropropene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-1,3-Dichloropropene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1,2-Trichloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Tetrachloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethylene Dibromide	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethylene Dichloride	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Chlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1,2,2-Tetrachloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,3-Dichlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,4-Dichlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Chlorotoluene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2-Dichlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2,4-Trichlorobenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Hexachlorobutadiene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-1,2-Dichloroethene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,1,1,2-Tetrachloroethane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Carbon Disulfide	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.

CADHS ELAP CERTIFICATION NUMBER 1431

Applied P & Ch Laboratory
4066 E. Mission Blvd., Pomona, CA 91766
Tel: (909) 622-5148 Fax: (909) 622-3199

APCL Analytical Report

Analysis of VOCs in Air

801-934866 Page 2 of 3

Component Analyzed	Method	Unit	PQL	Concentration 139617 Diluted 93-4866-01	139624 Undiluted 93-4866-02	139625 Diluted 93-4866-03	139673 Undiluted 93-4866-04	139676 Diluted 93-4866-05	139675 Undiluted 93-4866-06	139678 Blank 93-4866-07
Paraffins (C4-C8)										
n-Butane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Isobutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
n-Pentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Isopentane [2-methylbutane]*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Neopetane [2,2-dimethylpropane]*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
n-Hexane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Methylpentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
3-Methylpentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2,2-Dimethylbutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2,3-Dimethylbutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Aromatics										
Benzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Toluene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethyl Benzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
m,p-Xylenes	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
o-Xylene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Styrene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,3,5-Trimethylbenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,2,4-Trimethylbenzene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Phenol	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Naphthalene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Naphthenes										
Cyclopropane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Cyclobutane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Cyclopentane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Cyclohexane	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ketones										
Acetone	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Butanone	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1,3-Butadiene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Propadiene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Olefins										
1-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-2-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-2-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Methylpropene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1-Pentene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
cis-2-Pentene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
trans-2-Pentene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-methyl-2-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-methyl-1-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
3-methyl-1-Butene	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.

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APCL Analytical Report

Analysis of VOCs in Air

Component Analyzed	Method	Unit	PQL	Concentration 139617 Diluted 93-4866-01	139624 Undiluted 93-4866-02	139625 Diluted 93-4866-03	139673 Undiluted 93-4866-04	139676 Diluted 93-4866-05	139675 Undiluted 93-4866-06	139678 Blank 93-4866-07
Acetylenes (C4-C5)										
1-Butyne*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Butyne	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
1-Pentyne	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
2-Pentyne	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethers										
MTBE	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Dimethyl Ether	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethyl Methyl Ether*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Diethyl Ether	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Ethyl Propyl Ether*	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
Dipropyl Ether	TO-14	ppbV	5	N.D.	–	N.D.	–	N.D.	–	N.D.
VOCs by GC/FIDs										
Methane	TO-14/FID	ppbV	500	–	14,000	–	14,000	–	14,000	4,300
Ethane	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Propane	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Ethene	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Propene	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Ethyne	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.
Propyne*	TO-14/FID	ppbV	500	–	N.D.	–	N.D.	–	N.D.	N.D.

PQL : Practical Quantitation Limit
N.D. : Not Detected or Less Than The Quantitation Limit.
* Standards not available

Respectfully submitted,

Shu-Teh Pan
Lab Manager
Applied P & Ch Laboratory

CADHS ELAP CERTIFICATION NUMBER 1431

Appendix H.4. Aldehyde/Ketone Calculations, Run Sheets and Analyses

CARB 430

DATE DATE ENTERED: 1/4/93

PLANT: NG Boiler
TEST DATE: 11/17/93
CITY: Confidential
OPERATOR: Jon Kawaguchi
RUN #: 1, 2, 3
ENTERED BY: Dave Hansell
SAMPLE LOCATION: Stack
CHECKED BY:

DATA ENTRY	SYMBOL	UNITS		DATA		DATA		DATA			
RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
AVERAGE METER TEMPERATURE	Fm	degree F		73.40		87.80		89.60		83.60	10.62
BAROMETRIC PRESSURE	Pbar	in. Hg		30.09		30.09		30.09		30.09	0.00
AVG. DELTA H	dH	in. H20		1.50		1.50		1.40		1.47	3.94
GAS SAMPLE VOLUME	Vm	cubic ft.		1.02		1.19		1.17		1.12	8.22
METER CALIBRATION FACTOR	Y	-		1.00		1.00		1.00		1.00	0.00
TOTAL SAMPLING TIME	min	minutes		60.00		60.00		60.00		60.00	0.00
SAMPLE 1ST IMPINGER VOLUME	Siwt,1	ml		12.20		13.00		13.00		12.73	3.63
SAMPLE 2ND IMPINGER VOLUME	Siwt,2	ml		9.90		9.50		9.60		9.67	2.15
BLANK 1ST IMPINGER VOLUME	Biwt,1	ml		9.70		9.20		9.90		9.60	3.76
BLANK 2ND IMPINGER VOLUME	Biwt,2	ml		9.90		9.90		9.60		9.80	1.77
SAMPLE WEIGHTS (1ST IMPINGER)											
Formaldehyde	Swt,1	µg		1.65		0.48		0.28		0.80	92.12
Acetaldehyde	Swt,1	µg		0.63		0.48		0.28		0.46	37.90
Acrolein	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Swt,1	µg		0.21		0.20	ND	0.10	<	0.17	35.78
Acetone	Swt,1	µg		0.43		0.36	ND	0.10	<	0.30	58.61
Crotonaldehyde	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Swt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Swt,1	µg		0.37	ND	0.10	ND	0.10	<	0.19	82.04
SAMPLE WEIGHTS (2ND IMPINGER)											
Formaldehyde	Swt,2	µg		1.30		1.50		0.94		1.25	22.76
Acetaldehyde	Swt,2	µg		0.40		2.10		0.28		0.93	109.85
Acrolein	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Swt,2	µg		0.12		1.60	ND	0.10	<	0.61	141.81
Acetone	Swt,2	µg		0.18		1.10	ND	0.10	<	0.46	120.80
Crotonaldehyde	Swt,2	µg	ND	0.10		1.20	ND	0.10	<	0.47	136.09
Isobutyraldehyde	Swt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Swt,2	µg		0.13		1.10	ND	0.10	<	0.44	128.32
BLANK WEIGHTS (1ST IMPINGER)											
Formaldehyde	Bwt,1	µg		0.10		0.16		0.11		0.12	26.06
Acetaldehyde	Bwt,1	µg		0.10	ND	0.10	ND	0.10	<	0.10	0.00
Acrolein	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Crotonaldehyde	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Bwt,1	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
BLANK WEIGHTS (2ND IMPINGER)											
Formaldehyde	Bwt,2	µg		0.10	ND	0.10	ND	0.10	<	0.10	0.00
Acetaldehyde	Bwt,2	µg		0.10		0.11		0.12		0.11	9.09
Acrolein	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Propanal	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Acetone	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Crotonaldehyde	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Isobutyraldehyde	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00
Methyl Ethyl Ketone	Bwt,2	µg	ND	0.10	ND	0.10	ND	0.10	ND	0.10	0.00

CARB 430

PLANT: NG Boiler
CITY: Confidential
RUN #: 1, 2, 3
SAMPLE LOCATION: Stack

DATE DATE ENTERED: 1/4/93
TEST DATE: 11/17/93
OPERATOR: Jon Kawaguchi
ENTERED BY: Dave Hansell
CHECKED BY:

CALCULATED DATA	SYMBOL	UNITS	DATA		DATA		DATA			
RUN NUMBER	-	-	R1		R2		R3		AVE	RSD
AVG. METER TEMPERATURE, Tm = Fm + 460	Tm	degrees R	533.40		547.80		549.60		543.60	1.63
GAS SAMPLE VOLUME AT STANDARD CONDITIONS, VmStd = 17.64Y (Vm/Tm) (Pbar + dH/13.6)	VmStd	dscm	0.029		0.033		0.032		0.031	6.69

SAMPLE IMPINGER CONCENTRATION (ng/ml), S or Bic= 1000*(S or Bwt,1+S or Bwt,2)/(S or Biwt,1+S or Biwt,2)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Sic	ng/ml		133		88		54		92	43.44
Acetaldehyde	Sic	ng/ml		47		115		25		62	75.60
Acrolein	Sic	ng/ml	ND	9	ND	9	ND	9	ND	9	1.19
Propanal	Sic	ng/ml		15		80	ND	9	<	35	114.01
Acetone	Sic	ng/ml		28		65	ND	9	<	34	84.45
Crotonaldehyde	Sic	ng/ml	ND	9	<	58	ND	9	<	25	111.76
Isobutyraldehyde	Sic	ng/ml	ND	9	ND	9	ND	9	ND	9	1.19
Methyl Ethyl Ketone	Sic	ng/ml		23	<	53	ND	9	<	28	80.56
BLANK											
Formaldehyde	Bic	ng/ml		10	<	14	<	11	<	12	15.85
Acetaldehyde	Bic	ng/ml		10	<	11	<	11	<	11	5.16
Acrolein	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.37
Propanal	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.37
Acetone	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.37
Crotonaldehyde	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.37
Isobutyraldehyde	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.37
Methyl Ethyl Ketone	Bic	ng/ml	ND	10	ND	10	ND	10	ND	10	1.37

BLANK TO SAMPLE RATIO, Br=Sic/Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
RATIO											
Formaldehyde	Br		C	12	C	8	RL	5		8	43.44
Acetaldehyde	Br		RL	4	C	11	RL	2		6	75.60
Acrolein	Br		NA	NA	NA	NA	NA	NA		NA	NA
Propanal	Br		NA	NA	NA	NA	NA	NA		NA	NA
Acetone	Br		NA	NA	NA	NA	NA	NA		NA	NA
Crotonaldehyde	Br		NA	NA	NA	NA	NA	NA		NA	NA
Isobutyraldehyde	Br		NA	NA	NA	NA	NA	NA		NA	NA
Methyl Ethyl Ketone	Br		NA	NA	NA	NA	NA	NA		NA	NA

CARB 430

PLANT: NG Boiler
CITY: Confidential
RUN #: 1, 2, 3
SAMPLE LOCATION: Stack

DATE DATE ENTERED: 1/4/93
TEST DATE: 11/17/93
OPERATOR: Jon Kawaguchi
ENTERED BY: Dave Hansell
CHECKED BY:

CORRECTED SAMPLE CONCENTRATION (ng/ml) Br>5 Cic=Sic-Average(Bic); Br<5 Cic=5*Average(Bic)

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cic	ng/ml	C	122	C	76	RL	58	C	85	38.74
Acetaldehyde	Cic	ng/ml	RL	54	C	104	RL	54	C	71	40.59
Acrolein	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	9	ND NC	9	1.19
Propanal	Cic	ng/ml	NA	15	NA	80	ND NA	9	< NC	35	114.01
Acetone	Cic	ng/ml	NA	28	NA	65	ND NA	9	< NC	34	84.45
Crotonaldehyde	Cic	ng/ml	ND NA	9	< NA	58	ND NA	9	< NC	25	111.76
Isobutyraldehyde	Cic	ng/ml	ND NA	9	ND NA	9	ND NA	9	ND NC	9	1.19
Methyl Ethyl Ketone	Cic	ng/ml	NA	23	< NA	53	ND NA	9	< NC	28	80.56

CORRECTED SAMPLE CONCENTRATION 1 (mg/dscm). Cc,1=Cic*(Swt,1+Swt,2)/VmStd/1e06

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,1	mg/dscm	C	0.09	C	0.05	RL	0.04	C	0.06	44.55
Acetaldehyde	Cc,1	mg/dscm	RL	0.04	C	0.07	RL	0.04	C	0.05	36.34
Acrolein	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	6.93
Propanal	Cc,1	mg/dscm	NA	0.01	NA	0.06	ND NA	0.01	< NC	0.02	110.51
Acetone	Cc,1	mg/dscm	NA	0.02	NA	0.04	ND NA	0.01	< NC	0.02	80.59
Crotonaldehyde	Cc,1	mg/dscm	ND NA	0.01	< NA	0.04	ND NA	0.01	< NC	0.02	108.51
Isobutyraldehyde	Cc,1	mg/dscm	ND NA	0.01	ND NA	0.01	ND NA	0.01	ND NC	0.01	6.93
Methyl Ethyl Ketone	Cc,1	mg/dscm	NA	0.02	< NA	0.04	ND NA	0.01	< NC	0.02	76.67

CORRECTED SAMPLE CONCENTRATION 2 (ppbv). Cc,2=1000*24.05/Mw

RUN NUMBER	-	-		R1		R2		R3		AVE	RSD
SAMPLE											
Formaldehyde	Cc,2	ppbv	C	75	C	42	RL	33	C	50	44.55
Acetaldehyde	Cc,2	ppbv	RL	23	C	39	RL	21	C	28	36.34
Acrolein	Cc,2	ppbv	ND NA	3	ND NA	3	ND NA	3	ND NC	3	6.93
Propanal	Cc,2	ppbv	NA	5	NA	23	ND NA	3	< NC	10	110.51
Acetone	Cc,2	ppbv	NA	9	NA	19	ND NA	3	< NC	10	80.59
Crotonaldehyde	Cc,2	ppbv	ND NA	2	< NA	14	ND NA	2	< NC	6	108.51
Isobutyraldehyde	Cc,2	ppbv	ND NA	2	ND NA	2	ND NA	2	ND NC	2	6.93
Methyl Ethyl Ketone	Cc,2	ppbv	NA	6	< NA	12	ND NA	2	< NC	7	76.67

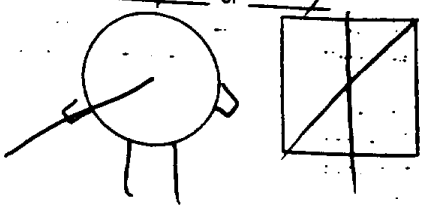
ND - Sample value below detection limit
< - Some sample values below detection limit
C - Blank Corrected
RL - Reporting Limit
NA - Not Available

CARB 430 RUN SHEET

Plant
City
Location
Operators JD
Date 11/17/93
Run Number 1
Stack Diam. (in.) 96"
Static Pressure (Pa) -0.10 (in. H2O)
Barometric Pressure (Pb) 30.09 (in. Hg)
Ambient Temperature (°F) 60

Sample Box Number
Meter Box Number V3
Meter Calibration (Y)
Meter dH @
Probe Length 5'
Probe Liner Material S/S
Pretest Leak Rate 000 cfm @ 7 (in. Hg)
Post Test Leak Rate 000 cfm @ 7 (in. Hg)

Sheet 1 of 1



Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH Probe Temp.	Comments
1	0	0909		~~[illegible]~~					188.87*
1	5	14	.5	190.30	.29	N/A	15	1.4	
	10	19	.5	192.53	.45		17	1.6	
	15	24	.6	194.79	.45		18	1.6	
	20	29	.6	~~[illegible]~~	.50		19	1.6	197.27*
	25	34	.6	199.95	.54		20	1.6	
	30	39	.6	202.47	.50		22	1.5	
	35	44	.6	205.40	.60		23	1.6	
	40	49	.6	207.87	.53		24	1.6	
	45	54	.6	210.71	.55		25	1.6	
	50	59	.6	213.58	.55		26	1.4	
	~~[illegible]~~	1004	.6	216.27	.54		27	1.2	
	60	09	.6	219.13	.57		28	1.6	
Average, Total									

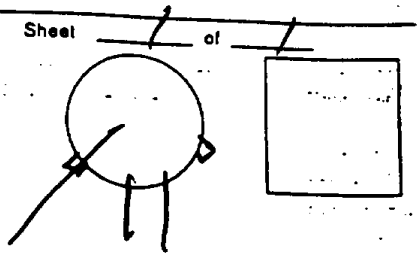
Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

CARB 430 RUN SHEET

Plant
City
Location
Operators JTR
Date 11/17/93
Run Number 2
Stack Diam. (in.) 96
Static Pressure (Pa) -0.1 (in. H2O)
Barometric Pressure (Pb) 30.04 (in. Hg)
Ambient Temperature (°F) 66

Sample Box Number
Meter Box Number U3
Meter Calibration (Y)
Meter dH @
Probe Length 5'
Probe Liner Material S/S
Pretest Leak Rate 000 cfm @ 7 (in. Hg)
Post Test Leak Rate ____ cfm @ ____ (in. Hg)

Sheet 1 of 1



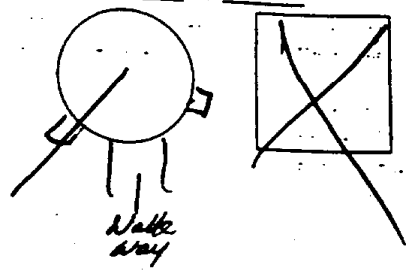
Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH (in. H2O)	Comments
1	0	1026		219.30					
1	5	53	.6	221.95	.53	N/A	30	1.4	
	10	58	.6	224.85	.58		30	1.4	
	15	1103	.6	227.54	.54		30	1.4	
	20	08	.6	230.35	.56		30	1.5	
	25	13	.6	233.21	.57		30	1.4	
	30	18	.6	235.99	.56		31	1.5	
	35	23	.6	238.85	.57		31	1.4	
	40	28	.6	241.55	.54		32	1.4	
	45	33	.6	244.47	.58		32	1.3	
	50	38	.6	247.25	.56		33	1.6	
	55	43	.6	250.03	.56		33	1.4	
	60	48	.6	252.93			33	1.5	
Average/Total									Flowrate at 0.50 liters/min +/- 10% Pretest Probe Purge with Stack Gas Pretest leak check with Charcoal Tube Where gloves when operating train

CARB 430 RUN SHEET

Plant
City
Location
Operators JD
Date 11/12/93
Run Number 3
Stack Diam. (in.) 96"
Static Pressure (Pa) -0.1 (in. H2O)
Barometric Pressure (Pb) 30.09 (in. Hg)
Ambient Temperature (°F) 74

Sample Box Number 1
Meter Box Number V3
Meter Calibration (Y)
Meter dH @
Probe Length 5'
Probe Liner Material S/S
Pretest Leak Rate 0.000 cfm @ 7 (in. Hg)
Post Test Leak Rate ___ cfm @ ___ (in. Hg)

Sheet 1 of 1



Traverse Point No.	Sampling Time, (Min.)	Clock Time (24 h)	Rotameter Reading	Gas Sample Volume, Vm (l)	Flowrate liters/min	Stack Temp (°F)	Dry Gas Meter Outlet Temp, Tm (°C)	ΔH Probe Temp.	Comments
1	0	1243		253.13					
1	5	48	.6	255.77	.53	N/A	31	1.6	
	10	53	.6	258.65	.58		31	1.4	
	15	58	.6	261.37	.54		32	1.4	
	20	1303	.6	264.13	.56		32	1.4	
	25	08	.6	266.91	.56		32	1.4	
	30	13	.6	269.60	.54		32	1.3	
	35	18	.6	272.44	.57		32	1.4	
	40	23	.6	275.15	.54		32	1.3	
	45	28	.6	277.94	.56		33	1.4	
	50	33	.6	280.71	.55		33	1.4	
	55	38	.6	283.50	.54		33	1.4	
	60	43	.6	286.18	.54		33	1.4	
Average/Total									

Flowrate at 0.50 liters/min +/- 10%
Pretest Probe Purge with Stack Gas
Pretest leak check with Charcoal Tube
Where gloves when operating train

Energy and Environmental Research Corporation

18 Mason, Irvine, CA 92718
tel: (714) 859-8851
fax: (714) 859-3194

Laboratory Report Due by _____ to:

EER Contact: Jon Kawaguchi. Address: EER
tel: (714) 552-1803 8001 Irvine Blvd
fax: (714) 857-1943 Santa Ana, CA 92705

Bill to: P.O. No.:
EER Corporation
18 Mason
Irvine, CA 92718

Sample Chain of Custody Record

EER Project No: 6373-020
Project Name: CARB VOC
Site Name:

Sampling System Prepared by: Jon K
Test Operator(s): Jon K
Samples Recovered by: Jon K

Laboratory I.D. No.	EER Label No.	Test ID / Location	Physical Description	Date	Time	No. of Containers	Aldehydes C1-C4	Ketones C3-C4					ADDITIONAL INFORMATION (e.g. Volumes, TT, Holding Times, Sample Preparation, Add'l Instructions, etc.)
	139679	1 /	Aldehyde Blank Front	11/17/93	1009	1	/	/					
	139680	1 / "	" " Back		↓	↓	/	/					
	154521	1 / "	" Front				/	/					
	154522	1 / "	" Back		↓		/	/					
	154523	2 / "	" Blank Front		1048		/	/					
	154524	2 / "	" " Back		↓		/	/					
	154525	2 / "	" Front				/	/					
	154526	2 / "	" Back		↓		/	/					
	154527	3 / "	" Blank Front		1343		/	/					
	154528	3 / "	" " Back		"	↓	/	/					

Method of Shipment: Fed X
Shipment I.D.:
Date Shipped: 11/18/93
Samples Shipped to: Air Toxics
Attention:

Remarks (RUSH!, units: mg/L, ppm, etc.):

After analysis: ☐ Archive samples (Hold for _____ months, then dispose.)
☐ Return samples to: EER Corporation 8001 Irvine Blvd., Irvine, CA 92705

Relinquished by: (Sign & Print)	Date / Time:	Received by: (Sign & Print)	Date / Time:
Jon Kawaguchi	11/18/93 0850	Theresa Schmidt	11/19/93 9:46

Energy and Environmental Research Corporation

18 Mason, Irvine, CA 92718
tel: (714) 859-8851
fax: (714) 859-3194

Laboratory Report Due by _____ to:

EER Contact: Jon Kawaguchi Address: EER

tel: (714) 552-1803 8001 Irvine Blvd

fax: (714) 857-1943 Santa Ana, CA 92643

Bill to: P.O. No.: _____

EER Corporation

18 Mason

Irvine, CA 92718

Sample Chain of Custody Record

page 2 of 2

EER Project No: 6373-020

Project Name: CARB VOC

Site Name:

Sampling System Prepared by: Jon K

Test Operator(s): Jon K

Samples Recovered by: Jon K

Laboratory I.D. No.	EER Label No.	FIELD SAMPLE IDENTIFICATION AND SAMPLING INFORMATION: Test ID / Location	Physical Description	Date	Time	No. of Containers	Aldehyde C1-C4	Ketones C3-C4	Compounds List 1				ADDITIONAL INFORMATION (e.g. Volumes, TT, Holding Times, Sample Preparation, Add'l Instructions, etc.)
	154529	3/	Aldehyde Front	11/17/93	1343	1	/	/					
	154530	3/	" Back	↓	↓	↓	/	/					
	154531	~~Temp~~	Trip Blank				/	/					
	154532		Trip Spike				/	/					
	139628		Fuel Gas Sample		1330				/				

Method of Shipment: Fed X

Shipment I.D.: Date Shipped: 11/18/93

Samples Shipped to: Air Toxics

Attention:

Remarks (RUSH!, units: mg/L, ppm, etc.): Tedlar Bag (139628) Will need to be analyzed right away

After analysis: ☐ Archive samples (Hold for _____ months, then dispose.)

☐ Return samples to: EER Corporation 8001 Irvine Blvd., Irvine, CA 92705

Relinquished by: (Sign & Print)	Date / Time:	Received by: (Sign & Print)	Date / Time:
Jon Kawaguchi	11/18/93 0850	Teresa Schmidt	11/18/93 9:40

TOP - ORIGINAL MUST STAY WITH SAMPLES MIDDLE - LABORATORY COPY BOTTOM - EER COPY RETAIN WITH FIELD LOG

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9311168A

Work Order Summary

CLIENT: Mr. Jon Kawaguchi
Energy & Environmental Research
8001 Irvine Blvd.
Santa Ana, CA 92705

BILL TO: Accounts Payable
EER Corporation
18 Mason
Irvine, CA 92718

PHONE: 714-552-1803
FAX: 714-859-3194
DATE RECEIVED: 11/19/93
DATE COMPLETED: 12/8/93

INVOICE # 2441
P.O. #
PROJECT # 6373-020 CARB VOC
AMOUNT$: $1,575.00

FRACTION #	NAME	TEST	PRICE
01A	139679	TO-5	$1575.00 /set.
01B	139680	TO-5	
01C	154521	TO-5	
01CC	154521 Duplicate	TO-5	
01D	154522	TO-5	
02A	154523	TO-5	
02B	154524	TO-5	
02C	154525	TO-5	
02CMS	154525 Matrix Spike	TO-5	
02D	154526	TO-5	
03A	154527	TO-5	
03B	154528	TO-5	
03C	154529	TO-5	
03D	154530	TO-5	
04A	154531 Trip Blank	TO-5	
05A	154532 Trip Spike	TO-5	
06A	Lab Blank	TO-5	
07A	Lab Spike	TO-5	

CERTIFIED BY: Jindal Fuman
Laboratory Director

DATE: 12/8/93

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: 139679

ID#: 9311168A-01A G1I1

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4112405**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**9.7**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.10
Acetaldehyde	0.10	0.10
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 139680

ID#: 9311168A-01B B1I2

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4112406**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**9.9**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.10
Acetaldehyde	0.10	0.10
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154521 T1I1

ID#: 9311168A-01C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112407**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**12.2**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	1.8
Acetaldehyde	0.10	0.64
Acrolein	0.10	Not Detected
Propanal	0.10	0.23
Acetone	0.10	0.68
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	0.44

AIR TOXICS LTD.

SAMPLE NAME: 154521 Duplicate T.21

ID#: 9311168A-01CC

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4112408**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**12.2**	**Date of Analysis:**	**11/24/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	1.5
Acetaldehyde	0.10	0.61
Acrolein	0.10	Not Detected
Propanal	0.10	0.19
Acetone	0.10	0.17
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	0.30

AIR TOXICS LTD.

SAMPLE NAME: 154522 T152

ID#: 9311168A-01D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112409**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**9.9**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	1.3
Acetaldehyde	0.10	0.40
Acrolein	0.10	Not Detected
Propanal	0.10	0.12
Acetone	0.10	0.18
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	0.13

AIR TOXICS LTD.

SAMPLE NAME: 154523 B7I1

ID#: 9311168A-02A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112410**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**9.2**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.16
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154524 BDII

ID#: 9311168A-02B

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112411**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**9.9**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.11
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154525 T211

ID#: 9311168A-02C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112412**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**13.0**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.48
Acetaldehyde	0.10	0.48
Acrolein	0.10	Not Detected
Propanal	0.10	0.20
Acetone	0.10	0.36
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154525 Matrix Spike

ID#: 9311168A-02CMS

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112413**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**13.0**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	0.10	88
Acetaldehyde	0.10	81
Acrolein	0.10	102
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

AIR TOXICS LTD.

SAMPLE NAME: 154526 T2I2

ID#: 9311168A-02D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112414**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**9.5**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	1.5
Acetaldehyde	0.10	2.1
Acrolein	0.10	Not Detected
Propanal	0.10	1.6
Acetone	0.10	1.1
Crotonaldehyde	0.10	1.2
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	1.1

AIR TOXICS LTD.

SAMPLE NAME: 154527

ID#: 9311168A-03A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112420**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**9.9**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.11
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154528

ID#: 9311168A-03B

B3I2

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112421**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**9.6**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	0.12
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154529 T3b1

ID#: 9311168A-03C

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112422**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**13.0**	**Date of Analysis:**	**11/24/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	0.28
Acetaldehyde	0.10	0.28
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD. T3I2

SAMPLE NAME: 154530

ID#: 9311168A-03D

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112423**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**9.6**	**Date of Analysis:**	**11/24/93**

Compound	**Det. Limit (uG)**	**Amount (uG)**
Formaldehyde	0.10	0.94
Acetaldehyde	0.10	0.28
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154531 Trip Blank

ID#: 9311168A-04A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112424**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	0.11
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: 154532 Trip Spike

ID#: 9311168A-05A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4112425**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**11.0**	**Date of Analysis:**	**11/24/93**

Compound	**Det. Limit (uG)**	**% Recovery**
Formaldehyde	0.10	75
Acetaldehyde	0.10	70
Acrolein	0.10	Not Spiked
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 9311168A-06A

Aldehydes and Ketones in Ambient Air
(EPA Method TO-5)
High Pressure Liquid Chromatography

File Name:	**4112426**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**10.0**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	Amount (uG)
Formaldehyde	0.10	Not Detected
Acetaldehyde	0.10	Not Detected
Acrolein	0.10	Not Detected
Propanal	0.10	Not Detected
Acetone	0.10	Not Detected
Crotonaldehyde	0.10	Not Detected
Isobutyraldehyde	0.10	Not Detected
Methyl Ethyl Ketone	0.10	Not Detected

AIR TOXICS LTD.

SAMPLE NAME: Lab Spike

ID#: 9311168A-07A

Aldehydes and Ketones in Ambient Air

(EPA Method TO-5)

High Pressure Liquid Chromatography

File Name:	**4112427**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Extraction:**	**11/19/93**
Sample Volume (mL):	**11.0**	**Date of Analysis:**	**11/24/93**

Compound	Det. Limit (uG)	% Recovery
Formaldehyde	0.10	95
Acetaldehyde	0.10	94
Acrolein	0.10	82
Propanal	0.10	Not Spiked
Acetone	0.10	Not Spiked
Crotonaldehyde	0.10	Not Spiked
Isobutyraldehyde	0.10	Not Spiked
Methyl Ethyl Ketone	0.10	Not Spiked

Appendix H.5. Fuel Analyses

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 9311168B

Work Order Summary

CLIENT: Mr. Jon Kawaguchi
Energy & Environmental Research
8001 Irvine Blvd.
Santa Ana, CA 92705

BILL TO: Accounts Payable
EER Corporation
18 Mason
Irvine, CA 92718

PHONE: 714-552-1803
FAX: 714-859-3194
DATE RECEIVED: 11/19/93
DATE COMPLETED: 12/8/93

INVOICE # 2441
P.O. #
PROJECT # 6373-020 CARB VOC
AMOUNT$: $180.00

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	PRICE
01A	139628	ASTM D-1945	Tedlar Bag	$175.00
02A	Lab Blank	ASTM D-1945	NA	NC
Misc. Charges	Return Shipping (11/17/93)			$5.00

CERTIFIED BY: Linda J. Furman
Laboratory Director

DATE: 12/8/93

180 BLUE RAVINE ROAD, SUITE B • FOLSOM, CA 95630
(916) 985-1000 • FAX (916) 985-1020

AIR TOXICS LTD.

SAMPLE NAME: 139628
ID#: 9311168B-01A

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name:	**3111902**	**Date of Collection:**	**11/17/93**
Dil. Factor:	**1.0**	**Date of Analysis:**	**11/19/93**

Compound	Det. Limit (%)	Amount (%)
Oxygen	0.001	0.64
Nitrogen	0.001	3.4
Carbon Monoxide	0.001	Not Detected
Methane	0.001	90
Carbon Dioxide	0.001	1.1
Ethane	0.001	3.8
Propane	0.001	0.65
Isobutane	0.001	0.064
Butane	0.001	0.075
Neopentane	0.001	Not Detected
Isopentane	0.001	0.022
n-Pentane	0.001	0.017
Ethylene	0.001	Not Detected
Propene	0.001	Not Detected
1-Butene	0.001	Not Detected
cis-2-Butene	0.001	Not Detected
trans-2-Butene	0.001	Not Detected
Cyclopentane	0.001	Not Detected
Ethyne	0.001	Not Detected
C6+	0.010	0.074
	Total (%) =	100

BTU/Cu. Ft. = 1000
Specific Gravity (Air = 1.000) = 0.61

Container Type: Tedlar Bag

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank
ID#: 9311168B-02A

NATURAL GAS ANALYSIS by ASTM D-1945
GC/TCD/FID

File Name:	**3111904**	**Date of Collection:**	**NA**
Dil. Factor:	**1.0**	**Date of Analysis:**	**11/19/96**

Compound	Det. Limit (%)	Amount (%)
Oxygen	0.001	Not Detected
Nitrogen	0.001	100
Carbon Monoxide	0.001	Not Detected
Methane	0.001	Not Detected
Carbon Dioxide	0.001	Not Detected
Ethane	0.001	Not Detected
Propane	0.001	Not Detected
Isobutane	0.001	Not Detected
Butane	0.001	Not Detected
Neopentane	0.001	Not Detected
Isopentane	0.001	Not Detected
n-Pentane	0.001	Not Detected
Ethylene	0.001	Not Detected
Propene	0.001	Not Detected
1-Butene	0.001	Not Detected
cis-2-Butene	0.001	Not Detected
trans-2-Butene	0.001	Not Detected
Cyclopentane	0.001	Not Detected
Ethyne	0.001	Not Detected
C6+	0.010	Not Detected
	Total (%) =	100

BTU/Cu. Ft. = NA
Specific Gravity (Air = 1.000) = NA

Container Type: NA