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Note: This is a reference cited in AP 42, *Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources*. AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

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SOURCE TEST REPORT GIBSON 7028-01

Brown and Caldwell
September 11, 1992

Testing Information

Facility: Gibson Oil and Refining Company
Bakersfield, CA

Type of Unit: Natural gas-fired Boiler

Purpose of Test: Start-up source test; Compliance with San Joaquin Valley
Unified Air Pollution Control District regulations.

Test Procedure: CARB 1-100, EPA 5/8 and EPA 18.

Test Date: July 30, 1992

Client Information

Name/Address: Gibson Oil and Refining Company
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Bakersfield, CA 93301

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Testing Firm Information

Company: Brown and Caldwell
3480 Buskirk Avenue
Pleasant Hill, California 94523

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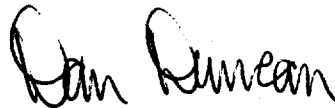
Source Test Report

Brown and Caldwell
3480 Buskirk Avenue
Pleasant Hill, California 94523

Project Number: 7028-01

Report Date: September 11, 1992

This report was prepared by



Dan Duncan
Project Engineer

who is responsible for all data included in this report.

This report was reviewed by



Tom Stucker, Manager
Air Emissions and Toxics Program

who attests to the accuracy and authenticity of this report.

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INTRODUCTION

On July 30, 1992, Brown and Caldwell performed start-up source testing on Boiler #1 at Gibson Oil and Refining Company's Bakersfield, CA facility. The source tests were performed to determine emissions of particulate matter (PM), sulfur oxides (SO_x), nonmethane hydrocarbons (NMHC), nitrogen oxides (NO_x), and carbon monoxide (CO). In addition, the concentrations of the diluent gases, oxygen (O₂) and carbon dioxide (CO₂), were determined. The sampling methods used, the number and duration of the runs performed, and the sample volumes collected per run (if applicable) are given in the table below:

<u>Parameter</u>	<u>Sampling Method</u>	<u>Number of Replicates</u>	<u>Sampling Duration</u>	<u>Sample Volume</u>
CO	CARB 1-100	2	1 hr.	N/A
CO ₂	CARB 1-100	3	1 hr.	N/A
NMHC	EPA 18	3 + FB	20 min.	10 liters
NO _x	CARB 1-100	2	1 hr.	N/A
O ₂	CARB 1-100	3	1 hr.	N/A
PM	EPA 5/8	2 + RB	2 hrs.	60 cu. ft.
SO _x	EPA 5/8	2 + RB	2 hrs.	60 cu. ft.

Note: FB - field blank; RB - reagent blanks

This report contains the results of the tests performed on site, as well as all raw data used to generate those results.

RESULTS SUMMARY

Parameter	RUN 1	RUN 2	AVERAGE
SOx/Particulate Sampling			
Duct Conditions:			
Date	7/30/92	7/30/92	
Time	917-1215	1323-1526	
Temperature, °F	476	480	478
Abs. Press., in Hg	29.46	29.37	29.41
Velocity, ft/sec	25.9	24.0	24.9
% Isokinetic	103.4	100.4	101.9
Volume Flow Rate			
ACFM	2742	2548	2645
SDCFM	1265	1168	1216
% H ₂ O	16.9	16.8	16.8
Fixed Gases			
%O ₂ vol.dry	3.4	3.5	3.45
%CO ₂ vol. dry	10.0	9.8	9.9
%N ₂ vol.dry	86.6	86.7	86.7
SOx/Particulate Concentrations			
Total Filterable, gr/SDCF	6.89E-05	4.10E-04	2.39E-04
Condensable, gr/SDCF	2.87E-03	2.15E-03	2.51E-03
H ₂ SO ₄ , ppm	0.02	0.06	0.04
SO ₃ , ppm	0.72	0.55	0.64
SO ₂ , ppm	1.56	1.27	1.41
SOx/Particulate Emission Rates			
Total Filterable, lb/hr	0.0007	0.0041	0.0024
Condensable, lb/hr	0.031	0.022	0.026
H ₂ SO ₄ , lb/hr	2.80E-04	7.60E-04	5.20E-04
SO ₃ , lb/hr	0.011	0.008	0.010
SO ₂ , lb/hr	0.020	0.015	0.017

0.0389 PM =

0.0024
0.026
0.0005
0.01
0.0389 = 0.039 14 hr.
212

RESULTS SUMMARY (cont)

Parameter	RUN 1	RUN 2	RUN 3	AVERAGE
Continuous Emissions Monitoring				

Date	7/30/92	7/30/92	7/30/92	
Time	1020-1122	1136-1235	1324-1423	

Stack Gas Concentrations

CO, ppm	0.0	0.0	-	0.0
CO2, % vol. dry	10.0	9.9	9.9	10.0
NOx, ppm	140.2	143.6	-	141.9
O2, % vol. dry	3.5	3.7	3.6	3.6

Stack Gas Emission Rates

CO, lb/hr	0.0	0.0	-	0.0
NOx, lb/hr	1.27	1.30	-	1.285

Hydrocarbon Sampling

Date	7/30/92	7/30/92	7/30/92	
Time	1034-1052	1155-1215	1340-1400	

Hydrocarbon Concentrations

Methane, ppm	2.3	1.3	2.2	1.9
Ethane, ppm	< 0.1	< 0.1	< 0.1	< 0.1
Propane, ppm	< 0.1	< 0.1	< 0.1	< 0.1
Butanes, ppm	< 0.1	< 0.1	< 0.1	< 0.1
Pentanes, ppm	< 0.1	< 0.1	< 0.1	< 0.1
Hexanes +, ppm	0.2	0.3	0.1	0.2
Total NMHC as C1, ppm	1	1	1	1

Hydrocarbon Emission Rates

Methane, lb/hr	0.007	0.004	0.006	0.006
Ethane, lb/hr	< 0.0006	< 0.0006	< 0.0005	< 0.0006
Propane, lb/hr	< 0.0009	< 0.0009	< 0.0008	< 0.0009
Butanes, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001
Pentanes, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001
Hexanes +, lb/hr	0.003	0.005	0.002	0.003
Total NMHC, lb/hr	0.002	0.002	0.002	0.002

EPA Method 5/8

The apparatus consists of an EPA 5 particulate train with the following modifications: Impinger 1 contains 100 ml of 80% isopropanol (IPA), impingers 2 and 3 contain 100 ml of 3% H₂O₂, and an unheated demister filter is placed between impingers 1 and 2.

The sample recovery scheme is as follows:

Container 1 - The heated particulate filter is placed in a petri dish labelled Rx-1, where x denotes run number or "b" for blank.

Container 2 - The probe and nozzle are rinsed 3 times each with 80% IPA; these rinses are recovered in a sample bottle labelled Rx-2, as above. The liquid level is marked to determine if leakage occurs during transport.

Container 3 - The first impinger is weighed and then the contents are poured into a 500 ml volumetric flask. Both the impinger and the sample line are rinsed with 80% IPA and these rinses are added to the flask. In addition, the demister filter is rinsed with 50 ml of deionized, distilled water and this rinse is added to the flask. The flask is then brought up to volume with 80% IPA. The contents of the flask are then transferred to a sample bottle labelled Rx-3, as above. The liquid level is marked to determine if leakage occurs during transport.

Container 4 - The second and third impingers are weighed and then their contents are poured into a 1000 ml volumetric flask. Both impingers are then rinsed with deionized, distilled water and these rinses are added to the flask. The flask is then brought up to volume with deionized, distilled water. The contents of the flask are then transferred to a sample bottle labelled Rx-4, as above. The liquid level is marked to determine if leakage occurs during transport.

The analysis scheme is as follows:

Container 1 - The filter is oven dried for 2-3 hours at 105 C, dessicated, and weighed to a constant weight.

Container 2 - The probe and nozzle rinses are poured into a tared dish and dried on a warm plate. The dish is then dessicated and weighed to a constant weight. The residue in the dish is reconstituted with 100 ml of 80% IPA and the resulting solution is submitted for sulfate analysis by ion chromatography. The net weight increase in the dish is combined with the net increase in the weight of the filter to get the net filterable particulate in the sample. The sulfate found in the solution is attributable to the amount of sulfuric acid recovered in the sample.

Container 3 - The contents of the sample are split 1:1 into bottles labelled Rx-3a and Rx-3b (as above). Sample 3a is analyzed for sulfate by ion chromatography. Sample 3b is poured into a tared dish and dried, dessicated, and weighed as above. The sulfate found in the solution is attributable to the amount of sulfur trioxide in the sample. The net weight increase in the dish is attributable to the amount of condensable particulate in the sample.

Container 4 - The contents of the sample are submitted for sulfate analysis by ion chromatography. The sulfate found in the solution is attributable to the amount of sulfur dioxide in the sample.

In addition to the samples, a reagent blank is prepared and analyzed for each sample fraction. The results from these analyses are used to correct the sample results for matrix effects and possible trace levels of sulfate in the reagents.

CALCULATIONS

Ref: Code of Federal Regulations, Title 40, Part 60

Symbols:

Subscripts d, m, and w denote duct, dry gas meter, and wet respectively
Subscripts std, bar and avg denote standard, barometric and average

A=area, square feet

Cp=pitot tube correction, dimensionless

Dp=velocity pressure head, inches H₂O

ER=emission rate of pollutant, lb/hr

gr/SDCF=pollutant concentration, gr/sdcf

lb/hr=pollutant emission rate, lb/hr

mg=mass of analyte in sample fraction, mg

M_{H₂O}=mass of water condensed, g

MW= molecular weight of duct gas, g/mole

NO_{x15}=ppm NO_x corrected to 15% Oxygen, ppm

P=absolute pressure, inches Hg

ppm=concentration (vol. dry) of gaseous pollutant, parts per million

Q=volume flow rate, CFM

SDCFM=Volume flow rate of stack effluent, ft³/min

T=absolute temperature, °R

V=net sample volume, ft³

v=velocity, feet/second

Y=dry gas meter correction factor, dimensionless

Y_i= mole fraction of component sampled

mole % (dry)/100 for CO₂, O₂, CO and N₂ (from Orsat analysis)

mole %/100 for H₂O (from percent water determination)

%H₂O=duct gas water content, percent volume

%Oxygen=concentration (vol. dry) of oxygen, percent

Equations:

Percent Water:

$$\% \text{H}_2\text{O} = 100 * V_w / (V_w + V_{mstd})$$

where

$$V_w = 0.04715 * M_{\text{H}_2\text{O}}$$

and

$$V_{mstd} = 17.64 * V_m * Y * P_m / T_m.$$

Molecular weight:

$$MW(\text{dry}) = [E_i(Y_i * MW_i)] = [(Y_{\text{CO}_2} * 44) + (Y_{\text{O}_2} * 32) + ((Y_{\text{N}_2} + Y_{\text{CO}}) * 28)]$$

$$MW(\text{wet}) = [E_i(Y_i * MW_i)] * (1 - Y_{\text{H}_2\text{O}}) + (Y_{\text{H}_2\text{O}} * 18)$$

Duct gas velocity at any traverse point:

$$v_d = 85.49 * C_p * [(T_d * D_p) / (P_d * MW)]^{0.5}$$

Duct gas volume flow rate:

$$Q_d = 60 * v_d(\text{avg}) * A_d = \text{ACFM}$$

$$Q_{\text{std(wet)}} = Q_d * T_{\text{std}} / T_d(\text{avg}) * P_d / P_{\text{std}} = \text{SCFM}$$

$$Q_{\text{std(dry)}} = Q_{\text{std(wet)}} * (1 - \% \text{H}_2\text{O} / 100) = \text{SDCFM}$$

Net mg of Particulate/Sulfur Compound Equations:

(Note: The following may include blank corrections and/or aliquot factors and/or molecular weight corrections specific to this project)

$$\text{mg filt} = (\text{Net filter weight gain}) - (\text{Blank filter weight gain}) + (\text{Net container 2 dish weight gain}) - (\text{Blank container 2 dish weight gain})$$

$$\text{mg cond} = (\text{Net container 3b dish weight gain}) - (\text{Blank container 3b dish weight gain}) * 2$$

$$\text{mg H}_2\text{SO}_4 = (\text{mg SO}_4 \text{ in container 2}) * 98/96$$

Equations (cont):

Net mg of Particulate/Sulfur Compound Equations

$$\text{mg SO}_3 = (\text{mg SO}_4 \text{ in container 3a}) * 80/96 * 2$$

$$\text{mg SO}_2 = (\text{mg SO}_4 \text{ in container 4}) * 64/96$$

Particulate/Sulfur Compound Concentration:

$$\text{gr/SDCF}_i = \text{mg}_i * 0.0154 / V_{m\text{std}}$$

$$\text{ppm}_i = \text{mg}_i * 1000 * 0.8494 / V_{m\text{std}} / \text{MW}_i$$

Particulate/Sulfur Compound Emission Rate:

$$\text{lb/hri} = \text{gr/SDCF}_i * 0.00858 * \text{SDCFM} \quad \text{or}$$

$$\text{lb/hr}_i = \text{mg}_i * 0.0154 / V_{m\text{std}} * 0.00858 * \text{SDCFM}$$

EPA 5/8 Data

CLIENT: Gibson
DATE: 7/30/92
UNIT: Boiler 1
SITE: Outlet

Variables	Units	Symbol	Run 1	Run 2	Avg
Moisture Data					
Init dgm reading	dcf	Vi	1148.336	225.855	
Final dgm reading	dcf	Vf	219.333	290.838	
Dgm cal factor	(Dim-less)	Yd	1.0172	1.0172	
Avg meter temp.	F	Tm avg	101	111	106
Avg orifice press. drop	inches H2O	Del H avg	1.1	0.89	0.995
Barometric pressure	inches Hg.	Pbar	29.46	29.37	29.415
Stack static pressure	inches H2O	Pstatic	-0.01	-0.01	-0.01
Mass of liquid condensed	grams	Mlc	288.5	258.0	
Stack CO2 conc.	% vol. dry	%CO2	10	9.8	9.9
Stack O2 conc.	% vol. dry	%O2	3.4	3.5	3.45
Velocity Data					
Pitot Tube Coefficient	(Dim-less)	Cp	0.84	0.84	
Avg of sq. rts of vel. heads	(in. H2O) ^{0.5}	N/A	0.3366	0.3115	
Avg stack temp.	F	Ts avg	476	480	
Stack config., c / r	N/A	N/A	c	c	
Stack Diameter (if appl.)	inches	Di	18.0	18.0	
Stack Width (if appl.)	inches	W	0	0	
Stack Depth (if appl.)	inches	De	0	0	
Particulate Data					
Net Sample Time	minutes	Theta	120	120	
Nozzle diameter	millimeters	Dia	9.45	9.45	
Total Filt. catch wt.	milligrams	mg filt	0.3	1.6	1.0
Cond. catch wt.	milligrams	mg cond	12.5	8.4	10.5
H2SO4 catch wt.	milligrams	mg H2SO4	0.112	0.296	0.204
SO3 catch wt.	milligrams	mg SO3	4.54	3.13	3.83
SO2 catch wt.	milligrams	mg SO2	7.87	5.74	6.80

(Continued on following page)

EPA 5/8 Results (cont)

Variables	Units	Symbol	Run 1	Run 2	Avg
Results					
Net sample volume	dscf	Vm(std)	67.082	60.109	63.595
Stack pressure	inches Hg.	Pstack	29.459	29.369	29.414
Stack Moisture	% (v/v)	Bws*100	16.9	16.8	16.8
Avg wet mol. wt.	g/g-mole	Ms	27.8	27.7	27.7
Avg stack gas vel.	ft/sec	vs	25.9	24.0	24.9
Stack cross-sect. area	square feet	A	1.77	1.77	1.77
Stack gas vol. flow rate	cf/min	ACFM	2742	2548	2645
Stack gas vol. flow rate	scf/min	SCFM	1522	1404	1463
Stack gas vol. flow rate	dscf/min	SDCFM	1265	1168	1216
Isokinetic samp. rate	percent	%I	103.4	100.4	101.9
Total Filt. conc.	gr/SDCF	gr/SDCF filt	6.89E-05	4.10E-04	2.39E-04
Cond. conc.	gr/SDCF	gr/SDCF cond	2.87E-03	2.15E-03	2.51E-03
H2SO4 conc.	ppm	ppm H2SO4	0.02	0.06	0.04
SO3 conc.	ppm	ppm SO3	0.72	0.55	0.64
SO2 conc.	ppm	ppm SO2	1.56	1.27	1.41
Total Filt. emission rate	lb/hr	lb/hr filt	0.0007	0.0041	0.0024
Cond. emission rate	lb/hr	lb/hr cond	0.031	0.022	0.026
H2SO4 emission rate	lb/hr	lb/hr H2SO4	2.80E-04	7.60E-04	5.20E-04
SO3 emission rate	lb/hr	lb/hr SO3	0.011	0.008	0.010
SO2 emission rate	lb/hr	lb/hr SO2	0.020	0.015	0.017

Continuous Emissions Monitoring

Brown and Caldwell 1-minute average readings:
Run #1, 7/30/92

Time	Out O2	NOx	CO	CO2
	% vd	ppm vd	ppm vd	% vd
1020	3.3	141.3	-0.8	10.0
1021	3.4	141.1	-0.7	10.1
1022	3.4	142.1	-0.8	10.1
1023	3.3	143.5	-0.8	10.1
1024	3.3	143.7	-0.8	10.1
1025	3.2	145.1	-0.8	10.1
1026	3.3	144.7	-0.7	10.1
1027	3.3	144.6	-0.8	10.1
1028	3.3	143.9	-0.8	10.1
1029	3.4	140.6	-0.8	10.0
1030	3.5	140.8	-0.8	10.0
1031	3.3	142.9	-0.8	10.1
1032	3.3	143.7	-0.8	10.0
1033	3.2	145.1	-0.7	10.1
1034	3.2	144.0	-0.8	10.1
1035	3.5	140.4	-0.8	9.9
1036	3.6	138.8	-0.8	9.9
1037	3.4	144.2	-0.8	10.2
1038	3.6	136.7	-0.8	9.8
1039	3.7	139.1	-0.8	9.9
1040	3.4	142.3	-0.8	10.1
1041	3.4	141.8	-0.8	10.1
1042	3.4	141.6	-0.8	10.1
1043	3.4	141.4	-0.8	10.1
1044	3.4	141.0	-0.8	10.0
1045	3.6	137.3	-0.8	9.8
1046	3.5	139.5	-0.8	9.9
1047	3.4	140.9	-0.8	10.1
1048	3.4	141.3	-0.8	10.0
1049	3.4	140.7	-0.8	10.0

Continuous Emissions Monitoring

Brown and Caldwell 1-minute average readings:
Run #1, 7/30/92 (cont)

Time	Out O2	NOx	CO	CO2
	% vd	ppm vd	ppm vd	% vd
1050	3.6	136.9	-0.8	9.9
1051	3.6	138.0	-0.8	9.9
1052	3.6	137.9	-0.9	9.9
1053	3.5	137.5	-0.8	9.9
1054	3.5	138.8	-0.8	10.0
1058	3.3	140.5	-0.8	10.1
1059	3.4	140.4	-0.9	10.1
1100	3.5	138.7	-0.9	10.0
1101	3.7	134.1	-0.9	9.9
1102	3.8	132.0	-0.9	9.8
1103	3.7	136.2	-0.9	9.9
1104	3.6	137.0	-0.9	9.8
1105	3.7	137.0	-0.9	9.9
1106	3.6	137.1	-0.9	10.0
1107	3.6	136.3	-0.9	9.8
1108	3.6	135.8	-0.9	9.9
1109	3.7	133.9	-0.9	9.8
1110	3.5	136.8	-0.9	10.0
1111	3.5	136.6	-0.9	9.9
1112	5.0	127.2	-0.8	9.0
1113	3.7	140.2	-0.9	10.0
1114	3.2	142.5	-0.9	10.1
1115	3.2	142.5	-0.9	10.2
1116	3.2	143.3	-0.9	10.1
1117	3.2	142.9	-0.9	10.1
1118	3.3	142.4	-0.9	10.1
1119	3.3	143.1	-0.9	10.0
1120	3.2	143.7	-0.9	10.1
1121	3.2	143.7	-0.9	10.1
1122	3.2	144.5	-0.9	10.1
Avg:	3.5	140.2	-0.8	10.0

Continuous Emissions Monitoring

Brown and Caldwell 1-minute average readings:
Run #2, 7/30/92

Time	Out O2	NOx	CO	CO2
	% vd	ppm vd	ppm vd	% vd
1136	3.4	140.0	-0.8	10.0
1137	3.6	137.6	-0.8	9.9
1138	3.4	141.8	-0.8	10.1
1139	3.4	143.5	-0.8	10.0
1140	3.4	144.5	-0.7	10.0
1141	3.4	144.2	-0.7	10.0
1142	3.4	144.2	-0.8	10.0
1143	3.3	145.6	-0.7	10.0
1144	3.4	143.9	-0.8	10.0
1145	3.5	143.4	-0.8	10.0
1146	3.5	143.9	-0.8	9.9
1147	3.4	146.1	-0.8	10.1
1148	3.5	141.6	-0.8	9.9
1149	3.8	137.8	-0.8	9.8
1150	3.7	139.9	-0.8	9.9
1151	3.5	143.3	-0.8	9.9
1152	3.4	145.0	-0.8	10.1
1153	3.4	142.6	-0.8	10.0
1154	3.9	135.2	-0.8	9.7
1155	3.9	136.6	-0.8	9.7
1156	3.7	139.7	-0.8	9.9
1157	3.4	143.8	-0.8	10.0
1158	3.4	144.7	-0.8	10.0
1159	3.4	144.0	-0.8	9.9
1200	3.4	143.7	-0.8	10.0
1201	3.4	143.9	-0.8	10.0
1202	3.4	144.1	-0.8	10.0
1203	3.5	144.3	-0.8	9.9
1204	3.4	144.9	-0.8	10.0
1205	3.4	145.4	-0.8	9.9

Continuous Emissions Monitoring

Brown and Caldwell 1-minute average readings:
Run #2, 7/30/92 (cont)

Time	Out O2	NOx	CO	CO2
	% vd	ppm vd	ppm vd	% vd
1206	3.5	145.4	-0.8	10.0
1207	3.5	145.6	-0.8	10.0
1208	3.4	146.2	-0.8	10.0
1209	3.4	146.2	-0.8	10.1
1210	3.5	145.3	-0.8	10.0
1211	3.4	146.0	-0.8	10.0
1212	3.4	147.4	-0.8	10.0
1213	3.4	146.9	-0.8	10.0
1214	3.5	145.3	-0.8	9.9
1215	3.4	145.2	-0.8	9.9
1216	3.7	141.4	-0.8	9.8
1217	5.9	123.4	-0.8	8.3
1218	6.4	124.4	-0.8	8.4
1219	5.8	132.1	-0.8	8.9
1220	4.8	137.1	-0.8	9.1
1221	6.0	130.8	-0.8	8.5
1222	5.3	144.0	-0.7	9.2
1223	3.1	158.3	-0.7	10.3
1224	3.1	154.1	-0.8	10.2
1225	3.2	150.8	-0.8	10.1
1226	3.2	150.8	-0.8	10.1
1227	3.3	148.3	-0.8	10.1
1228	3.4	147.6	-0.8	10.0
1229	3.4	148.4	-0.8	10.1
1230	3.4	148.6	-0.8	10.1
1231	3.4	148.9	-0.8	10.1
1232	3.5	147.1	-0.9	10.0
1233	3.4	148.2	-0.9	10.1
1234	3.5	145.7	-0.9	10.0
1235	3.5	147.5	-0.8	10.0
Avg:	3.7	143.6	-0.8	9.9

Continuous Emissions Monitoring

Brown and Caldwell 1-minute average readings:
Run #3, 7/30/92

Time	Out O2	CO2
	% vd	% vd
1324	3.6	10.0
1325	3.5	10.0
1326	3.5	10.0
1327	3.6	9.9
1328	3.7	9.9
1329	3.6	9.9
1330	3.6	9.9
1331	3.8	9.9
1332	3.8	9.9
1333	3.6	9.8
1334	3.6	10.0
1335	3.5	9.9
1336	3.7	9.8
1337	3.6	10.0
1338	3.5	10.0
1339	3.3	10.1
1340	3.3	10.0
1341	3.4	10.0
1342	3.5	10.0
1343	3.5	10.0
1344	3.6	9.9
1345	3.5	10.0
1346	3.6	10.0
1347	3.6	9.9
1348	3.6	9.9
1349	3.6	9.9
1350	3.6	9.8
1351	3.2	9.9
1352	2.7	10.3
1353	2.9	10.5

Continuous Emissions Monitoring

Brown and Caldwell 1-minute average readings:
Run #3, 7/30/92 (cont)

Time	Out O2	CO2
	% vd	% vd
1354	3.0	10.4
1355	3.0	10.2
1356	3.0	10.3
1357	3.0	10.3
1358	3.1	10.3
1359	3.3	10.3
1400	3.5	10.2
1401	3.6	9.9
1402	3.6	9.8
1403	3.7	9.9
1404	3.8	9.9
1405	3.9	9.7
1406	3.8	9.7
1407	3.9	9.7
1408	3.9	9.8
1409	3.8	9.7
1410	3.8	9.8
1411	3.9	9.8
1412	4.0	9.7
1413	3.9	9.7
1414	4.0	9.7
1415	3.7	9.7
1416	3.8	9.9
1417	4.0	9.8
1418	3.9	9.7
1419	3.9	9.8
1420	4.0	9.7
1421	4.4	9.5
1422	3.8	9.6
1423	3.6	9.8
Avg:	3.6	9.9

1290 COMBERMERE STREET, TROY, MICHIGAN 48064 (313) 589-2950

Customer :

C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE, IL. 60067

*** CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES ***

PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability

Protocol # 1

File # PD 3449

Certified Accuracy 1 % NBS Traceable

Our Project # : 337478

Your P.O.# : 5446-71300

Expiration Date : 12-08-93

Cylinder Number : ALN-028532

Cylinder Pressure : 1900 psig

ANALYZED CYLINDER

INSTRUMENTATION

LAST CALIBRATION DATE

INSTR/MODEL/SERIAL #

ANALYTICAL PRINCIPLE

5-7-92

BECKMAN

PARAMAGNETIC

951A

270-0828998

CONC.

10.08 %

1.97 %

AAI-18515

FF26982

2658

2657A

10.14 %

10.08 %

NITROGEN

10.14 %

ANALYSIS

DATE : 6-1-92

ANALYSIS

TEST

GAS

RESULTS

CONC.

REFERENCE

GAS

RESULTS

CONC.

(mV)

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

10.14

ANALYSIS

DATE : 6-1-92

CALIBRATION CURVE

1 st DEGREE

SRM # CONC. SPLIT DIVN FITTED PERCENT

(CRM #) % PT (Z) (mV) VALUE ERROR

2658 10.08 100 100.00 10.08 0.00

2657A 1.97 20 19.50 1.97 -0.14

0.00 0 0.00 0.00 0.00

0 0 0 0.00 0.00

0 0 0 0.0000 0.00

0 0 0 0.00 0.00

2657A 1.97 LOW 19.50 1.97 -0.14

2658 10.08 HIGH 100.00 10.08 0.00

AVERAGE : 10.14 %

ANALYST : J. Shapiro

APPROVED BY : J. Shapiro

ANALYST : J. Shapiro

APPROVED BY : J. Shapiro

ANALYST : J. Shapiro

APPROVED BY : J. Shapiro

ANALYST : J. Shapiro

APPROVED BY : J. Shapiro

ANALYST : J. Shapiro

APPROVED BY : J. Shapiro

ANALYST : J. Shapiro

APPROVED BY : J. Shapiro

ANALYST : J. Shapiro

INTERNAL STANDARD

Approved By :

Analyst :

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

Scott Specialty Gases

Scott Environmental Technology, Inc.

Our Project # : 537478

Year P.O. # : 5446-71500

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

C A E INSTRUMENT RENTAL

246 HOOD WORK LANE

PALATINE IL 60067

*** CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES ***

PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability

Protocol # 1

File # PO-3473

Certified Accuracy 1 % NBS Traceable

Expiration Date : 12-1-93

Cylinder Number : ALM028532

Cylinder Pressure : 1900 psig

ANALYZED CYLINDER

REFERENCE STD

INSTRUMENTATION

LAST CALIBRATION DATE

ANALYTICAL PRINCIPLE

INSTR/MODEL/SERIAL #

CONC.

CYLINDER NUMBER

SRM # (CRM #)

CERTIFIED CONC.

CARBON DIOXIDE

10.10 %

ALM-001324

14.02 %

HORIBA

4-20-92

NON-DISPERSIVE INFRARED

BALANCE GAS : NITROGEN

1675

ALM-004805

18.35 %

PIR-2000

4-20-92

NON-DISPERSIVE INFRARED

ANALYSIS

DATE : 6-1-92

ZERO GAS (mV)	TEST GAS (mV)	RESULTS %	REFERENCE GAS CONC.	RESULTS %
0.00	89.00	10.11	14.02 %	110.50
0.00	89.00	10.11	110.50	14.03
0.00	89.00	10.11	110.50	14.03

CALCULATED

RESULTS

10.10

AVERAGE : 10.10 %

CALIBRATION CURVE

3 rd DEGREE

SRM # (CRM #)	CONC. %	SPLIT	DVM	FITTED VALUE	PERCENT ERROR
---------------	---------	-------	-----	--------------	---------------

6M18	18.35	100	130.00	18.34	-0.00
------	-------	-----	--------	-------	-------

1675	14.02	76	110.50	14.03	0.06
------	-------	----	--------	-------	------

6M18	9.999	55	88.30	9.992	-0.07
------	-------	----	-------	-------	-------

6M18	5.013	27	52.30	5.017	0.07
------	-------	----	-------	-------	------

	0.0000	0	0.00	0.0000	0.00
--	--------	---	------	--------	------

	0	0	0.0000	0.00	0.00
--	---	---	--------	------	------

	0	0	0.00	0.00	0.00
--	---	---	------	------	------

6M18	5.013	LOW	52.30	5.017	0.07
------	-------	-----	-------	-------	------

1675	14.02	HIGH	110.50	14.03	0.08
------	-------	------	--------	-------	------

6M18 - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst :

Approved By :

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.



11-Dec-91
B. C. ANALYTICAL

P.O. NO.: 8752-570
EMERYVILLE, CA

CERTIFICATION OF CYLINDER #CC-64298

COMPONENT:

MEAN CONCENTRATION:

Carbon Monoxide	794 +/- 14 ppm
Sulfur Dioxide	793 +/- 19 ppm
Nitric Oxide	812 +/- 14 ppm
Total NOx	814 ppm
Nitrogen	Balance

Cylinder pressure
Expiration date:

1800 psi
09-Jun-93

This mixture was prepared and analyzed following EPA Revised Traceability Protocol No.1, Section 3.0.4, Procedure G1. The concentration of the Carbon Monoxide was determined by direct comparison with SRM 1681b, S/N CLM-000341, Sample I-49-G, 968 +/- 9 ppm Carbon Monoxide in Nitrogen, dated Jan. 10, 1989. The analysis was performed on a HORIBA AIA-24, NDIR, S/N AIA-56447603, 0-1000 ppm range. The last multipoint calibration was done on Oct. 11, 1991.

The concentration of the Sulfur Dioxide was determined by direct comparison with NBS SRM 1662a, Sample No.:93-9-D, S/N FF-28200, 1013 +/- 10 ppm Sulfur Dioxide in Nitrogen, dated March 19, 1991. The analysis was performed on a Tracor Atlas 825R-D Hydrogen Sulfide Gas Analyzer, and a 856 Total Sulfur Hydrogenator, Serial #3725, with furnace 001419, s/n 9009115 operated at @1265 deg C. The last multipoint range calibration was done on November 12, 1991.

The concentration of the Nitric Oxide was determined by direct comparison with NBS SRM 1687b, Sample No.:41-26-G, S/N CLM-633, 972 +/- 10 ppm Nitric Oxide in Nitrogen, dated June 14, 1991. The analysis was performed on a Beckman 951A chemiluminescent-type analyzer measuring the reaction of Nitric Oxide with Ozone. S/N 00100508, 0-1000 ppm range. The last multipoint calibration was done on November 16, 1991.

M. W. Choi

Analyst

**ALPHAGAZ**

DIVISION OF LIQUID AIR CORPORATION

EPA PROTOCOL NO.1 DATA SHEET COMPONENT: CARBON MONOXIDE 290-1258ppm
NIST SRM 1681b CLM-000341 I-49-G 968 +/- 9 ppm CO in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	12/04/91	12/04/91	12/04/91	12/11/91	12/11/91	12/11/91
UNITS	VDC	VDC	VDC	VDC	VDC	VDC
CLM-341	0.2820	0.2820	0.2820	0.2850	0.2850	0.2850
ZERO	-0.0210	-0.0210	-0.0210	-0.0240	-0.0240	-0.0240
CC-64298	0.2280	0.2280	0.2280	0.2290	0.2290	0.2290

EPA PROTOCOL NO.1 DATA SHEET COMPONENT: CARBON MONOXIDE 290-1258ppm
NIST SRM 1681b CLM-000341 I-49-G 968 +/- 9 ppm CO in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	12/04/91	12/04/91	12/04/91	12/11/91	12/11/91	12/11/91
UNITS	VDC	VDC	VDC	VDC	VDC	VDC
CLM-341	0.2820	0.2820	0.2820	0.2850	0.2850	0.2850
ZERO	-0.0210	-0.0210	-0.0210	-0.0240	-0.0240	-0.0240
CC-64298	0.2280	0.2280	0.2280	0.2290	0.2290	0.2290
ASSAY:	795.49	795.49	795.49	792.57	792.57	792.57
	VALID	VALID	VALID	VALID	VALID	VALID
	TRIADS 4,5,6 MEAN: 795.5			TRIADS 4,5,6 MEAN: 792.6		
	CARBON MONOXIDE			CONCENTRATION IN ppm: 794		

VARIABILITY	VDC	PPM x PPM
ZERO :	0.0005	0.2500
SRM :	0.0090	81.0000
SRMd :	0.0010	1.0000
MIXd :	0.0010	1.0000
LINEARITY :	0.0100	100.0000
TOLERANCE	SQRT SUM :	14 ppm

**ALPHAGAZ**

DIVISION OF LIQUID AIR CORPORATION

EPA PROTOCOL NO.1 DATA SHEET COMPONENT:SULFUR DIOXIDE 304-1317
NBS SRM 1662a FF-28200 93-9-D 1013 +/- 10 ppm SO2 in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	11/04/91	11/04/91	11/04/91	12/11/91	12/11/91	12/11/91
UNITS	VDC X10	VDC X10	VDC X10	VDC X10	VDC X10	VDC X10
FF-28200	9.530	9.500	9.520	9.720	9.730	9.750
ZERO	0.000	0.000	0.000	0.000	0.000	0.000
CC-64298	7.451	7.427	7.456	7.609	7.635	7.651

EPA PROTOCOL NO.1 WORK SHEET COMPONENT:SULFUR DIOXIDE 304-1317
NBS SRM 1662a FF-28200 93-9-D 1013 +/- 10 ppm SO2 in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	11/04/91	11/04/91	11/04/91	12/11/91	12/11/91	12/11/91
UNITS	VDC X10	VDC X10	VDC X10	VDC X10	VDC X10	VDC X10
FF-28200	9.530	9.500	9.520	9.720	9.730	9.750
ZERO	0.000	0.000	0.000	0.000	0.000	0.000
CC-64298	7.451	7.427	7.456	7.609	7.635	7.651
ASSAYS:	792.01	791.95	793.37	793.00	794.89	794.92
	INVALID	INVALID	INVALID	INVALID	INVALID	INVALID
	TRIADS 1,2,3 MEAN:		792.4	TRIADS 4,5,6 MEAN:		794.3
	CONCENTRATION IN ppm:					793

VARIABILITY VDC X10 PPM x PPM
ZERO : 0.0005 0.8724
MIXd : 0.0005 0.8724
LINEARITY : 0.0100 348.94
TOLERANCE SQRT SUM : 19 ppm

**ALPHAGAZ**

DIVISION OF LIQUID AIR CORPORATION

EPA PROTOCOL NO.1 DATA SHEET COMPONENT:NITRIC OXIDE 0-1000ppm
 NBS SRM 1687b:41-26-G,CLM-633 972 +/- 10 ppm NO in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	12/04/91	12/04/91	12/04/91	12/11/91	12/11/91	12/11/91
UNITS	VDC	VDC	VDC	VDC	VDC	VDC
CLM-633	972	973	974	976	977	976
ZERO	0	0	0	0	0	0
CC-64298	818	811	811	814	815	816
TNOx	816	817	816	817	817	817

EPA PROTOCOL NO.1 WORK SHEET COMPONENT:NITRIC OXIDE 285.6 - 1237.6ppm
 NBS SRM 1687b:41-26-G,CLM-633 972 +/- 10 ppm NO in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	12/04/91	12/04/91	12/04/91	12/11/91	12/11/91	12/11/91
UNITS	VDC	VDC	VDC	VDC	VDC	VDC
CLM-633	972	973	974	976	977	976
ZERO	0	0	0	0	0	0
CC-64298	818	811	811	814	815	816
TNOx	816	817	816	817	817	817
ASSAY:	818.00	810.17	809.33	810.66	810.83	812.66
	VALID	VALID	VALID	VALID	VALID	VALID
	TRIADS 1,2,3 MEAN:		812.5	TRIADS 4,5,6 MEAN:		811.4
			CONCENTRATION IN ppm:			
			812			
VARIABILITY	VDC	PPM x PPM	TOTAL NOx IN ppm:		814	
ZERO :	0.0001	0.0100				
SRM :	0.0100	100.0000				
SRMd :	0.0001	0.0100				
MIXd :	0.0001	0.0100				
LINEARITY :	0.0100	100.0000				
TOLERANCE	SQRT SUM :		14 ppm			



23-Jan-92
ALPHAGAZ LACAL -FREMONT

P.O.#: 190122391
FREMONT, CA

CERTIFICATION OF CYLINDER # CC-38378

COMPONENT:

MEAN CONCENTRATION:

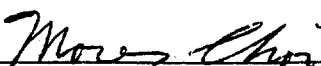
Carbon Monoxide	79.8 +/- 2.7 ppm
Nitric Oxide	77.0 +/- 1.5 ppm
Total NOx	78.5 ppm
Sulfur Dioxide	81.3 +/- 2.2 ppm
Nitrogen	Balance

Cylinder pressure: 1800 psi
Expiration date: 25-Jul-92

This mixture was prepared and analyzed following EPA Revised Traceability Protocol No.1, Section 3.0.4, Procedure G1. The concentration of the Carbon Monoxide was determined by direct comparison with NBS SRM 1679b, Sample No.:3-45-F, S/N FF-19983, 95.4 +/- 0.9 ppm Carbon Monoxide in Nitrogen, dated Jan. 22, 1988. The analysis was performed on a HORIBA AIA-24, NDIR, S/N AIA-56447603, 0-250 ppm range. The last multipoint calibration was done on Dec. 5, 1991.

The concentration of the Nitric Oxide was determined by direct comparison with NIST SRM 1684b, Sample No.:44-47-N, S/N: CLM-2233, 95.1 +/- 1.1 ppm Nitric Oxide in Nitrogen, date October 990. The analysis was performed on a Beckman 951A chemiluminescent-type analyzer measuring the reaction of Nitric Oxide with Ozone. S/N 00100508, 0-100 ppm range. The last multipoint calibration was done on November 16, 1991.

The concentration of the Sulfur Dioxide was determined by direct comparison with NIST SRM 1694a, Sample No.:95-9-D, S/N FF28675, 95.7 +/- 2.0 ppm Sulfur Dioxide in Nitrogen, dated February 06, 1991. The analysis was performed on a Tracor Atlas 825R-D Hydrogen Sulfide Gas Analyzer, and a 856 Total Sulfur Hydrogenator, Serial #3725, with furnace 001373, s/n 9009139 operated at @1265 deg C. The last multipoint range calibration was done on November 9, 1991.


Authorized signature

**ALPHAGAZ**

DIVISION OF LIQUID AIR CORPORATION

EPA PROTOCOL NO.1 DATA SHEET COMPONENT: CARBON MONOXIDE 28.6-124ppm
NBS SRM 1679b:3-45-F, FF-19983, 95.4 +/- 0.9ppm CO in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	01/13/92	01/13/92	01/13/92	01/23/92	01/23/92	01/23/92
UNIT	VDC	VDC	VDC	VDC	VDC	VDC
FF-19983	0.8290	0.8280	0.8290	0.8620	0.8630	0.8630
ZERO	-0.0020	-0.0020	-0.0020	0.0310	0.0310	0.0310
CC-38378	0.6920	0.6930	0.6930	0.7250	0.7260	0.7270

EPA PROTOCOL NO.1 WORK SHEET COMPONENT: CARBON MONOXIDE 28.6-124ppm
NBS SRM 1679b:3-45-F, FF-19983, 95.4 +/- 0.9ppm CO in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6	
DATE	01/13/92	01/13/92	01/13/92	01/23/92	01/23/92	01/23/92	
UNIT	VDC	VDC	VDC	VDC	VDC	VDC	
FF-19983	0.8290	0.8280	0.8290	0.8620	0.8630	0.8630	
ZERO	-0.0020	-0.0020	-0.0020	0.0310	0.0310	0.0310	
CC-38378	0.6920	0.6930	0.6930	0.7250	0.7260	0.7270	
ASSAY:	79.67	79.88	79.79	79.67	79.69	79.81	
VALID	VALID	VALID	VALID	VALID	VALID	VALID	
TRIADS 1,2,3 MEAN:			79.78	TRIADS 4,5,6 MEAN:			79.72
CARBON MONOXIDE			CONCENTRATION IN ppm:			79.8	

VARIABILITY	VDC	PPM x PPM
ZERO :	0.0002	0.0025
SRM :	0.0036	0.8100
SRMd :	0.0002	0.0025
MIXd :	0.0002	0.0025
LINEARITY :	0.0100	6.2500
TOLERANCE	SQRT SUM :	2.7 ppm



EPA PROTOCOL NO.1 DATA SHEET COMPONENT: NITRIC OXIDE 28.5-124ppm
 NIST SRM 1684b: 44-47-N, CLM-002233 95.1 +/- 1.1 NO in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	01/13/92	01/13/92	01/13/92	01/23/92	01/23/92	01/23/92
UNITS	VDC	VDC	VDC	VDC	VDC	VDC
CLM-2233	95.1	95.2	95.0	95.1	95.2	95.3
ZERO	0.0	0.0	0.0	0.1	0.1	0.1
CC-38378	76.9	77.1	77.0	77.2	77.0	77.1
TNOx	78.8	78.9	79.0	78.0	78.3	78.4

EPA PROTOCOL NO.1 DATA SHEET COMPONENT: NITRIC OXIDE 28.5-124ppm
 NIST SRM 1684b: 44-47-N, CLM-002233 95.1 +/- 1.1 NO in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	01/13/92	01/13/92	01/13/92	01/23/92	01/23/92	01/23/92
UNITS	VDC	VDC	VDC	VDC	VDC	VDC
CLM-2233	95.1	95.2	95.0	95.1	95.2	95.3
ZERO	0.0	0.0	0.0	0.1	0.1	0.1
CC-38378	76.9	77.1	77.0	77.2	77.0	77.1
TNOx	78.8	78.9	79.0	78.0	78.3	78.4
ASSAY:	76.90	77.02	77.08	77.18	76.90	76.92
VALID	VALID	VALID	VALID	VALID	VALID	VALID
TRIADS 1,2,3 MEAN:	77.00			TRIADS 4,5,6 MEAN: 77.00		
NITRIC OXIDE			CONCENTRATION in ppm: 77.0			
VARIABILITY	VDC	PPM x PPM	TOTAL NOx in ppm: 78.5			
ZERO :	0.0005	0.0025				
SRM :	0.0110	1.2100				
SRMd :	0.0020	0.0400				
MIXd :	0.0020	0.0400				
LINEARITY :	0.0100	1.0000				
TOLERANCE	SQRT SUM :		1.5 ppm			

**ALPHAGAZ**

DIVISION OF LIQUID AIR CORPORATION

EPA PROTOCOL NO.1 DATA SHEET COMPONENT:SULFUR DIOXIDE 28.7-124.4
NIST SRM 1694a FF28675 95-9-D 95.7 +/- 2.0 ppm SO2 in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	01/10/92	01/10/92	01/10/92	01/23/92	01/23/92	01/23/92
UNITS	VDC X10	VDC X10	VDC X10	VDC X10	VDC X10	VDC X10
FF28675	7.950	7.970	7.980	8.010	8.020	8.030
ZERO	0.000	0.000	0.000	0.000	0.000	0.000
CC-38378	6.760	6.770	6.780	6.820	6.810	6.800

EPA PROTOCOL NO.1 DATA SHEET COMPONENT:SULFUR DIOXIDE 28.7-124.4
NIST SRM 1694a FF28675 95-9-D 95.7 +/- 2.0 ppm SO2 in N2

	TRIAD #1	TRIAD #2	TRIAD #3	TRIAD #4	TRIAD #5	TRIAD #6
DATE	01/10/92	01/10/92	01/10/92	01/23/92	01/23/92	01/23/92
UNITS	VDC X10	VDC X10	VDC X10	VDC X10	VDC X10	VDC X10
FF28675	7.950	7.970	7.980	8.010	8.020	8.030
ZERO	0.000	0.000	0.000	0.000	0.000	0.000
CC-38378	6.760	6.770	6.780	6.820	6.810	6.800
ASSAYS:	81.38	81.29	81.31	81.48	81.26	81.04
	VALID	VALID	VALID	VALID	VALID	VALID
TRIADS 1,2,3 MEAN:	81.3			TRIADS 4,5,6 MEAN:	81.3	
				CONCENTRATION IN ppm:	81.3	

VARIABILITY	VDC	PPM x PPM
ZERO :	0.0050	0.2500
SRM :	0.0200	4.0000
SRMd :	0.0050	0.2500
MIXd :	0.0050	0.2500
TOLERANCE	SQRT SUM :	2.2 ppm

BAG SAMPLING FIELD DATA SHEET

Client: Gibson
Project #: 7028-01

Site: Boiler #1 Exhaust
Date: 7/30/92

<u>Sample ID</u>	<u>Start Time</u>	<u>Stop Time</u>	<u>Comments</u>
R1-EPA18-1	0940 restorable 1034 - 1052	-0942	Concurrent w/ run 1 method 5/8 Pretest leak check Dead @ 5" H ₂ O
R2-EPA18-1	1155 - 1215		Pretest leak check Dead @ 5" H ₂ O
R3-EPA18-1	1340 - 1400		Pretest leak check ≤ 0.01" H ₂ O/min @ 5" H ₂ O

FIELD DATA EPA METHOD 5/8 for Particulate/50x

Page 1 of 2

Project Gibson Oil 70.8.01
 Client Gibson Oil
 City, State Bakersfield, CA
 Site Outlet Baler #1
 Date 7-30-92
 Run Number 1
 Stack Diameter, in. 18
 Coupling Length, in. 18
 Number of Ports C/R 2
 Points per Port 40
 Minutes per Point 250

Ambient Temp 85+ deg F
 Barometric (Pbar) 29.40 in Hg
 Static (Pstat) -0.01 in H2O
 Pitot Tube (Cp) 0.84
 Probe Length 3 ft
 Probe Liner Plex
 Probe Heater 248 deg F
 Assumed Moisture 14.4 % H2O
 Train ID A Operator SC
 LCD Meter No. 787 Avg Y 1.0172
 Pump No. 1
 Heater Box No. Temp 248 deg F

Nozzle ID No. P89007
 Nozzle Diameter 9.45 mm
 Initial Leak 0.008 CFM @ 6 in Hg
 Final Leak 0.008 CFM @ 4 in Hg
 Filter Type QMA No. 12
 Target: 0.0 CF in 120 min
 Remarks: 0.13.20 - Vapor 12.0.11.4.5.8.6.4
SWT in

Trav Point No.	Time		Vacuum ("Hg)	Stack Temp (deg F)	Meter Temp (deg F)		Delta P ("H2O)	Delta H ("H2O)		Last Impinger (deg F)	Probe Temp (F)	Filter Temp (F)	Meter Volume (CF)
	Clock (24 hr)	Sample (θ, min)			In	Out		Calc	Act				
6	917-0830	15-130		464	82	81	0.13	1.20(0.61)				Initial	148.336
6	935-35	130-140	3.5	472	84	83	0.13	1.20(0.61)	1.20	64	240	270	149.311
6	108-05	140-150	3.5	477	97	96	0.14	1.36(0.65)	1.36	65	270	271	152.563
5	1021-	10-20	4	479	101	89	0.13	1.25(0.60)	1.25	61	272	274	154.4
4	1031-	20-30	3.5	483	104	91	0.11	1.23(0.55)	1.02	58	270	272	160.7
3	1041-	30-40	3.5	483	105	95	0.11	1.03(0.58)	1.03	62	284	281	166.4
2	1051-	40-50	3.5	481	101	96	0.12	1.15(0.60)	1.15	65	235	228	172.7
1	1101-	50-60	3.5	451	108	99	0.11	1.10(0.59)	1.10	65	269	267	178.2
	1111 off	change parts											184.245
6	1115-57	60-70	4	471	106	101	0.14	1.42(0.66)	1.42	64	270	262	190.9
5	1125	70-80	4	477	102	100	0.15	1.24(0.63)	1.29	59	284	240	197.4
4	1135	80-90	4	481	107	101	0.12	1.18(0.61)	1.18	59	271	225	203.6
3	1145	90-100	3	481	109	102	0.08	0.74(0.50)	0.74	63	247	258	208.7
2	1155	100-110	3	478	106	103	0.10	0.94(0.56)	0.94	62	252	252	214.3
1	1205-	110-120	3	470	107	103	0.08	0.75(0.50)	0.75	66	259	269	

1215

final 219.333

Project 7088-01
Client GIBSON
City, State Baker, WA
Site GIBSON Boiler #1
Date 7-30-92
Run Number 2
Stack Diameter, in. 18
Coupling Length, in. 13
Number of Ports C/R 20
Points per Port 6
Minutes per Point 10

Ambient Temp 95.4 deg F
Barometric (Pbar) 29.37 in Hg
Static (Pstat) -0.01 in H2O
Pitot Tube (Cp) 0.54 ft
Probe Length 3 ft
Probe Liner THERX
Probe Heater 248 deg F
Assumed Moisture 17.2 % H2O
Train ID 5 Operator SC
LCD Meter No. 789 Avg Y 1.172
Pump No.
Heater Box No. Temp 250 deg F

Nozzle ID No. 089-007
Nozzle Diameter 9.45 mm
Initial Leak 0.00 CFM @ 6 in Hg
Final Leak 0.00 CFM @ 4 in Hg
Filter Type RMA No. 15
Target: 60 CF in 120 min
Remarks:

Trav Point No.	Time		Vacuum ("Hg)	Stack Temp (deg F)	Meter Temp (deg F)		Delta P ("H2O)	Delta H ("H2O)		Last Impinger (deg F)	Probe Temp (F)	Filter Temp (F)	Meter Volume (CF)
	Clock (24 hr)	Sample (θ, min)			In	Out		Calc	Act				
6	1323:00	0-10	3	483	111	107	0.11	1.01(0.54)	1.01	84	267	258	235.855
5	1333	10-20	3	480	106	105	0.09	0.79(0.52)	0.79	73	269	251	236.7
4	1343	20-30	2.5	480	109	107	0.08	0.71(0.50)	0.71	72	259	261	241.6
3	1353	30-40	2.5	484	111	109	0.09	0.80(0.52)	0.80	72	242	267	240.8
2	1403	40-50	3	485	112	109	0.10	0.88(0.54)	0.88	73	281	240	252.1
1	1413-50-60	2.5	401	114	110	110	0.09	0.88(0.52)	0.88	45	250	267	257.403
	1423:00												
6	1430:30	60-70	3	478	111	110	0.12	1.41(0.60)	1.14	70	265	251	262.5
5	1436	70-80	3	479	114	111	0.12	1.15(0.60)	1.15	71	270	252	269.6
4	1446	80-90	3	483	113	111	0.11	1.02(0.57)	1.02	70	274	248	275.4
3	1456	90-100	2.5	484	112	111	0.08	0.72(0.44)	0.72	70	255	262	280.8
2	1504	100-110	3	485	113	112	0.09	0.81(0.53)	0.81	69	274	258	285.6
1	1516	110-	3	479	115	112	0.09	0.81(0.53)	0.81	60	252	259	290.88

East

North

Trav Point No.	Time		Vacuum ("Hg)	Stack Temp (deg F)	Meter Temp (deg F)		Delta P ("H2O)	Delta H ("H2O)		Condenser /Impinger (deg F)	Probe Temp (F)	Filter Temp (F)	Meter Volume (CF)
	Clock (24 hr)	Sample (θ, min)			In	Out		Calc	Act				
Total													

TRAIN	Contents	Final	Initial	Net Wt.	RINSES	ORSAT
Impinger 1	Dem 80% IPA	720.3 g	581.4 g	g		CO2 9.8 %
Impinger 2	Dem 30% H2O	644.4 g	595.9 g	g		O2 (13.3) 3.5 %
Impinger 3	"	626.8 g	602.3 g	g		CO () %
Impinger 4	5.1% G-1	840.7 g	814.6 g	g		N2 %
Impinger 5		g	g	g		ISOKINETICS
Impinger 6		g	g	g		Mini 1 %
		g	g	g		Mini 2 %
	Total:					

Sample Numbers (Chain-of-Custody)

ZERO CALIBRATION # 4

DATE	TIME	O2	NOx	CONCENTRATION				O2	VOLTAGE			TEMPERATURES			DUCT	AMB.	IBM	HT
				SO2	CO	CO2	INSO2		NOx	SO2	CO	CO2	INSO2					
07-30-1992	09:43:46	0.0	0	0	0.0	0	0	0.003	0.002	0.001	-0.001	-0.004	0.813					

WARNING !!! WARNING! CH 5OUT OF RANGE.

channels not used

HIGH SPAN CALIBRATION # 4

DATE	TIME	O2	NOx	CONCENTRATION				O2	VOLTAGE			TEMPERATURES			DUCT	AMB.	IBM	HT
				SO2	CO	CO2	INSO2		NOx	SO2	CO	CO2	INSO2					
07-30-1992	09:46:59	10.1	814	19	79.8	10	769	0.421	8.043	0.518	8.056	0.675	1.440					

WARNING !!! CH 2OUT OF RANGE. CH 5OUT OF RANGE.

ComDAC TEST DATE 07-30-1992
FIRM TESTED ID#
PERMIT#
NAME Gibson
STREET
CITY, STATE, ZIP Bakersfield CA

UNIT TESTED
REQUESTED BY

East Boiler

Channels not used

SAMPLE DATA RUN # 4

SAMPLE DATA RUN # 4		CONCENTRATION						VOLTAGE				CORRECTED		PERCENT OF	LIMIT
DATE	TIME	O2	NOx	SO2	CO	CO2	INSO2	O2	NOx	SO2	CO	CO2	INSO2	SO2	
07-30-1992 10:17:47		START TIME													
07-30-1992	10:18:31	2.5	115	14	-1	8.1	%51.7	0.106	1.136	0.378	-.063	0.544	1.018		
07-30-1992	10:18:32	3.3	141	18	-1	9.9	%575.2	0.139	1.397	0.473	-.084	0.565	1.282		
07-30-1992	10:20:33	3.4	141	18	-1	10.0	%524.9	0.143	1.395	0.472	-.081	0.571	1.241		
07-30-1992	10:21:33	3.3	142	18	-1	10.1	%502.8	0.140	1.405	0.471	-.084	0.574	1.222		
07-30-1992	10:22:34	3.2	143	18	-1	10.1	%489.6	0.136	1.419	0.472	-.084	0.575	1.212		
07-30-1992	10:23:35	3.2	144	18	-1	10.0	%473.5	0.137	1.421	0.472	-.083	0.572	1.199		
07-30-1992	10:24:36	3.2	145	18	-1	10.1	%430.9	0.135	1.435	0.473	-.083	0.576	1.188		
07-30-1992	10:25:37	3.2	145	18	-1	10.1	%441.2	0.136	1.431	0.472	-.078	0.576	1.172		
07-30-1992	10:26:38	3.2	144	18	-1	10.1	%436.8	0.136	1.430	0.472	-.084	0.574	1.160		
07-30-1992	10:27:39	3.2	144	18	-1	10.0	%416.0	0.136	1.423	0.472	-.085	0.571	1.152		
07-30-1992	10:28:40	3.4	141	18	-1	9.9	%330.3	0.143	1.390	0.470	-.083	0.565	1.131		
07-30-1992	10:29:41	3.5	141	18	-1	10.0	%380.1	0.146	1.392	0.471	-.085	0.569	1.122		
07-30-1992	10:30:42	3.3	143	18	-1	10.1	%373.5	0.139	1.413	0.471	-.085	0.576	1.117		
07-30-1992	10:31:43	3.3	144	18	-1	10.0	%370.5	0.137	1.421	0.471	-.085	0.570	1.115		
07-30-1992	10:32:44	3.2	145	18	-1	10.1	%355.7	0.135	1.435	0.473	-.081	0.575	1.111		
07-30-1992	10:33:45	3.2	144	18	-1	10.0	%349.6	0.134	1.424	0.472	-.085	0.571	1.097		
07-30-1992	10:34:45	3.4	140	18	-1	9.9	%334.0	0.145	1.388	0.472	-.085	0.563	1.085		
07-30-1992	10:35:46	3.5	139	18	-1	9.9	%318.1	0.148	1.373	0.471	-.085	0.562	1.068		
07-30-1992	10:36:46	3.3	144	18	-1	10.1	%313.7	0.140	1.426	0.470	-.085	0.578	1.068		
07-30-1992	10:37:47	3.5	137	18	-1	9.8	%288.0	0.151	1.352	0.470	-.088	0.554	1.047		
07-30-1992	10:38:48	3.6	139	18	-1	9.9	%289.7	0.152	1.376	0.472	-.085	0.560	1.049		
07-30-1992	10:39:49	3.3	142	18	-1	10.1	%263.2	0.141	1.407	0.471	-.085	0.574	1.043		
07-30-1992	10:40:50	3.4	142	18	-1	10.0	%268.8	0.142	1.402	0.470	-.087	0.571	1.032		
07-30-1992	10:41:51	3.3	141	18	-1	10.1	%261.0	0.141	1.400	0.470	-.085	0.574	1.025		
07-30-1992	10:42:51	3.3	141	18	-1	10.0	%249.1	0.141	1.398	0.470	-.088	0.571	1.015		
07-30-1992	10:43:52	3.3	141	18	-1	10.0	%249.1	0.141	1.394	0.471	-.087	0.565	1.015		
07-30-1992	10:44:53	3.5	137	18	-1	9.8	%231.1	0.149	1.358	0.471	-.089	0.557	1.001		
07-30-1992	10:45:54	3.5	139	18	-1	9.9	%235.7	0.147	1.380	0.470	-.088	0.563	0.996		
07-30-1992	10:46:55	3.3	141	18	-1	10.1	%214.9	0.140	1.393	0.469	-.087	0.573	0.988		
07-30-1992	10:47:56	3.3	141	18	-1	10.0	%207.8	0.140	1.397	0.469	-.086	0.570	0.982		
07-30-1992	10:48:57	3.4	141	18	-1	10.0	%193.4	0.142	1.391	0.469	-.088	0.568	0.970		
07-30-1992	10:49:58	3.5	137	18	-1	9.9	%175.6	0.149	1.354	0.468	-.089	0.561	0.956		
07-30-1992	10:50:59	3.5	138	18	-1	9.9	%175.4	0.148	1.365	0.469	-.088	0.563	0.955		
07-30-1992	10:52:00	3.6	136	18	-1	9.8	%168.3	0.150	1.364	0.469	-.092	0.558	0.949		
07-30-1992	10:53:01	3.4	137	18	-1	9.9	%164.1	0.145	1.360	0.470	-.087	0.559	0.946		
07-30-1992	10:54:02	3.4	138	18	-1	10.0	%153.9	0.144	1.373	0.470	-.090	0.568	0.938		

07-30-1992 10:58:24	3.3	140	18	-1	10.0	x147.3	0.139	1.389	0.469	-.089	0.672	0.932
07-30-1992 10:59:24	3.3	140	18	-1	10.1	x578.8	0.141	1.388	0.470	-.094	0.672	1.384
07-30-1992 11:00:25	3.5	139	18	-1	10.0	x455.7	0.146	1.372	0.469	-.094	0.669	1.785
07-30-1992 11:01:26	3.6	134	18	-1	9.8	x381.9	0.152	1.326	0.467	-.093	0.658	1.724
07-30-1992 11:02:27	3.8	132	18	-1	9.8	x332.8	0.160	1.306	0.467	-.095	0.653	1.084
07-30-1992 11:03:28	3.7	136	18	-1	9.8	x302.3	0.154	1.347	0.469	-.095	0.658	1.059
07-30-1992 11:04:29	3.5	137	18	-1	9.8	x270.6	0.148	1.355	0.469	-.095	0.657	1.033
07-30-1992 11:05:30	3.6	137	18	-1	9.9	x239.5	0.152	1.355	0.468	-.097	0.661	1.008
07-30-1992 11:06:31	3.5	137	18	-1	10.0	x213.7	0.148	1.356	0.467	-.095	0.665	0.987
07-30-1992 11:07:32	3.6	136	18	-1	9.8	x188.0	0.150	1.348	0.468	-.095	0.657	0.966
07-30-1992 11:08:33	3.5	136	18	-1	9.9	x167.1	0.148	1.343	0.468	-.095	0.663	0.948
07-30-1992 11:09:34	3.6	134	18	-1	9.8	x142.5	0.152	1.324	0.467	-.095	0.657	0.928
07-30-1992 11:10:35	3.5	137	18	-1	10.0	x129.4	0.147	1.353	0.467	-.097	0.668	0.918
07-30-1992 11:11:36	3.5	137	17	-1	9.8	99.4	0.146	1.351	0.466	-.093	0.658	0.893
07-30-1992 11:12:37	4.9	127	17	-1	9.0	25.2	0.207	1.258	0.465	-.089	0.602	0.833
07-30-1992 11:13:38	3.7	140	18	-1	9.9	76.7	0.156	1.386	0.467	-.093	0.665	0.875
07-30-1992 11:14:39	3.2	142	18	-1	10.1	65.9	0.134	1.409	0.468	-.095	0.675	0.866
07-30-1992 11:15:40	3.2	142	17	-1	10.2	47.4	0.134	1.409	0.466	-.095	0.680	0.851
07-30-1992 11:16:41	3.1	143	17	-1	10.1	27.6	0.133	1.417	0.466	-.095	0.677	0.835
07-30-1992 11:17:42	3.2	143	18	-1	10.0	9.7	0.134	1.413	0.468	-.094	0.671	0.820
07-30-1992 11:18:43	3.2	142	17	-1	10.1	-9.5	0.136	1.408	0.466	-.095	0.675	0.804
07-30-1992 11:19:44	3.2	143	18	-1	10.0	x-28.0	0.136	1.415	0.467	-.095	0.669	0.789
07-30-1992 11:20:45	3.2	144	17	-1	10.1	x-44.2	0.135	1.421	0.466	-.095	0.677	0.776
07-30-1992 11:21:46	3.2	144	17	-1	10.0	x-60.3	0.135	1.421	0.466	-.095	0.672	0.763
07-30-1992 11:22:47	3.2	144	18	-1	10.0	x-77.1	0.135	1.429	0.467	-.095	0.671	0.749
07-30-1992 11:23:48	3.2	144	17	-1	10.0	x-94.5	0.135	1.437	0.467	-.095	0.670	0.736

Continuation of R1

Channels not used

SR

R1

SR

07-30-1992 11:24:49	-0.0	0	0	-0	0.0	X-815.6	0.000	0.000	0.000	-0.015	-0.001	0.147
07-30-1992 11:25:50	-0.1	0	0	-0	-0.0	X-822.8	0.000	0.000	0.000	-0.013	-0.006	0.141
07-30-1992 11:26:51	-0.1	0	0	-0	-0.0	X-830.5	0.000	0.000	0.000	-0.012	-0.006	0.134
07-30-1992 11:27:52	-0.1	0	0	-0	0.0	X-838.9	0.000	0.000	0.000	-0.012	-0.001	0.127
07-30-1992 11:28:53	4.5	635	15	28	6.9	X-291.9	0.190	6.279	0.407	2.846	0.462	0.574
07-30-1992 11:29:54	10.0	813	19	79	10.0	X-84.3	0.415	8.038	0.511	7.955	0.669	0.743
07-30-1992 11:30:55	10.1	813	19	79	10.0	X-84.3	0.417	8.038	0.511	7.955	0.669	0.743
07-30-1992 11:31:56	10.1	813	19	79	10.1	X-103.4	0.418	8.037	0.511	7.949	0.675	0.748
07-30-1992 11:32:57	10.1	813	19	79	10.1	X-123.8	0.419	8.038	0.510	7.961	0.676	0.741
07-30-1992 11:33:58	6.2	284	18	45	10.1	X-189.6	0.259	2.809	0.473	4.537	0.672	0.657
07-30-1992 11:34:59	3.4	145	17	-1	9.9	X-246.5	0.143	1.432	0.464	-0.074	0.664	0.611
07-30-1992 11:36:00	3.4	142	17	-1	10.0	X-263.2	0.143	1.404	0.463	-0.098	0.667	0.607
07-30-1992 11:37:01	3.6	139	17	-1	9.9	X-282.4	0.151	1.380	0.462	-0.098	0.661	0.582
07-30-1992 11:38:02	3.4	144	17	-1	10.1	X-281.8	0.143	1.422	0.462	-0.097	0.673	0.582
07-30-1992 11:39:03	3.3	145	17	-1	10.0	X-296.1	0.141	1.422	0.462	-0.098	0.667	0.570
07-30-1992 11:40:04	3.3	146	17	-1	10.0	X-306.3	0.141	1.449	0.464	-0.095	0.665	0.562
07-30-1992 11:41:05	3.3	146	17	-1	9.9	X-318.9	0.140	1.446	0.464	-0.095	0.665	0.552
07-30-1992 11:42:06	3.2	146	17	-1	10.0	X-331.4	0.139	1.446	0.464	-0.098	0.669	0.542
07-30-1992 11:43:07	3.2	148	17	-1	10.0	X-341.0	0.137	1.460	0.464	-0.095	0.668	0.534
07-30-1992 11:44:08	3.3	146	17	-1	10.0	X-357.8	0.139	1.443	0.464	-0.100	0.667	0.520
07-30-1992 11:45:09	3.4	145	17	-1	10.0	X-371.5	0.144	1.428	0.462	-0.092	0.667	0.509
07-30-1992 11:46:10	3.4	146	17	-1	9.9	X-384.1	0.145	1.443	0.463	-0.100	0.660	0.499
07-30-1992 11:47:11	3.3	148	17	-1	10.0	X-389.5	0.139	1.465	0.463	-0.098	0.672	0.494
07-30-1992 11:48:12	3.4	144	17	-1	9.9	X-409.2	0.144	1.420	0.461	-0.098	0.662	0.478
07-30-1992 11:49:13	3.7	140	17	-1	9.7	X-426.6	0.156	1.382	0.462	-0.102	0.650	0.464
07-30-1992 11:50:14	3.7	142	17	-1	9.9	X-430.8	0.155	1.403	0.460	-0.104	0.659	0.461
07-30-1992 11:51:15	3.5	145	17	-1	9.9	X-429.0	0.147	1.427	0.462	-0.104	0.662	0.462
07-30-1992 11:52:16	3.3	147	17	-1	10.0	X-434.4	0.140	1.454	0.462	-0.099	0.670	0.458
07-30-1992 11:53:17	3.4	145	17	-1	10.0	X-443.3	0.142	1.430	0.461	-0.100	0.666	0.450
07-30-1992 11:54:17	3.9	137	17	-1	9.7	X-452.2	0.162	1.356	0.458	-0.105	0.649	0.438
07-30-1992 11:55:18	3.8	139	17	-1	9.6	X-463.7	0.161	1.370	0.461	-0.105	0.643	0.434
07-30-1992 11:56:19	3.6	142	17	-1	9.9	X-455.3	0.153	1.401	0.461	-0.105	0.660	0.441
07-30-1992 11:57:20	3.4	146	17	-1	10.0	X-447.5	0.143	1.442	0.461	-0.098	0.662	0.447
07-30-1992 11:58:21	3.3	147	17	-1	10.0	X-443.3	0.140	1.451	0.460	-0.104	0.668	0.450
07-30-1992 11:59:22	3.4	146	17	-1	9.9	X-456.3	0.143	1.444	0.461	-0.097	0.662	0.443
07-30-1992 12:00:23	3.4	146	17	-1	10.0	X-449.7	0.142	1.441	0.460	-0.102	0.668	0.446
07-30-1992 12:01:23	3.4	146	17	-1	10.0	X-444.5	0.142	1.443	0.460	-0.105	0.667	0.449
07-30-1992 12:02:24	3.4	146	17	-1	10.0	X-451.7	0.143	1.445	0.461	-0.104	0.666	0.443
07-30-1992 12:03:24	3.4	146	17	-1	9.9	X-456.9	0.145	1.447	0.461	-0.105	0.659	0.440
07-30-1992 12:04:25	3.4	147	17	-1	10.0	X-452.9	0.143	1.453	0.461	-0.105	0.666	0.442
07-30-1992 12:05:26	3.4	147	17	-1	9.9	X-453.5	0.143	1.458	0.461	-0.104	0.663	0.442
07-30-1992 12:06:27	3.5	147	17	-1	9.9	X-451.7	0.146	1.458	0.460	-0.104	0.665	0.443
07-30-1992 12:07:28	3.4	148	17	-1	10.0	X-446.9	0.144	1.460	0.460	-0.103	0.665	0.447
07-30-1992 12:08:28	3.3	148	17	-1	10.0	X-451.7	0.140	1.466	0.461	-0.105	0.666	0.443
07-30-1992 12:09:29	3.4	148	17	-1	10.0	X-442.7	0.143	1.466	0.460	-0.103	0.670	0.451
07-30-1992 12:10:30	3.4	147	17	-1	10.0	X-443.3	0.144	1.457	0.459	-0.105	0.669	0.450
07-30-1992 12:11:31	3.4	148	17	-1	10.0	X-443.9	0.142	1.464	0.459	-0.101	0.667	0.450
07-30-1992 12:12:31	3.2	149	17	-1	10.0	X-448.1	0.139	1.478	0.460	-0.105	0.666	0.446
07-30-1992 12:13:32	3.3	149	17	-1	10.0	X-444.5	0.141	1.473	0.459	-0.105	0.669	0.449
07-30-1992 12:14:33	3.5	147	17	-1	9.9	X-454.1	0.146	1.457	0.460	-0.105	0.659	0.442
07-30-1992 12:15:34	3.4	147	17	-1	9.9	X-451.7	0.143	1.456	0.459	-0.105	0.662	0.443
07-30-1992 12:16:35	3.7	143	17	-1	9.7	X-463.1	0.154	1.418	0.458	-0.105	0.650	0.434
07-30-1992 12:17:36	5.9	125	17	-1	8.3	X-540.3	0.245	1.238	0.453	-0.098	0.553	0.371
07-30-1992 12:18:37	6.3	126	17	-1	8.4	X-539.1	0.264	1.248	0.454	-0.100	0.559	0.372
07-30-1992 12:19:38	5.7	134	17	-1	8.8	X-515.8	0.239	1.325	0.457	-0.098	0.590	0.391
07-30-1992 12:20:39	4.7	139	17	-1	9.1	X-500.2	0.197	1.375	0.458	-0.100	0.608	0.404
07-30-1992 12:21:40	5.9	133	17	-1	8.4	X-563.1	0.247	1.312	0.456	-0.097	0.563	0.377
07-30-1992 12:22:41	5.2	146	17	-1	9.2	X-493.0	0.219	1.444	0.459	-0.094	0.616	0.410
07-30-1992 12:23:42	3.1	160	17	-1	10.2	X-429.6	0.130	1.587	0.460	-0.095	0.685	0.462
07-30-1992 12:24:43	3.1	156	17	-1	10.2	X-433.2	0.130	1.545	0.459	-0.098	0.681	0.459
07-30-1992 12:25:44	3.1	153	17	-1	10.1	X-443.9	0.133	1.512	0.459	-0.101	0.672	0.450
07-30-1992 12:26:44	3.2	153	17	-1	10.1	X-445.1	0.133	1.512	0.460	-0.105	0.674	0.449
07-30-1992 12:27:45	3.2	150	17	-1	10.1	X-445.1	0.135	1.487	0.458	-0.105	0.673	0.449
07-30-1992 12:28:46	3.3	150	17	-1	10.0	X-445.7	0.140	1.480	0.458	-0.105	0.668	0.448
07-30-1992 12:29:47	3.3	150	17	-1	10.1	X-441.6	0.140	1.488	0.457	-0.105	0.674	0.452
07-30-1992 12:30:48	3.3	151	17	-1	10.0	X-441.6	0.140	1.490	0.457	-0.105	0.671	0.452

07-30-1992 12:31:49	3.3	151	17	-1	10.0	X-442.7	0.140	1.493	0.457	-0.103	0.670	0.451
07-30-1992 12:32:50	3.4	149	17	-1	10.0	X-445.1	0.144	1.475	0.457	-0.107	0.668	0.449
07-30-1992 12:33:51	3.4	150	17	-1	10.0	X-445.7	0.143	1.486	0.457	-0.107	0.672	0.448
07-30-1992 12:34:52	3.4	148	17	-1	9.9	X-454.1	0.144	1.461	0.458	-0.112	0.664	0.442
07-30-1992 12:35:53	3.4	149	17	-1	10.0	X-445.9	0.145	1.479	0.457	-0.106	0.665	0.447
07-30-1992 12:36:53	3.3	151	17	-1	10.0	X-452.3	0.141	1.495	0.458	-0.106	0.665	0.443
07-30-1992 12:37:54	0.8	0	-0	-1	0.3	X-937.5	0.038	0.003	-0.011	-0.089	0.013	-0.002
07-30-1992 12:38:55	-0.1	0	-1	-0	-0.0	X-1016.7	0.001	0.002	-0.018	-0.030	-0.006	-0.018
07-30-1992 12:39:56	-0.1	0	-0	-0	0.0	X-1010.7	0.000	0.002	-0.011	-0.032	-0.001	-0.012
07-30-1992 12:40:57	-0.1	0	-0	-0	0.1	X-1010.7	0.000	0.002	-0.005	-0.029	-0.000	-0.013
07-30-1992 12:41:58	0.3	243	6	2	1.9	X-904.1	0.014	2.400	0.148	0.227	0.126	0.074
07-30-1992 12:42:59	9.6	833	19	56	10.0	X-427.8	0.397	8.228	0.504	5.641	0.659	0.452
07-30-1992 12:44:00	10.1	835	19	78	10.1	X-415.8	0.421	8.254	0.503	7.888	0.677	0.473
07-30-1992 12:45:01	10.2	838	19	78	10.1	X-418.8	0.422	8.283	0.503	7.881	0.678	0.470
07-30-1992 12:45:02	10.2	837	19	78	10.1	X-427.6	0.422	8.275	0.503	7.892	0.672	0.466
07-30-1992 12:47:03	10.2	837	19	78	10.1	X-419.4	0.422	8.271	0.503	7.888	0.674	0.470
07-30-1992 12:48:04	10.2	835	19	78	10.1	X-417.6	0.422	8.245	0.502	7.894	0.676	0.471
07-30-1992 12:49:05	8.7	451	13	76	9.8	X-440.4	0.361	4.463	0.345	7.644	0.652	0.453
07-30-1992 12:50:06	0.7	1	-1	17	0.1	X-1010.7	0.030	0.016	-0.021	1.722	0.001	-0.013
07-30-1992 12:51:07	-0.0	1	-1	-0	0.0	X-1010.1	0.002	0.007	-0.024	-0.029	-0.001	-0.012
07-30-1992 12:52:08	-0.1	0	-1	-0	0.0	X-1017.2	0.001	0.007	-0.023	-0.028	-0.007	-0.018
07-30-1992 12:53:09	-0.1	0	-0	-0	0.0	X-1014.9	0.000	0.003	0.001	-0.027	-0.003	-0.016
07-30-1992 12:54:10	0.2	0	-0	-0	3.0	X-850.3	0.013	0.003	-0.003	-0.027	0.195	0.118
07-30-1992 12:55:11	3.2	0	-1	-0	10.1	X-441.6	0.134	0.002	-0.015	-0.026	0.675	0.452
07-30-1992 12:56:12	3.2	-0	-0	-0	10.0	X-448.1	0.137	0.001	-0.010	-0.027	0.670	0.446
07-30-1992 12:57:13	3.3	-0	-1	-0	10.0	X-448.1	0.139	0.000	-0.015	-0.030	0.665	0.446
07-30-1992 12:58:13	3.6	-0	-1	-0	9.8	X-455.9	0.153	0.000	-0.016	-0.027	0.657	0.440
07-30-1992 12:59:14	3.5	-0	-0	-0	10.0	X-450.5	0.150	0.002	-0.004	-0.031	0.665	0.444
07-30-1992 13:00:15	3.6	-0	-1	-0	9.8	X-458.9	0.154	0.000	-0.021	-0.029	0.653	0.438
07-30-1992 13:01:16	3.8	-0	-1	-0	9.8	X-458.2	0.160	0.002	-0.014	-0.032	0.653	0.438
07-30-1992 13:02:17	4.1	-0	-0	-0	9.4	X-480.5	0.173	-0.002	-0.005	-0.030	0.630	0.420
07-30-1992 13:03:18	4.3	-0	-1	-0	9.5	X-472.7	0.180	-0.001	-0.021	-0.030	0.635	0.426
07-30-1992 13:04:19	3.9	-0	-0	-0	9.8	X-457.1	0.164	-0.000	-0.006	-0.027	0.655	0.439
07-30-1992 13:05:20	3.4	-0	0	-0	10.1	X-442.9	0.142	-0.000	0.001	-0.026	0.675	0.450
07-30-1992 13:06:21	3.1	-0	-0	-0	10.2	X-437.4	0.131	0.000	-0.001	-0.029	0.682	0.455
07-30-1992 13:07:22	3.0	-0	-0	-0	10.3	X-435.0	0.125	0.001	-0.002	-0.027	0.687	0.467
07-30-1992 13:08:23	3.1	-0	-0	-0	10.2	X-436.2	0.131	-0.001	-0.004	-0.030	0.685	0.456
07-30-1992 13:09:24	2.9	-0	0	-0	10.2	X-436.8	0.124	0.001	0.005	-0.030	0.685	0.456
07-30-1992 13:10:25	3.1	-0	-1	-0	10.1	X-440.4	0.132	-0.002	-0.030	-0.032	0.675	0.453
07-30-1992 13:11:26	3.0	-0	-0	-0	10.3	X-435.2	0.127	-0.001	0.001	-0.032	0.686	0.459
07-30-1992 13:12:27	3.1	-0	0	-0	10.2	X-441.0	0.130	-0.002	0.003	-0.030	0.680	0.452
07-30-1992 13:13:28	3.4	-0	-0	-0	10.0	X-451.7	0.142	-0.001	0.000	-0.032	0.668	0.443
07-30-1992 13:14:29	2.3	-0	-0	-0	5.0	X-731.8	0.100	0.000	-0.008	-0.033	0.332	0.215
07-30-1992 13:15:30	-0.1	0	-0	-0	0.1	X-1014.9	0.001	0.002	-0.001	-0.030	-0.000	-0.016
07-30-1992 13:16:31	-0.1	0	-0	-0	0.1	X-1014.3	-0.000	0.002	-0.003	-0.032	0.000	-0.016
07-30-1992 13:17:32	3.1	431	11	12	5.3	X-712.0	0.130	4.262	0.299	1.213	0.351	0.281
07-30-1992 13:18:33	10.1	837	19	76	10.1	X-418.2	0.418	8.272	0.500	7.715	0.674	0.471
07-30-1992 13:19:34	10.1	841	19	78	10.2	X-418.2	0.421	8.308	0.501	7.878	0.679	0.471
07-30-1992 13:20:35	10.2	841	19	78	10.1	X-418.8	0.422	8.308	0.501	7.871	0.678	0.470
07-30-1992 13:21:36	10.2	840	19	78	10.0	X-424.8	0.422	8.300	0.501	7.877	0.670	0.465
07-30-1992 13:22:37	8.8	515	16	70	10.1	X-424.2	0.366	5.089	0.476	7.111	0.674	0.466
07-30-1992 13:23:38	3.7	136	17	8	9.9	X-447.5	0.156	1.350	0.450	0.772	0.663	0.447
07-30-1992 13:24:39	3.6	133	17	2	9.9	X-450.5	0.152	1.318	0.450	0.166	0.665	0.444
07-30-1992 13:25:40	3.5	134	17	-0	10.0	X-448.1	0.147	1.324	0.450	-0.006	0.667	0.446
07-30-1992 13:26:41	3.5	134	17	-1	10.0	X-451.7	0.147	1.325	0.451	-0.084	0.665	0.443
07-30-1992 13:27:42	3.5	133	17	-1	9.8	X-459.5	0.149	1.319	0.451	-0.105	0.657	0.437
07-30-1992 13:28:43	3.6	130	17	-1	9.8	X-459.5	0.153	1.287	0.451	-0.118	0.655	0.437
07-30-1992 13:29:44	3.6	132	17	-1	9.8	X-459.5	0.151	1.304	0.451	-0.118	0.658	0.437
07-30-1992 13:30:44	3.6	131	17	-1	9.9	X-455.3	0.152	1.301	0.450	-0.120	0.660	0.441
07-30-1992 13:31:45	3.8	146	17	-1	9.8	X-460.7	0.158	1.445	0.453	-0.120	0.656	0.436
07-30-1992 13:32:46	3.7	147	17	-1	9.8	X-459.5	0.157	1.453	0.453	-0.118	0.657	0.437
07-30-1992 13:33:47	3.6	147	17	-1	9.8	X-460.1	0.152	1.457	0.453	-0.119	0.653	0.437
07-30-1992 13:34:47	3.5	147	17	-1	9.9	X-455.9	0.149	1.458	0.453	-0.117	0.662	0.440
07-30-1992 13:35:48	3.5	148	17	-1	9.9	X-449.9	0.148	1.461	0.452	-0.115	0.660	0.440
07-30-1992 13:36:49	3.5	146	17	-1	9.9	X-450.3	0.153	1.445	0.453	-0.116	0.653	0.433
07-30-1992 13:37:50	3.5	147	17	-1	9.9	X-447.5	0.153	1.453	0.453	-0.118	0.654	0.434

Zero

SPAM

Zero

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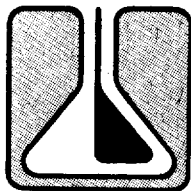
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7-30-1992 13:38:51	3.4	148	17	-1	10.0	X-447.5	0.145	1.467	0.452	-115	0.657	0.447
7-30-1992 13:39:52	3.3	150	17	-1	10.0	X-443.9	0.141	1.482	0.451	-119	0.669	0.450
7-30-1992 13:40:53	3.2	151	17	-1	10.0	X-451.1	0.137	1.489	0.453	-116	0.667	0.444
7-30-1992 13:41:54	3.3	151	17	-1	10.0	X-447.5	0.139	1.496	0.452	-115	0.667	0.447
7-30-1992 13:42:55	3.3	150	17	-1	9.9	X-453.5	0.140	1.482	0.453	-117	0.663	0.442
7-30-1992 13:43:56	3.4	148	17	-1	9.9	X-449.9	0.145	1.469	0.452	-118	0.662	0.445
7-30-1992 13:44:57	3.5	148	17	-1	9.9	X-449.9	0.147	1.462	0.451	-118	0.661	0.445
7-30-1992 13:45:58	3.6	147	17	-1	9.9	X-448.7	0.150	1.452	0.451	-126	0.664	0.446
7-30-1992 13:46:59	3.5	148	17	-1	10.0	X-447.5	0.146	1.461	0.451	-123	0.666	0.447
7-30-1992 13:48:00	3.5	147	17	-1	9.9	X-452.9	0.149	1.450	0.451	-125	0.660	0.442
7-30-1992 13:49:01	3.5	147	17	-1	9.9	X-451.7	0.150	1.451	0.450	-124	0.660	0.443
7-30-1992 13:50:02	3.6	145	17	-1	9.8	X-454.7	0.151	1.433	0.451	-125	0.657	0.441
7-30-1992 13:51:03	3.6	144	17	-1	9.8	X-461.9	0.152	1.430	0.452	-124	0.652	0.435
7-30-1992 13:52:03	3.6	147	17	-1	9.9	X-457.1	0.150	1.457	0.452	-123	0.659	0.439
7-30-1992 13:53:04	3.2	159	17	-1	10.2	X-433.2	0.135	1.572	0.453	-115	0.682	0.459
7-30-1992 13:54:05	2.7	165	17	-1	10.4	X-433.6	0.116	1.629	0.453	-101	0.697	0.466
7-30-1992 13:55:06	2.9	161	17	-1	10.3	X-439.0	0.121	1.591	0.453	-102	0.691	0.462
7-30-1992 13:56:07	3.0	160	17	-1	10.2	X-439.2	0.125	1.586	0.453	-110	0.681	0.454
7-30-1992 13:57:08	3.0	160	17	-1	10.3	X-429.6	0.125	1.585	0.452	-109	0.686	0.462
7-30-1992 13:58:09	2.9	159	17	-1	10.2	X-435.0	0.124	1.571	0.453	-106	0.683	0.457
7-30-1992 13:59:10	2.9	159	17	-1	10.2	X-436.8	0.125	1.577	0.453	-108	0.683	0.456
7-30-1992 14:00:11	3.1	158	17	-1	10.2	X-435.0	0.131	1.560	0.451	-111	0.682	0.457
7-30-1992 14:01:11	3.2	156	17	-1	10.1	X-440.4	0.137	1.538	0.451	-110	0.675	0.453
7-30-1992 14:02:12	3.5	151	17	-1	9.9	X-453.5	0.146	1.494	0.451	-114	0.659	0.442
7-30-1992 14:03:13	3.6	148	17	-1	9.8	X-461.9	0.151	1.464	0.452	-118	0.653	0.435
7-30-1992 14:04:14	3.6	147	17	-1	9.8	X-461.3	0.152	1.453	0.452	-120	0.655	0.436
7-30-1992 14:05:15	3.7	146	17	-1	9.8	X-454.7	0.156	1.449	0.450	-120	0.658	0.441
7-30-1992 14:06:15	3.8	144	17	-1	9.7	X-463.1	0.160	1.427	0.450	-124	0.647	0.434
7-30-1992 14:07:16	3.9	143	17	-1	9.7	X-464.9	0.163	1.412	0.450	-127	0.646	0.433
7-30-1992 14:08:17	3.8	143	17	-1	9.7	X-458.5	0.160	1.410	0.451	-127	0.645	0.430
7-30-1992 14:09:18	3.8	143	17	-1	9.7	X-459.5	0.161	1.418	0.449	-123	0.651	0.437
7-30-1992 14:10:19	3.9	144	17	-1	9.7	X-463.7	0.163	1.421	0.450	-126	0.646	0.434
7-30-1992 14:11:20	3.6	144	17	-1	9.8	X-459.5	0.159	1.430	0.448	-126	0.652	0.437
7-30-1992 14:12:21	3.7	145	17	-1	9.8	X-458.3	0.158	1.433	0.449	-125	0.652	0.438
7-30-1992 14:13:22	3.8	143	17	-1	9.7	X-465.5	0.161	1.414	0.450	-126	0.645	0.432
7-30-1992 14:14:23	3.9	143	17	-1	9.6	X-467.9	0.165	1.415	0.450	-125	0.642	0.430
7-30-1992 14:15:24	3.8	142	17	-1	9.6	X-470.3	0.161	1.410	0.450	-126	0.643	0.428
7-30-1992 14:16:25	4.0	141	17	-1	9.6	X-470.9	0.169	1.390	0.449	-128	0.645	0.428
7-30-1992 14:17:26	3.7	145	17	-1	9.8	X-458.3	0.156	1.433	0.449	-127	0.657	0.438
7-30-1992 14:18:27	3.8	144	17	-1	9.7	X-465.5	0.159	1.423	0.449	-129	0.650	0.432
7-30-1992 14:19:28	3.9	142	17	-1	9.6	X-469.7	0.165	1.403	0.449	-129	0.645	0.429
7-30-1992 14:20:29	3.8	143	17	-1	9.7	X-460.1	0.161	1.419	0.448	-127	0.649	0.437
7-30-1992 14:21:30	3.9	143	17	-1	9.7	X-461.9	0.162	1.412	0.448	-129	0.647	0.435
7-30-1992 14:22:31	4.0	140	17	-1	9.4	X-478.1	0.168	1.383	0.449	-129	0.632	0.422
7-30-1992 14:23:32	4.4	140	17	-1	9.5	X-472.7	0.184	1.390	0.448	-129	0.638	0.426
7-30-1992 14:24:33	3.7	144	17	-1	9.7	X-461.9	0.158	1.422	0.449	-129	0.650	0.435
7-30-1992 14:25:34	3.6	147	17	-1	9.9	X-457.7	0.151	1.451	0.450	-127	0.660	0.439
7-30-1992 14:26:35	3.6	148	17	-1	9.9	X-452.3	0.151	1.450	0.449	-129	0.662	0.443
7-30-1992 14:27:36	3.4	153	17	-1	10.0	X-443.9	0.142	1.510	0.449	-122	0.669	0.450
7-30-1992 14:28:37	3.2	155	17	-1	10.1	X-437.4	0.134	1.532	0.450	-117	0.676	0.455
7-30-1992 14:29:38	3.2	155	17	-1	10.1	X-439.8	0.135	1.531	0.450	-119	0.675	0.453
7-30-1992 14:30:39	3.2	155	17	-1	10.1	X-440.4	0.135	1.537	0.450	-119	0.673	0.453
7-30-1992 14:31:40	3.4	149	17	-1	9.9	X-453.5	0.145	1.475	0.450	-126	0.661	0.442
7-30-1992 14:32:41	3.8	0	0	-1	0.3	X-1024.7	0.035	0.003	0.008	-103	0.015	0.005
7-30-1992 14:33:42	-0.1	0	-0	-0	-0.0	X-1020.8	-0.000	0.002	-0.005	-0.046	-0.005	-0.021
7-30-1992 14:34:43	-0.1	0	-0	-0	0.1	X-1010.7	-0.000	0.002	-0.006	-0.046	0.000	-0.013
7-30-1992 14:35:44	0.1	0	0	0	0.1	X-1020.2	0.000	0.002	0.015	-0.046	0.007	0.023
7-30-1992 14:36:45	-0.1	0	-0	-0	-0.0	X-1011.5	-0.000	0.002	-0.019	-0.045	-0.004	-0.011
7-30-1992 14:37:46	2.0	415	9	9	4.1	X-778.5	0.088	4.103	0.244	0.952	0.269	0.177
7-30-1992 14:38:47	10.0	845	19	76	10.1	X-428.6	0.417	8.354	0.496	7.625	0.674	0.466
7-30-1992 14:39:48	10.2	848	19	77	10.0	X-428.4	0.423	8.381	0.497	7.817	0.672	0.465
7-30-1992 14:40:49	10.2	848	19	77	10.1	X-428.8	0.424	8.377	0.496	7.817	0.676	0.470
7-30-1992 14:41:50	10.2	847	19	78	10.0	X-428.2	0.424	8.366	0.496	7.824	0.671	0.468
7-30-1992 14:42:51	10.2	847	19	77	10.0	X-428.6	0.425	8.365	0.496	7.821	0.668	0.465
7-30-1992 14:43:52	10.4	8	11	25	0.8	X-565.2	0.759	0.062	-0.007	2.540	0.051	0.004
7-30-1992 14:44:53	10.5	15	3	1	0.1	X-1011.3	0.006	0.150	0.065	0.110	0.003	-0.014

20M

07-30-1992 14:45:54	3.3	76	15	52	0.1	X-935.3	0.140	0.754	0.390	5.274	0.000	-0.001	
07-30-1992 14:46:55	0.0	80	16	76	0.1	X-933.7	0.005	0.789	0.423	7.721	0.004	-0.000	
07-30-1992 14:47:55	-0.0	80	15	77	0.2	X-985.1	0.003	0.790	0.413	7.748	0.008	0.007	BIAS 798 ppm
07-30-1992 14:48:56	-0.0	80	15	77	0.1	X-990.3	0.002	0.788	0.409	7.745	0.001	0.000	
07-30-1992 14:49:57	-0.0	79	16	77	0.1	X-994.5	0.001	0.785	0.420	7.732	0.001	0.000	BIAS 798
07-30-1992 14:50:58	6.3	38	7	61	0.2	X-932.3	0.254	0.374	0.187	5.194	0.008	0.001	
07-30-1992 14:51:59	16.5	1	-0	5	5.2	X-720.4	0.683	0.014	-0.002	0.464	0.344	-0.224	
07-30-1992 14:53:00	10.4	0	-0	-1	9.8	X-460.7	0.431	0.005	-0.002	-1.15	0.658	0.436	
07-30-1992 14:54:01	10.2	0	0	-1	9.9	X-455.9	0.423	0.004	0.002	-1.17	0.662	0.440	BIAS 10/10 aka
07-30-1992 14:55:02	10.2	0	-0	-1	9.9	X-454.7	0.423	0.003	0.000	-1.17	0.663	0.441	
07-30-1992 14:56:03	10.2	0	-0	-1	9.9	X-452.9	0.423	0.004	0.000	-1.19	0.665	0.442	
07-30-1992 14:57:04	10.3	0	0	-1	9.2	X-427.8	0.428	0.007	0.003	-1.17	0.615	0.406	BIAS 874 ppm NA
07-30-1992 14:58:04	8.4	564	18	64	0.9	X-944.2	0.351	5.571	0.478	6.455	0.050	0.012	
07-30-1992 14:59:05	0.2	814	18	99	0.2	X-977.8	0.013	8.042	0.493	9.955	0.010	0.014	
07-30-1992 15:00:06	-0.0	813	18	99	0.2	X-977.8	0.003	8.032	0.493	9.954	0.008	0.014	
07-30-1992 15:01:07	0.1	755	18	99	0.2	X-978.4	0.008	7.456	0.490	9.951	0.009	0.014	
07-30-1992 15:02:08	14.4	232	17	98	0.2	X-986.1	0.598	2.294	0.441	9.932	0.007	0.007	

Final He rate = DS @ -22" HA



ZALCO LABORATORIES, INC.

Analytical & Consulting Services

BC Analytical
1255 Powell Street
Emeryville, Ca. 94608-2692

Attention: Dan Duncan

Lab. No.: 032521_001
Received: Jul 30, 1992
Reported: Jul 31, 1992

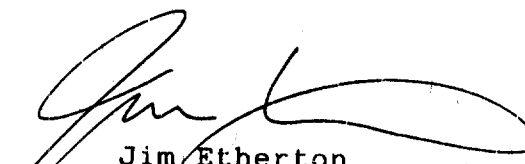
Sample Description: R1 - EPA 18 7/30/92

* CHROMATOGRAPHIC ANALYSIS (2 1645) *

(FID with C6+ Backflush to Detector)

Components	PPM, Volume
Methane (C1)	2.3
Ethane (C2)	<0.1
Propane (C3)	<0.1
Butanes (I+N C4)	<0.1
Pentanes (I+N C5)	<0.1
Hexanes+ (C6+)	.2
Total Hydrocarbons	2.5
Total Non-Methane Hydrocarbons	0
Total Non-(C1+C2) Hydrocarbons	0
Total Non-Methane Hydrocarbons as C1	1

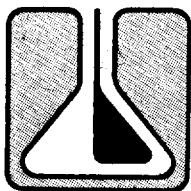

Analyst


Jim Etherton
Laboratory Director

4309 Armour Avenue Bakersfield, California 93308

(805) 395-0539

FAX (805) 395-3069



ZALCO LABORATORIES, INC.

Analytical & Consulting Services

BC Analytical
1255 Powell Street
Emeryville, Ca. 94608-2692

Lab. No.: 032521_002
Received: Jul 30, 1992
Reported: Jul 31, 1992

Attention: Dan Duncan

Sample Description: R2 - EPA 18 7/30/92

* CHROMATOGRAPHIC ANALYSIS (Z 1645) *

(FID with C6+ Backflush to Detector)

Components	PPM, Volume
Methane (C1)	1.3
Ethane (C2)	<0.1
Propane (C3)	<0.1
Butanes (I+N C4)	<0.1
Pentanes (I+N C5)	<0.1
Hexanes+ (C6+)	.3
Total Hydrocarbons	1.6
Total Non-Methane Hydrocarbons	0
Total Non-(C1+C2) Hydrocarbons	0
Total Non-Methane Hydrocarbons as C1	1

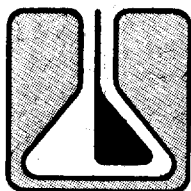
CHH
Analyst

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Jim Etherton
Laboratory Director

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Attention: Dan Duncan

Lab. No.: 032521_003
Received: Jul 30, 1992
Reported: Jul 31, 1992

Sample Description: R3 - EPA 18 7/30/92

* CHROMATOGRAPHIC ANALYSIS (Z 1645) *

(FID with C6+ Backflush to Detector)

Components	PPM, Volume
Methane (C1)	2.2
Ethane (C2)	<0.1
Propane (C3)	<0.1
Butanes (I+N C4)	<0.1
Pentanes (I+N C5)	<0.1
Hexanes+ (C6+)	.1
Total Hydrocarbons	2.4
Total Non-Methane Hydrocarbons	0
Total Non-(C1+C2) Hydrocarbons	0
Total Non-Methane Hydrocarbons as C1	1

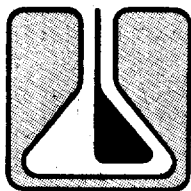
CHH
Analyst

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1255 Powell Street
Emeryville, Ca. 94608-2692

Lab. No.: 032521_004
Received: Jul 30, 1992
Reported: Jul 31, 1992

Attention: Dan Duncan

Sample Description: R Blank EPA 18 7/30/92

* CHROMATOGRAPHIC ANALYSIS (Z 1645) *

(FID with C6+ Backflush to Detector)

Components	PPM, Volume
Methane (C1)	1.6
Ethane (C2)	<0.1
Propane (C3)	<0.1
Butanes (I+N C4)	<0.1
Pentanes (I+N C5)	<0.1
Hexanes+ (C6+)	.2
Total Hydrocarbons	1.8
Total Non-Methane Hydrocarbons	0
Total Non-(C1+C2) Hydrocarbons	0
Total Non-Methane Hydrocarbons as C1	1


Analyst


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ZALCO LABORATORIES, INC.

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BC Analytical
1255 Powell Street
Emeryville, Ca. 94608-2692

Lab. No.: Blk_7_31_1
Received: Jul 31, 1992
Reported: Jul 31, 1992

Attention: Dan Duncan

Sample Description: 100% Helium Gas Blank 7/31/92

* CHROMATOGRAPHIC ANALYSIS (Z 1645) *

(FID with C6+ Backflush to Detector)

Components	PPM, Volume
Methane (C1)	<0.1
Ethane (C2)	<0.1
Propane (C3)	<0.1
Butanes (I+N C4)	<0.1
Pentanes (I+N C5)	<0.1
Hexanes+ (C6+)	<0.1
Total Hydrocarbons	0.0
Total Non-Methane Hydrocarbons	0
Total Non-(C1+C2) Hydrocarbons	0
Total Non-Methane Hydrocarbons as C1	0

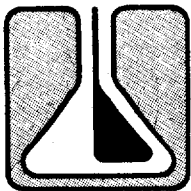

Analyst


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ZALCO LABORATORIES, INC.

Analytical & Consulting Services

BC Analytical
1255 Powell Street
Emeryville, Ca. 94608-2692

Lab. No.: Cal_7_31_1
Received: Jul 31, 1992
Reported: Jul 31, 1992

Attention: Dan Duncan

Sample Description: Scotty Cal Gas Can #243 7/31/92

* CHROMATOGRAPHIC ANALYSIS (Z 1645) *

(FID with C6+ Backflush to Detector)

Components	PPM, Volume
Methane (C1)	16.3
Ethane (C2)	16.3
Propane (C3)	16.3
Butanes (I+N C4)	16.3
Pentanes (I+N C5)	16.4
Hexanes+ (C6+)	30.9
Total Hydrocarbons	112.5
Total Non-Methane Hydrocarbons	96
Total Non-(C1+C2) Hydrocarbons	80
Total Non-Methane Hydrocarbons as C1	374

CHAS
Analyst


Jim Etherton
Laboratory Director

Analytical Report

ANALYTICAL REPORT

LOG NO: E92-08-216

Received: 10 AUG 92

Mailed: AUG 19 1992

Mr. Scott Chesnut
Brown and Caldwell, Air Monitoring Program
3480 Buskirk Avenue
Pleasant Hill, California 94596

Project: 7028-1

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, VAPOR OR AIR SAMPLES					DATE SAMPLED	
08-216-1	R1-3a					30 JUL 92	
08-216-2	R2-3a					30 JUL 92	
08-216-3	RB-3a					30 JUL 92	
08-216-4	R1-4					30 JUL 92	
08-216-5	R2-4					30 JUL 92	
PARAMETER	08-216-1	08-216-2	08-216-3	08-216-4	08-216-5		
Sulfate, as SO4 (by IC), mg/L	13	9.6	2.1	13	9.8		

Analytical Report

LOG NO: E92-08-216

Received: 10 AUG 92

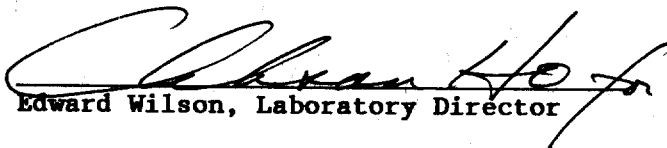
Mr. Scott Chesnut
Brown and Caldwell, Air Monitoring Program
3480 Buskirk Avenue
Pleasant Hill, California 94596

Project: 7028-1

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, VAPOR OR AIR SAMPLES	DATE SAMPLED
08-216-6	RB-4	30 JUL 92
PARAMETER	08-216-6	
Sulfate, as SO ₄ (by IC), mg/L	1.2	


Edward Wilson, Laboratory Director



Brown and Caldwell
Analytical

1255 Powell Street
Emeryville CA 94608
415-428-2300
FAX 415-547-3643

1255 Powell Street
Emeryville, CA 94608
510/428-2300
Fax: 510/547-3643

LOG NO: E92-08-539

Received: 27 AUG 92

Mailed: SEP 14 1992

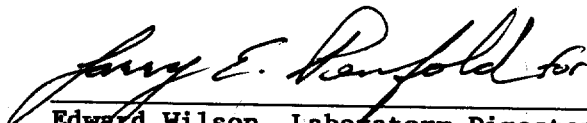
Mr. Dan Duncan
Brown and Caldwell, Air Monitoring Program
3480 Buskirk Avenue
Pleasant Hill, California 94596

Project: 7028-01

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, VAPOR OR AIR SAMPLES	DATE SAMPLED		
08-539-1	R1-2			
08-539-2	R2-2			27 AUG 92
08-539-3	RB-2			27 AUG 92
				27 AUG 92
PARAMETER		08-539-1	08-539-2	08-539-3
Sulfate, as SO ₄ (by IC), mg		0.11	0.29	<0.05


Edward Wilson, Laboratory Director

From Page No. _____

TARE WEIGHTS^(g)

DISH ID		TARE 1	TARE 2	TARE 3	TARE 4	TARE 5
Dish Type	DATE TIME	8/12/92 ^{AR}	8/12/92	8/13/92	8/14/92	8/17/92
100ml Beaker		1350 ^{AR} 0800	1615	0825	1515	0820
✓ AI		121.1216	121.1193	121.1219	121.1200	121.1221
BI		120.1470	120.1451	120.1475	120.1454	120.1478
CI		120.4201	120.4180	120.4202	120.4183	120.4204
DI		122.9868	122.9842	122.9873	122.9855	122.9876
EI		120.7330	120.7304	120.7335	120.7315	120.7336
FI		103.0575	103.0553	103.0581	103.0560	103.0581
GI		123.0680	123.0652	123.0685	123.0663	123.0686
HI		121.0934	121.0909	121.0937	121.0917	121.0939
II		125.9265	125.9243	125.9267	125.9248	125.9268
JI		117.4050	117.4027	117.4055	117.4034	117.4058
KI		100.9949	100.9933	100.9958	100.9942	100.9958
✓ LI		119.4025	119.4007	119.4030	119.4014	119.4030
		NR	NR	NR	NR	NR

To Page No. _____

Witnessed & Understood by me. _____

Date _____

Invented by _____

Date _____

Recorded by _____

Project No. _____

Book No. _____

TITLE _____

Page No. _____

DISHIP		SAMPLED	TARE #1	TARE #2	TARE #3		AVG
DATE		TIME	8/10/92	8/11/92	9/12/92	8/14/92	
			1545 AR	0850 AR	0815 AR	01524 AR	
SIZE	FD						
1x50	N		92.6967	92.6489	—		92.696
	G		105.6245	105.6244	—		105.6245
	D		102.6013	102.7940	102.7950	102.7954 AR	102.795
	E		100.0890	100.0891	—		100.0891
	B		105.7106	105.7110	—		105.7108
	A		100.5137	100.5134	—		100.513
70x50	32		58.3163	58.3165	—		58.3165
	35		60.4066	60.4068	—		60.4067
	6		56.2132	56.2136	—		56.2135

To Page No. _____

Witnessed & Understood by me. _____

Date _____

Invented by _____

Date _____

From Page No.

Tare weights

Dish ID

Date
Time

Tare 1

Tare 2

8-25-92
08058-26-92
0800

E1

120.7306

120.7305

J1

125.9248

125.9245

J1

117.4037

117.4036

To Page No

Witnessed & Understood by me.

Date

Invented by

Date

8-26-92

No. —	Designation	Method	5	Ave
Starts				
Per ID		Tare wt 1	Tare wt 2	
3x		8809	1 8810	
2x		8624	2 8626	
6x		8799	3 8696	
		8799	4 8797	8798
		6605		
		6716		
		6632		
		8756	5	8755
		8755	6	8755
		8757	7	8758
		8728		8726
		8752	9	8750
		8695	10	8691
		8597	11	8597
		8641	12	8641
		8820	13	8825
		8813	14	8810
		8691	15	8690
		8782	16	8782
		8630	17	8631
		8597	18	8598
		8639	19	8638
		8683	20	8683
		8656	21	8656
		8732	22	8730

To Page No. _____

Read & Understood by me, _____

Date _____

Invented by _____

Date _____

Recorded by _____

GIBSON 7028-01

Filter ID	SAMPLE ID	Final DATE #1 (u)	Final DATE #2	Final DATE #3	Avgl Differa
	DATE TIME	8/10/92 1530 JR	8/11/92 0830 AR	8/12/92 0820 AR	
14	EPA 58-RB-1	0.8586	0.8585		0.8585
12	R1-1	0.8800	0.8775	0.8777	0.8776
15	R2-1	0.8635	0.8632		0.8634
	REMARKS				

CITY OF LA 6942-02

Filter ID	SAMPLE ID	DATE TIME Tech	FINAL #1(g)	FINAL #2(g)	FINAL #3(g)	AVG
117	P1-B-3	8/11/92 0840 AR	0.6392	0.6395		0.6394
120	P1-R1-3		0.6418	0.6415		0.6417
119	P1-R2-3		0.6385	0.6387		0.6386
118	P1-R3-3		0.6414	0.6417		0.6416
116	P2-R1-3		0.6367	0.6367		0.6367
115	P2-R2-3		0.6394	0.6396		0.6395
114	P2-R3-3		0.6370	0.6370		0.6370

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No.

Gibson			Final 1	Final 2	Final 3
Dish ID	Sample ID	Avg. Tare wt.	8-25-92 0809	8-26-92 0821	8-27-92 0818
C1	R1-2	120.4203	120.4211	120.4210	
F1	R2-2	103.0581	(not done @ Time/Date)	103.0607	103.0601
G	RB-2 (18.8g)	56.2134	56.2138	56.2139	
D	R1-3b (250ml)	102.7952	(not done @ Time/Date)	102.8025	102.8021
E1	RS-3b (250ml)	120.73055			
J1	RB-3b (250ml)	117.40365			117.4043

Final 4
8/25/92
0834

J1 117.4047
AK

Final 1
8-31-92
0831

Final 2
9-2-92
0845

E1

120.7354

120.7358

To Page No.

Used & Understood by me,

Date

Invented by

Date

Recorded by

Dan Duncan

9-2-92

PUMP METER ASSEMBLY CALIBRATION DATA

DATE	21-Jul-92	PUMP NUMBER	488
OPERATOR	DR	ASSEMBLY NUM	789
		AVERAGE Y	1.017167
		AVERAGE DELTA	1.83694
		AVERAGE %Dev.	1.716665

	RUN #1	RUN #2	RUN #3
Pbar (in.Hg)	29.8	29.8	29.8
RUN TIME (MIN.)	15	15	15

WET METER DATA

Mi	26.3	38.9	56.339
Mf	36.367	47.248	62.377
NET (ft3)	10.067	8.348	6.038
Tm (F)	71.5	71.5	71
DH (in.)	-1	-0.8	-0.5
Vw(std)	9.785475	8.118561	5.881939

DRY METER DATA

Mi	83.379	95.834	112.91
Mf	93.315	104.062	118.809
NET (ft3)	9.936	8.228	5.899
Tm (F)	72	73	76
DH (in.)	1.5	1	0.5
Vd(std)	9.708729	8.014849	5.70699

RESULTS

RATE	0.647249	0.534323	0.380466
Y	1.007905	1.01294	1.030655
Delta H@	1.916451	1.848111	1.746257
%DEV.	-0.79048	-1.294	-3.06552
Y Tolerance	-0.00911	-0.00416	0.013261
^H@ Tol.	0.043284	0.006082	-0.04937

Post test cal. Gibson

Avg $\Delta H \approx 1.1$ Vacuum = 3.5 in Hg

7/31/92
NR

PUMP NUMBER
ASSEMBLY NUMBER
AVERAGE Y
AVERAGE DELTA H@
AVERAGE %Dev.

0488

~~751~~



RUN #3

30.10
10

30:10
10

30.10
10

Mi
Mf
NET (ft3)
Tm (F)
DH (in.)
Vw(std)

43.488
79.238
71
-1.2

99.238
105.065
71
-1.2

506
10.814
71
-1.2

Mi
 Mf
 NET (ft3)
 Tm (F)
 DH (in.)
 Vd(std)
 Vacuum

301.625
307.377
74
1.1
3.5

307.377
313.228
76
1.1
3.5

313.228
319.001
78
1.1
3.5

RATE
Y
Delta H@
%DEV.
Y Tolerance
^H@ Tol.

[illegible]

PUMP METER ASSEMBLY CALIBRATION DATA

Gibson Post Test

Avg H = 1.1

Max Vac = 3.5 in Hg

DATE 7/31/92
OPERATOR DR

PUMP NUMBER 789
ASSEMBLY NUMBER 789
AVERAGE Y 1.000875
AVERAGE DELTA H@ 1.859617
AVERAGE %Dev. 0.133576

	RUN #1	RUN #2	RUN #3
Pbar (in.Hg)	30.1	30.1	30.1
RUN TIME (MIN.)	10	10	10

WET METER DATA

Mi	93.488	99.238	5.065
Mf	99.238	105.065	10.814
NET (ft3)	5.75	5.827	5.749
Tm (F)	71	71	71
DH (in.)	-1.2	-1.2	-1.2
Vw(std)	5.648155	5.723791	5.647173

DRY METER DATA

Mi	301.625	307.377	313.228
Mf	307.377	313.228	319.001
NET (ft3)	5.752	5.851	5.773
Tm (F)	74	76	78
DH (in.)	1.1	1.1	1.1
Vd(std)	5.650037	5.725837	5.628504

RESULTS

RATE	0.565004	0.572584	0.56285
Y	0.999667	0.999643	1.003317
Delta H@	1.882824	1.826551	1.869476
%DEV.	0.033312	0.035732	-0.33169
Y Tolerance	-0.00121	-0.00123	0.002439
H@ Tol.	0.01248	-0.01778	0.005301