

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/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

Background Report Reference

AP-42 Section Number: 1.4

Background Chapter: 2

Reference Number: 9

Title: Urea Permit Compliance Testing at
Alamitos Generation Station Unit 2

Carnot

Carnot

November 1992

AP-42 ~~32~~#9
Section 1.4
(BIO Ch. 2)

15

**UREA PERMIT
COMPLIANCE TESTING AT ALAMITOS
GENERATING STATION UNIT 2**

Prepared For:

**Southern California Edison Company
Rosemead, California**

For Submittal To:

South Coast Air Quality Management District

Prepared By:

Edward J. Filadelfia

**CARNOT
Tustin, California**

NOVEMBER 1992

REVIEW AND CERTIFICATION

All work, calculations, and other activities and tasks performed and documented in this report were carried out under my direction and supervision.

Edward J. Filadelfia

Edward J. Filadelfia
Senior Engineer

Date 11/24/92

I have reviewed, technically and editorially, details, calculations, results, conclusions and other appropriate written material contained herein, and hereby certify that the presented material is authentic and accurate.

Carmela J. Rossi

Carmela J. Rossi, P.E.
Senior Engineer

Date 11/24/92



SECTION 1.0

INTRODUCTION

Carnot was contracted to conduct a series of emissions tests on Unit 2 at the Alamos Generating Station for Southern California Edison (SCE). Carnot conducted testing to comply with South Coast Air Quality Management District (SCAQMD) Permit A/N 248230.

A test program was conducted to quantify the effect of urea injection on various stack emissions as stated in the permit to construct. Emissions tests were performed on Alamos Unit 2 for the following:

- NO_x, CO, and O₂
- ROG as non-methane hydrocarbons
- Particulates
- NH₃ (urea on only)

Emissions testing was conducted by Edward J. Filadelfia, Craig H. Fry, Jim Mulligan and Robert Madrigal of Carnot, on October 6, 7, and 8, 1992. Mr. Barry Novodvorsky and Mike Escarcega of SCE coordinated the testing.

TABLE 1-1
EMISSIONS TEST RESULTS SUMMARY
ALAMITOS UNIT 2
October, 1992

Parameter	<u>NET LOAD 165 MW</u>		<u>NET LOAD 138 MW</u>		<u>NET LOAD 40 MW</u>	
	Urea Off	Urea On	Urea Off	Urea On	Urea Off	Urea On
NO _x ppm ⁽¹⁾	144.9	106.5	83.2	71.3	108.2	91.0
NO _x PPM @ 3% O ₂ ⁽¹⁾	141.9	103.1	85.8	73.7	142.9	120.5
CO ppm ⁽¹⁾	1.4	4.6	0.6	1.2	0.31	0.6
ppm @ 3%O ₂ ⁽¹⁾	1.3	4.5	0.6	1.2	0.4	0.8
Methane, ppm	ND < 1.0	< 1.4	< 1.1	ND < 1.0	ND < 1.0	ND < 1.0
TNMHC as CH ₄ , ppm	15.7	18.7	14.1	13.4	12.6	11.2
Particulate, lb/hr	1.30	1.23	0.44	1.36	0.24	1.01
Grain loading, gr/dscf	0.0008	0.0007	0.0003	0.0009	0.0003	0.0013
Total urea flow	0.0	1.2	0.0	0.7	0.0	0.25
NH ₃ Slip						
ppm	-	7.8	-	5.4	-	3.3
ppm @ 3%O ₂ ⁽²⁾	-	10.3	-	7.4	-	6.3

(1) Carnot CEM Data.

(2) Oxygen for correction from portable O₂ meter.

Notes: ND < indicates that this species was not detected.
 < indicated that this species was detected in at least one but not all samples.

SECTION 2.0

BOILER DESCRIPTION

1750 MW/AT/AR

Alamitos Unit 2 is a gas- or oil-fired steam-electric unit with a nameplate rating of 175 MW. The boiler is similar to five other units designed and built by B&W for SCE in 1956, and has a steam capacity of 1,140,000 lb/hr at design conditions of 1990 psig, 1000°F superheat, and 1000°F reheat steam temperature.

The furnace is fired with 16 combination gas/oil B&W burners arranged in a four-by-four matrix on the front wall. During gas fuel operation, the oil guns and diffusers are retracted to the back of the windbox. Gas is introduced radially inward through an external manifold spud burner. Combustion air enters each burner through adjustable vane-type air registers. The draft system is comprised of forced and induced draft fans, and the furnace is operated with slightly negative pressure.

The boilers are equipped with flue gas recirculation (GR) to the furnace hopper which is intended for steam temperature control. The flue gas is extracted from the boiler exhaust upstream of both air preheaters, and introduced into the furnace through slots between the waterwall tubes located in the rear wall immediately above the hopper. Spray attemperation for the superheaters and reheaters is also provided for steam temperature control.

SECTION 3.0

TEST DESCRIPTION

3.1 TEST CONDITIONS

The demonstration tests were conducted at two conditions and at three loads. Condition one was with urea off and condition two was with optimum urea injection. Duplicate tests were performed at each of the following net loads: 40, 138 and 165 MW. All testing were performed with the boiler fired on natural gas fuel. The test matrix and unit operating data are outlined in Tables 3-1 and 3-2. Test conditions were established by SCE personnel, and unit data was collected by Carnot and SCE personnel.

3.2 SAMPLE LOCATIONS

The particulate sampling was performed in two exhaust ducts located between the air preheater (APH) and the stack. Samples were drawn from two ports with seven points each on both the east and west ducts. This resulted in a total of 14 points per duct as shown in Figure 3-1.

Ammonia and hydrocarbon sampling was performed at the same locations as the particulates.

All gaseous testing (NO_x , CO and O_2) was performed on the hot (inlet) side of the APH, as shown in Figure 3-2, with an 8-point sampling grid on both the east and west ducts (16-point total).

3.3 TEST PROCEDURES

The test procedures used for this program are in Table 3-3. Descriptions of standard procedures are included in Appendix A. Additional information and modifications to standard procedures are presented in the following section.

TABLE 3-1
TEST MATRIX SCE ALAMITOS UNIT 2
October, 1992

Test	Date	Time	Type of Test	Load MW	Urea Injection Status	Comments
1-2-PM	10/6/92	0900/1027	Particulate	165	off	
1-2-HC	10/6/92	1012/1032	Hydrocarbon	165	off	
1-2-CEM	10/6/92	1012/1042	NO _x , CO & O ₂	165	off	
2-2-PM	10/6/92	1115/1157	Particulate	165	off	Isokinetics out of range.
3-2-PM	10/6/92	1305/1449	Particulate	165	off	
3-2-HC	10/6/92	1316/1336	Hydrocarbon	165	off	
3-2-CEM	10/6/92	1315/1350	NO _x , CO & O ₂	165	off	
4-2-PM	10/6/92	1530/1700	Particulate	165	on	
4-2-HC	10/6/92	1410/1430	Hydrocarbon	165	on	
4-2-CEM	10/6/92	1615/1645	NO _x , CO & O ₂	165	on	
4-2-NH ₃	10/6/92	1610/1641	Ammonia	165	on	
5-2-PM	10/6/92	1740/1907	Particulate	165	on	
5-2-HC	10/6/92	1810/1830	Hydrocarbon	165	on	
5-2-CEM	10/6/92	1815/1845	NO _x , CO & O ₂	165	on	
5-2-NH ₃	10/6/92	1810/1841	Ammonia	165	on	
6-2-PM	10/7/92	0830/1012	Particulate	138	off	
6-2-HC	10/7/92	0917/0937	Hydrocarbon	138	off	
6-2-CEM	10/7/92	0910/0955	NO _x , CO & O ₂	138	off	
7-2-PM	10/7/92	1056/1222	Particulate	138	off	
7-2-HC	10/7/92	1126/1146	Hydrocarbon	138	off	
7-2-CEM	10/7/92	1130/1225	NO _x , CO & O ₂	138	off	

(Continued)

TABLE 3-1 (Cont'd)
TEST MATRIX SCE ALAMITOS UNIT 2
October, 1992

Test	Date	Time	Type of Test	Load MW	Urea Injection Status	Comments
8-2-PM	10/7/92	1327/1457	Particulate	138	on	
8-2-HC	10/7/92	1400/1420	Hydrocarbon	138	on	
8-2-CEM	10/7/92	1400/1445	NO _x , CO & O ₂	138	off	
8-2-NH ₃	10/7/92	1400/1431	Ammonia	138	on	
9-2-PM	10/7/92	1535/1704	Particulate	138	on	
9-2-HC	10/7/92	1615/1635	Hydrocarbon	138	on	
9-2-CEM	10/7/92	1620/1650	NO _x , CO & O ₂	138	on	
9-2-NH ₃	10/7/92	1615/1646	Ammonia	138	on	
10-2-PM	10/8/92	0835/1012	Particulate	40	on	
10-2-HC	10/8/92	0909/0929	Hydrocarbon	40	on	
10-2-CEM	10/8/92	0905/0935	NO _x , CO & O ₂	40	on	
10-2-NH ₃	10/8/92	0900/0131	Ammonia	40	on	
11-2-PM	10/8/92	1105/1233	Particulate	40	on	
11-2-HC	10/8/92	1117/1137	Hydrocarbon	40	on	
11-2-CEM	10/8/92	1115/1145	NO _x , CO & O ₂	40	on	
11-2-NH ₃	10/8/92	1116/1147	Ammonia	40	on	
12-2-PM	10/8/92	1215/1441	Particulate	40	off	
12-2-HC	10/8/92	1345/1405	Hydrocarbon	40	off	
12-2-CEM	10/8/92	1345/1415	NO _x , CO & O ₂	40	off	
13-2-PM	10/8/92	1515/1641	Particulate	40	off	
13-2-HC	10/8/92	1525/1545	Hydrocarbon	40	off	
13-2-CEM	10/8/92	1525/1555	NO _x , CO & O ₂	40	off	

TABLE 3-2
UNIT OPERATING DATA SCE ALAMITOS UNIT 2
October, 1992

Test No.	Date	Load MW	Urea Status	Total Urea Flow gpm
1-2	10/6/92	166	off	0.0
2-2	10/6/92	166	off	0.0
3-2	10/6/92	166	off	0.0
4-2	10/6/92	166	on	1.2
5-2	10/6/92	166	on	1.2
6-2	10/7/92	137	off	0.0
7-2	10/7/92	138	off	0.0
8-2	10/7/92	137	on	0.7
9-2	10/7/92	138	on	0.7
10-2	10/8/92	39	off	0.25
11-2	10/8/92	39	off	0.25
12-2	10/8/92	39	off	0.0
13-2	10/8/92	39	off	0.0

⁽¹⁾ Burners Out Of Service.

TABLE 3-3
EMISSIONS TEST PROCEDURES SCE ALAMITOS UNIT 2
October, 1992

Parameter	Number of Replicates	Duration of Test (Minutes)	Measurement Principle	Reference Method	Method Detection Limit
NO _x	2	30	Chemiluminescent	SCAQMD 100.1	Below 2% of instrument full scale
CO	2	30	NDIR/Gas filter correlation	SCAQMD 100.1	Below 2% of instrument full scale
O ₂	2	30	Electrochemical cell	SCAQMD 100.1 EPA 3A	Below 2% of instrument full scale
ROG as Hydrocarbons	2	20	Gas chromatography/FID	SCAQMD 25.2	0.1 ppm
Particulate	2	86	In-stack filtration	SCAQMD 5.3	0.002 gr/dscf
Ammonia	2	30	Colorimetry Spectrophotometry	SCAQMD Draft 207.1	0.1 ppm

3.3.1 Gaseous Emissions

Gaseous species (NO_x , CO and O_2) were measured using Carnot's Continuous Emissions Monitor (CEM) described in Appendix A. This system meets SCAQMD, CARB and EPA requirements for gaseous species. Two thirty minute gaseous emissions test runs were done for each test condition and load. Leak checks were done at the beginning and end of the test program on all points of the grid. Carnot connected one of the probes to a heated line and knockout to perform a system bias. NO_2 was measured once at each test condition. The results can be found in Appendix D.2. On the cold side of the APH, O_2 was measured at each point during all isokinetic tests with a portable Teledyne O_2 analyzer. Linearity of the portable O_2 analyzer was established before and after each test day. The results from these calibrations are presented in Appendix C. For molecular weight and dilution calculations on the cold side of the APH, CO_2 was determined by stoichiometric calculation.

3.3.2 Particulate Matter

Particulate was measured according to SCAQMD Method 5.3 (in-stack filtration). A total of two separate runs were used for each load condition. Each test run was 84 minutes in duration. Emissions were calculated in lb/hr and lb/MMBtu.

During particulate sampling, a gas sample was drawn through a stainless steel nozzle into a Gelman in stack filter housing with a tared 45 mm fiberglass filter. The filter collected existing particulate at actual exhaust temperature. The gas sample was then drawn through two Smith Greenburg impingers containing 100 ml of distilled water, an empty impinger as a knock-out, a fourth impinger containing silica gel. The impingers collected any condensible particulate species.

3.3.3 Reactive Organic Gases (ROG) as Hydrocarbons

Hydrocarbon samples were collected in new tedlar bags and analyzed according to SCAQMD method 25.2. The samples were analyzed within 72 hours of collection by Atmosphere Assessments in Chatsworth, California.

3.3.4 Ammonia

Ammonia samples were collected non-isokinetically, with NH_3 being absorbed in two impingers containing 0.1 N H_2SO_4 . The ammonia was analyzed by SCAQMD NH_3 Draft Method in Carnot's Tustin Laboratory.

3.3.5 Velocity and Moisture

Stack gas velocity and moisture were determined by SCAQMD methods 2 and 4 in conjunction with every isokinetic test.

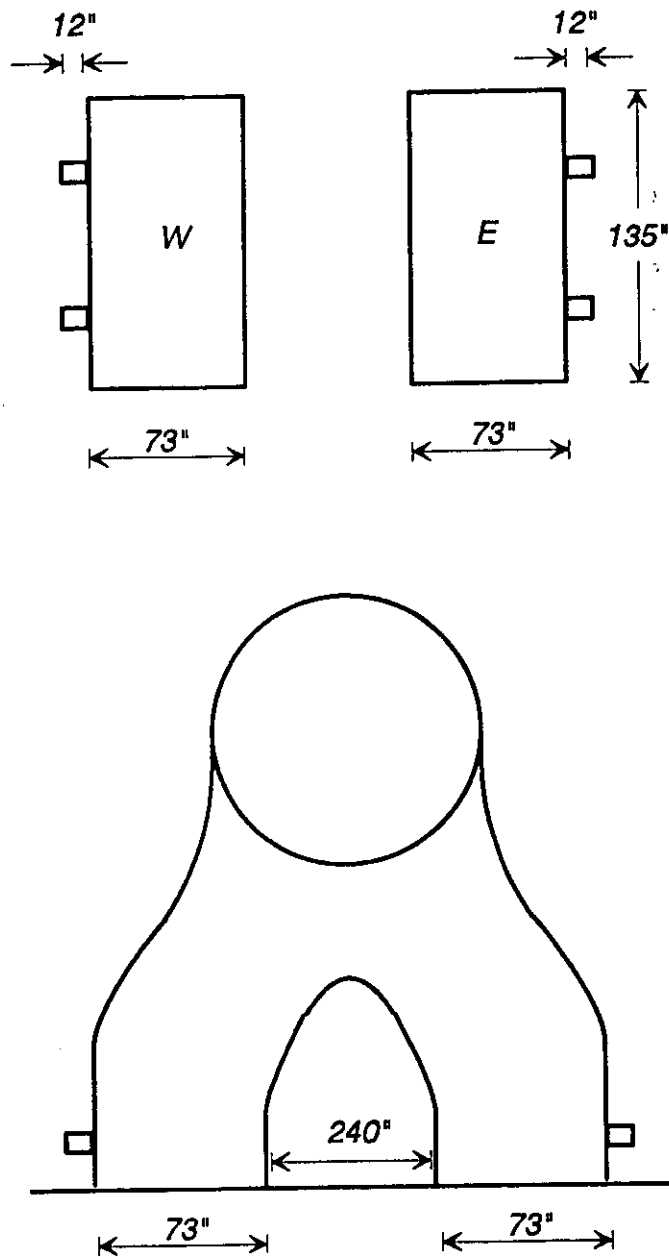


Figure 3-1. Alamitos Unit 2 Air Preheater Outlet Ducts Test Location

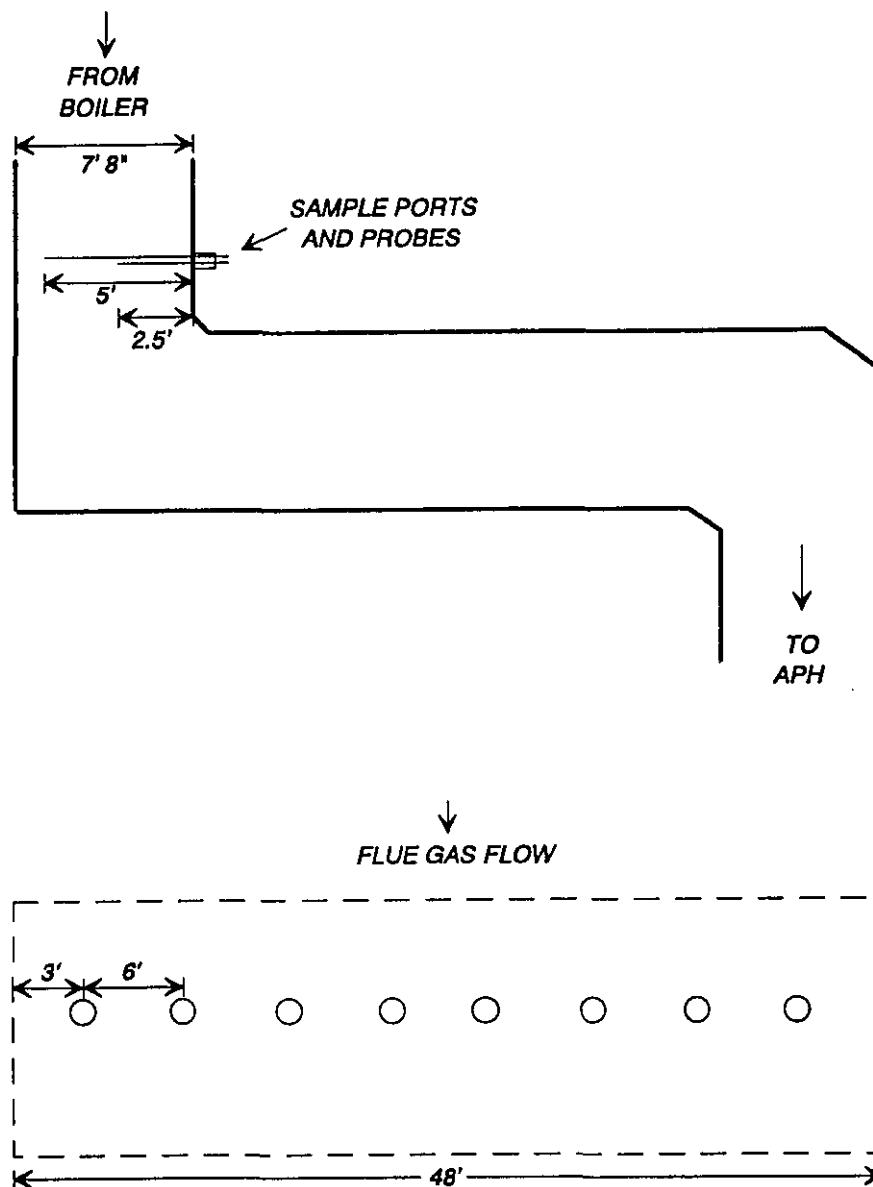


Figure 3-2. Alamitos Unit 2 Air Preheater Inlet Sample Test Location for NO_x, CO and O₂ Sampling

SECTION 4.0

RESULTS

Emissions test results are presented in Tables 4-1 to 4-6. Measurement procedures are detailed in Appendix A. Quality assurance and equipment calibrations are in Appendix B. All raw data sheets from Carnot's testing and from unit operation are included in Appendix C. Appendix D contains general and specific emissions calculations. Appendix E contains laboratory reports. Carnot's instrument strip charts are in Appendix F. Chain of Custody information is included in Appendix G.

TABLE 4-1
EMISSION TEST RESULTS AT 165 MW
UREA OFF
ALAMITOS UNIT 2
October 6, 1992

Parameter	Test No. 1-2	Test No. 3-2	Test Averages
NO _x , ppm ⁽¹⁾	147.3	142.4	144.9
ppm @ 3% O ₂ ⁽¹⁾	145.8	137.9	141.9
CO, ppm ⁽¹⁾	0.8	1.9	1.4
ppm @ 3% O ₂ ⁽¹⁾	0.8	1.8	1.3
O ₂ % ⁽¹⁾	2.8	2.4	2.6
Methane, ppm			
Total non-methane hydrocarbon as methane, ppm	ND < 1.0 13.8	ND < 1.0 17.5	ND < 1.0 15.7
Particulate analysis:			
Flow dscfm	187,400	199,700	193,600
Stack temperature °F	314.5	329.0	321.8
Moisture %	14.0	15.1	14.6
O ₂ % ⁽²⁾	7.7	7.4	7.6
lb/hr	1.61	0.98	1.30
Grain loading, gr/dscf	0.0013	0.0008	0.0010

(1) Carnot CEM Data.

(2) Oxygen for correction from portable O₂ meter.

Notes: ND < indicates that this species was not detected.
 < indicated that this species was detected in at least one but not all samples.

TABLE 4-2
EMISSIONS TEST RESULTS AT 165 MW
UREA ON
ALAMITOS UNIT 2
October 6, 1992

Parameter	Test No. 4-2	Test No. 5-2	Test Averages
NO _x , ppm ⁽¹⁾	109.3	103.6	106.5
ppm @ 3 % O ₂ ⁽¹⁾	105.9	100.3	103.1
CO, ppm ⁽¹⁾	3.3	5.9	4.6
ppm @ 3 % O ₂ ⁽¹⁾	3.2	5.7	4.5
O ₂ % ⁽¹⁾	2.4	2.4	2.4
Methane, ppm			
Total non-methane hydrocarbon as methane, ppm	1.7 18.0	ND < 1.0 19.4	< 1.4 18.7
NH ₃ , ppm	4.0	11.5	7.8
ppm @ 3 % O ₂ ⁽²⁾	5.3	15.3	10.3
Particulate analysis:			
Flow dscfm	216,600	192,500	204,600
Stack temperature °F	310.4	319.6	315.0
Moisture %	16.1	15.2	15.6
O ₂ % ⁽²⁾	7.4	7.4	7.4
lb/hr	1.17	1.29	1.23
Grain loading, gr/dscf	0.0006	0.0008	0.0007

(1) Carnot CEM Data.

(2) Oxygen for correction from portable O₂ meter.

Notes: ND < indicates that this species was not detected.
< indicated that this species was detected in at least one but not all samples.

TABLE 4-3
EMISSION TEST RESULTS AT 138 MW
UREA OFF
ALAMITOS UNIT 2
October 7, 1992

Parameter	Test No. 6-2	Test No. 7-2	Test Averages
NO _x , ppm ⁽¹⁾	82.9	83.5	83.2
ppm @ 3% O ₂ ⁽¹⁾	84.8	86.7	85.8
CO, ppm ⁽¹⁾	0.7	0.5	0.6
ppm @ 3% O ₂ ⁽¹⁾	0.7	0.5	0.6
O ₂ % ⁽¹⁾	3.4	3.7	3.6
Methane, ppm			
Total non-methane hydrocarbon as methane, ppm	1.2 14.6	ND < 1.0 13.6	< 1.1 14.1
Particulate analysis:			
Flow dscfm	156,600	193,500	175,100
Stack temperature °F	300.2	339.6	319.9
Moisture %	13.9	14.2	14.1
O ₂ % ⁽²⁾	8.5	8.1	8.3
lb/hr	0.24	0.64	0.44
Grain loading, gr/dscf	0.0002	0.0004	0.0003

(1) Carnot CEM Data.

(2) Oxygen for correction from portable O₂ meter.

Notes: ND < indicates that this species was not detected.
 < indicated that this species was detected in at least one but not all samples.

TABLE 4-4
EMISSION TEST RESULTS AT 138 MW
UREA ON
ALAMITOS UNIT 2
October 7, 1992

Parameter	Test No. 8-2	Test No. 9-2	Test Averages
NO _x , ppm ⁽¹⁾	70.7	71.9	71.3
ppm @ 3 % O ₂ ⁽¹⁾	72.9	74.4	73.7
CO, ppm ⁽¹⁾	1.3	1.0	1.2
ppm @ 3 % O ₂ ⁽¹⁾	1.4	1.0	1.2
O ₂ % ⁽¹⁾	3.5	3.6	3.6
Methane, ppm			
Total non-methane hydrocarbon as methane, ppm	ND < 1.0 13.6	ND < 1.0 13.1	ND < 1.0 13.4
NH ₃ , ppm	3.3	7.5	5.4
ppm @ 3 % O ₂ ⁽²⁾	4.6	10.2	7.4
Particulate analysis:			
Flow dscfm	177,600	156,000	166,800
Stack temperature °F	342.3	298.5	320.4
Moisture %	14.7	14.0	14.3
O ₂ % ⁽²⁾	8.2	7.8	8.0
lb/hr	1.80	0.91	1.36
Grain loading, gr/dscf	0.0012	0.0007	0.0009

(1) Carnot CEM Data.

(2) Oxygen for correction from portable O₂ meter.

Notes: ND < indicates that this species was not detected.
< indicated that this species was detected in at least one but not all samples.

TABLE 4-5
EMISSION TEST RESULTS AT 40 MW
UREA OFF
ALAMITOS UNIT 2
October 8, 1992

15.8

Parameter	Test No. 12-2	Test No. 13-2	Test Averages
NO _x , ppm ⁽¹⁾	108.6	107.7	108.2
ppm @ 3% O ₂ ⁽¹⁾	143.4	142.4	142.9
CO, ppm ⁽¹⁾	0.32	0.30	0.31
ppm @ 3% O ₂ ⁽¹⁾	0.4	0.4	0.4
O ₂ % ⁽¹⁾	7.3	7.3	7.3
Methane, ppm			
Total non-methane hydrocarbon as methane, ppm	ND < 1.0 10.3	ND < 1.0 14.8	ND < 1.0 12.6
Particulate analysis:			
Flow dscfm	76,800	113,800	95,300
Stack temperature °F	337.6	284.1	310.9
Moisture %	11.6	11.9	11.8
O ₂ % ⁽²⁾	12.2	11.1	11.7
lb/hr	0.22	0.26	0.24
Grain loading, gr/dscf	0.0003	0.0023	0.0013

(1) Carnot CEM Data.

(2) Oxygen for correction from portable O₂ meter.

Notes: ND < indicates that this species was not detected.
< indicated that this species was detected in at least one but not all samples.

TABLE 4-6
EMISSION TEST RESULTS AT 40 MW
UREA On
ALAMITOS UNIT 2
October 8, 1992

15.7

Parameter	Test No. 10-2	Test No. 11-2	Test Averages
NO _x , ppm ⁽¹⁾	89.3	92.7	91.0
ppm @ 3% O ₂ ⁽¹⁾	117.8	123.1	120.5
CO, ppm ⁽¹⁾	0.5	0.7	0.6
ppm @ 3% O ₂ ⁽¹⁾	0.7	0.9	0.8
O ₂ % ⁽¹⁾	7.3	7.4	7.4
Methane, ppm			
Total non-methane hydrocarbon as methane, ppm	ND < 1.0 11.1	ND < 1.0 11.3	ND < 1.0 11.2
NH ₃ , ppm	4.1	2.5	3.3
ppm @ 3% O ₂ ⁽²⁾	7.8	4.8	6.3
Particulate analysis:			
Flow dscfm	104,100	88,200	96,200
Stack temperature °F	282.2	335.4	308.8
Moisture %	13.4	11.8	12.6
O ₂ % ⁽²⁾	11.6	11.5	11.6
lb/hr	0.3	1.72	1.01
Grain loading, gr/dscf	0.0003	0.0003	0.0003

(1) Carnot CEM Data.

(2) Oxygen for correction from portable O2 meter.

Notes: ND < indicates that this species was not detected.
 < indicated that this species was detected in at least one but not all samples.

APPENDIX A
MEASUREMENT PROCEDURES

Continuous Emissions Monitoring System

Oxygen (O_2) by Continuous Analyzer

NO/ NO_x by Continuous Analyzer

Carbon Monoxide (CO) by NDIR/Gas Filter Correlation

Total Particulate by SCAQMD Method 5.3 w/Condensible Analysis

Hydrocarbons by SCAQMD Micro TCA Method

Ammonia

Continuous Emissions Monitoring System

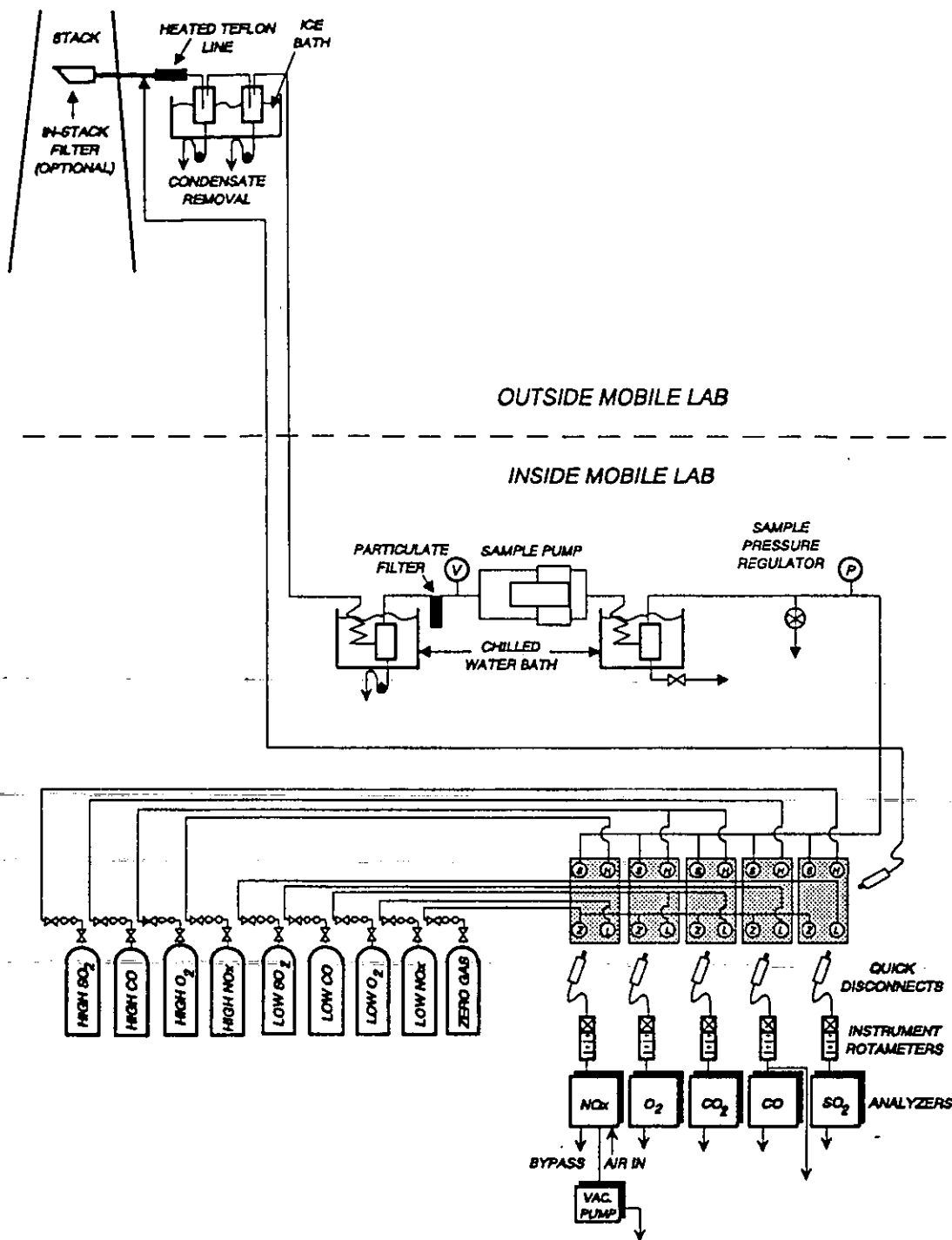
O₂, CO, CO₂, NO, NO_x and SO₂ are measured using an extractive continuous emissions monitoring (CEM) package, shown in the following figure. This package is comprised of three basic subsystems. They are: (1) the sample acquisition and conditioning system, (2) the calibration gas system, and (3) the analyzers themselves. This section presents a description of the sampling and calibration systems. Descriptions of the analyzers used in this program and the corresponding reference test methods follow. Information regarding quality assurance information on the system, including calibration routines and system performance data follows.

The sample acquisition and conditioning system contains components to extract a representative sample from the stack or flue, transport the sample to the analyzers, and remove moisture and particulate material from the sample. In addition to performing the tasks above, the system must preserve the measured species and deliver the sample for analysis intact. The sample acquisition system extracts the sample through a stainless steel probe. The probe is insulated or heated as necessary to avoid condensation. If the particulate loading in the stack is high, a sintered stainless steel filter is used on the end of the probe.

Where water soluble NO₂ and/or SO₂ are to be measured, the sample is drawn from the probe through a heated teflon sample line into an on-stack cooled (approximately 35-40°F) water removal trap. The trap consists of stainless steel flasks in a bath of ice and water. This design removes the water vapor by condensation. The contact between the sample and liquid water is minimized and the soluble NO₂ and SO₂ are conserved. This system meets the requirements of EPA Method 20. The sample is then drawn through a teflon transport line, particulate filter, secondary water removal and into the sample pump. The pump is a dual head, diaphragm pump. All sample-wetted components of the pump are stainless steel or teflon. The pressurized sample leaving the pump flows through a third condensate trap in a refrigerated water bath (≈38°F) for final moisture removal. A drain line and valve are provided to constantly expel any condensed moisture from the dryer at this point. After the dryer, the sample is directed into a distribution manifold. Excess sample is vented through a back-pressure regulator, maintaining a constant pressure of 5-6 psig to the analyzer rotameters.

The calibration system is comprised of two parts: the analyzer calibration, and the system bias check (dynamic calibration). The analyzer calibration equipment includes pressurized cylinders of certified span gas. The gases used are, as a minimum, certified to 1% by the manufacturer. Where necessary to comply with reference method requirements EPA Protocol 1 gases are used. The cylinders are equipped with pressure regulators which supply the calibration gas to the analyzers at the same pressure and flow rate as the sample. The selection of zero, span, or sample gas directed to each analyzer is accomplished by operation of the sample/calibration selector fittings.

The system bias check is accomplished by transporting the same gases used to zero and span the analyzers to the sample system as close as practical to the probe inlet. This is done either by attaching the calibration gas supply line to the probe top with flexible tubing or by actuation of a solenoid valve located at the sample conditioner inlet (probe exit). The span gas is exposed to the same elements as the sample and the system response is documented. The analyzer indications for the system calibration check must agree within 5% of the analyzer calibration. Values are adjusted and changes/repairs are made to the system to compensate for any difference in analyzer readings. Specific information on the analytical equipment and test methods used is provided in the following pages.



SCHEMATIC OF CEM SYSTEM

CEM-807

CARNOT

Method:	Oxygen (O ₂) by Continuous Analyzer
Applicable Reference Methods:	EPA 3A, EPA 20, ARB 100, BA ST-14, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned, and conveyed to the instrument for direct readout of O ₂ concentration.
Analyzer:	Teledyne Model 326A
Measurement Principle:	Electrochemical cell
Ranges:	0-5, 0-10, 0-25% O ₂
Accuracy:	1 % of full scale
Output:	0-100 mV, linear
Interferences:	Halogens and halogenated compounds will cause a positive interference. Acid gases will consume the fuel cell and cause a slow calibration drift.
Response Time:	90% < 7 seconds
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. If Method 20 is used, that method's specific procedures for selecting sample points are used. Otherwise, stratification checks are performed at the start of a test program to select single or multiple-point sample locations.
Analytical Procedure:	An electrochemical cell is used to measure O ₂ concentration. Oxygen in the flue gas diffuses through a Teflon membrane and is reduced on the surface of the cathode. A corresponding oxidation occurs at the anode internally, and an electric current is produced that is proportional to the concentration of oxygen. This current is measured and conditioned by the instrument's electronic circuitry to give an output in percent O ₂ by volume.
Special Calibration Procedure:	The measurement cells used with the O ₂ instrument have to be replaced on a regular basis. After extended use, the cell tend to produce a nonlinear response. Therefore, a three-point calibration is performed at the start of each test day to check for linearity. If the response is not linear ($\pm$ 2% of scale), the cell is replaced.

Method:	NO/NO _x by Continuous Analyzer
Applicable Reference Methods:	EPA 7E, EPA 20; ARB 100, BA ST-13A, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned, and conveyed to the instrument for direct readout of NO or NO _x .
Analyzer:	Teco Model No. 10AR
Measurement Principle:	Chemiluminescence
Accuracy:	1% of full scale
Ranges:	0-2.5, 0-10, 0-25, 0-100, 0-250, 0-1000, 0-2500, 0-10,000 ppm
Output:	0-10 mV
Inferences:	Compounds containing nitrogen (other than ammonia) may cause interference.
Response Time:	90%, 1.5 seconds (NO mode) and 1.7 seconds (NO _x mode)
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. If EPA Method 20 is used, that method's specific procedures for selecting sample points are used.
Analytical Procedure:	The oxides of nitrogen monitoring instrument is a chemiluminescent nitric oxide analyzer. The operational basis of the instrument is the chemiluminescent reaction of NO and ozone (O₃) to form NO₂ in an excited state. Light emission results when excited NO₂ molecules revert to their ground state. The resulting chemiluminescence is monitored through an optical filter by a high sensitivity photomultiplier tube, the output of which is electronically processed so it is linearly proportional to the NO concentration. The output of the instrument is in ppmV. When NO₂ is expected to be present in the flue gas, a supercooled water dropout flask will be placed in the sample line to avoid loss of NO₂. Since NO₂ is highly soluble in water, "freezing out" the water will allow the NO₂ to reach the analyzers for analysis. The analyzer measures NO only. In the NO_x mode, the gas is passed through a moly converter which converts NO₂ to NO and a total NO_x measurement is obtained. NO₂ is determined as the difference between NO and NO_x. Use of a moly converter instead of a stainless steel converter eliminates NH₃ interference; NH₃ is converted to NO with a stainless converter, but not with a moly converter.

Method: Carbon Monoxide (CO) by NDIR/Gas Filter Correlation

Applicable Reference Methods: EPA 10; ARB 1-100; BA ST-6, SCAQMD 100.1

Principle: A sample is continuously drawn from the flue gas stream, conditioned, and conveyed to the instrument for direct readout of CO concentration.

Analyzer: TECO, Model 48

Measurement Principle: NDIR/Gas Filter Correlation

Precision: 0.1 % ppm

Ranges: 0-5, 0-10, 0-25, 0-50, 0-100, 0-250, 0-500, 0-1000, 0-5000 ppm

Output: 0-100 mV

Interferences: Negligible interference from water and CO₂

Rise/Fall Times (0-95 %) 1 minute @ 1 lpm flow, 30 second integration time

Sampling Procedure: A representative flue gas sample is collected and conditioned using the CEM system described previously. Sample point selection has been described previously.

Analytical Procedure: Radiation from an infrared source is chopped and then passed through a gas filter which alternates between CO and N₂ due to rotation of a filter wheel. The radiation then passes through a narrow band-pass filter and a multiple optical pass sample cell where absorption by the sample gas occurs. The IR radiation exits the sample cell and falls on a solid state IR detector.

Method: **Total Particulate by SCAQMD Method 5.3 with Condensible Analysis**

Reference: EPA Method 5
SCAQMD Source Testing Manual, March, 1989

Principle: A metered flue gas sample is collected isokinetically and particulates are collected in-stack filter followed by a series of water impingers.

Sampling Procedure: The sample train used in the tests is shown in the following figure. The sample is drawn isokinetically through a nozzle, a stainless steel or glass probe, and an in-stack filter. This is followed by two Smith-Greenburg impingers which contain 100 ml of distilled water, an empty impinger as a knock-out, and an impinger containing silica-gel to protect the leak-tight vacuum pump and calibrated dry gas meter from moisture. The impingers collect condensible particulate species while the filter collects any existing as particulate at stack temperature.

EPA Method 4 (moisture) and Methods 1 and 2 (velocity) are performed in conjunction with the test. Stack velocity is measured during the test to maintain isokinetic sampling and to measure stack flow rate. Moisture concentration is determined by weighing the impingers before and after sampling to determine the amount of moisture collected.

Sample Recovery and Analysis: Following testing, the impingers are weighed for moisture determination and the following sample fractions are recovered:

1. Probe, nozzle and front-half glassware - water and brushing
2. Filter
3. Impingers and connecting glassware - water wash

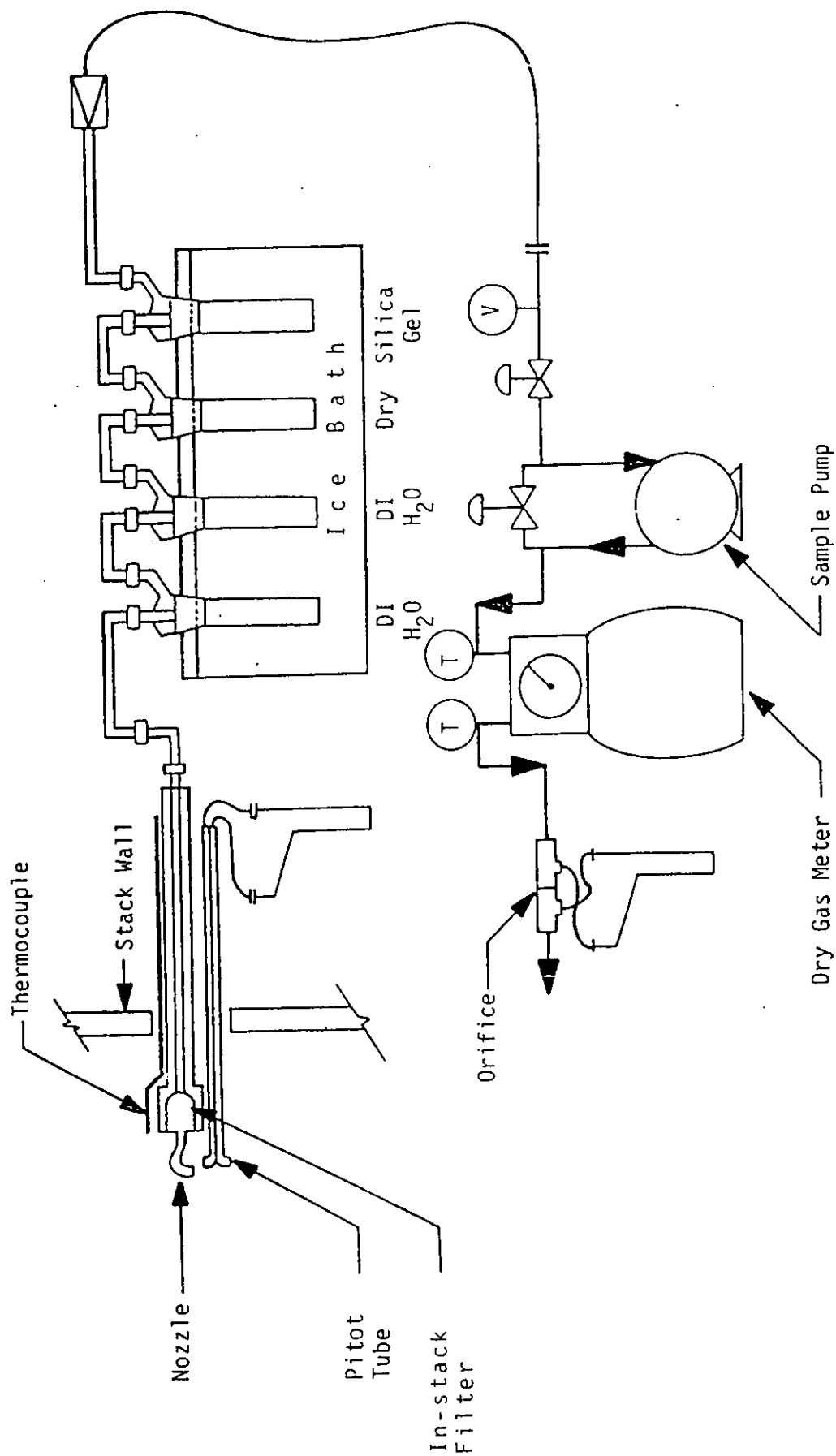
The probe wash is evaporated at low temperatures, baked at 105°C, desiccated and weighed; the filter is baked at 105°C, desiccated and weighed; and the aliquots of the impinger catch are baked at 105°C, desiccated and weighed.

Each sample train fraction is analyzed by acid-base titration for its acid sulfate content and by barium-thorin titration for sulfate content.

Particulate concentration is determined by dividing the mass of particulate collected by the sample gas volume.

If the sample contains semi-volatile hydrocarbon species that might be lost by evaporating at 105°C, the sample is extracted with methylene chloride to remove those species, and the methylene chloride fraction is evaporated at ambient temperature and weighed.

If there are high concentrations of SO₂ in the gas stream, a positive interference can be caused by oxidation of SO₂ to sulfuric acid in the impingers. In this case, the impinger boildown residue is analyzed for sulfuric acid (either by titration or precipitation) and the acid is



Sample Train for Determination of Particulate by
SCAQMD Method 5.3

subtracted from the particulate catch as $\text{H}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}$. If the filter was heated to 250°F , this fraction includes both SO_2 -related "pseudo-particulate" as well as the true particulate species SO_3 , a separate test for sulfuric acid mist is run and sulfuric acid mist is added back to the particulate catch as $\text{H}_2\text{SO}_4 \cdot 2\text{H}_2\text{O}$.

If interfering species such as NH_3 or HCl are present in the gas, large quantities of pseudoparticulate sulfates and chlorides can be formed. In these cases, special procedures must be used to ensure that erroneously high particulate emission rates are not reported.

Method: Hydrocarbons by SCAQMD Micro Total Carbon Analysis (TCA/FID) Method

Reference: SCAQMD Method 25.2 (draft Source Test Manual)

Principle: A Tedlar bag is filled with flue gas at a constant rate. The bag contents are analyzed by gas chromatography/flame ionization detection for CO, CO₂, methane and total gaseous non-methane hydrocarbons.

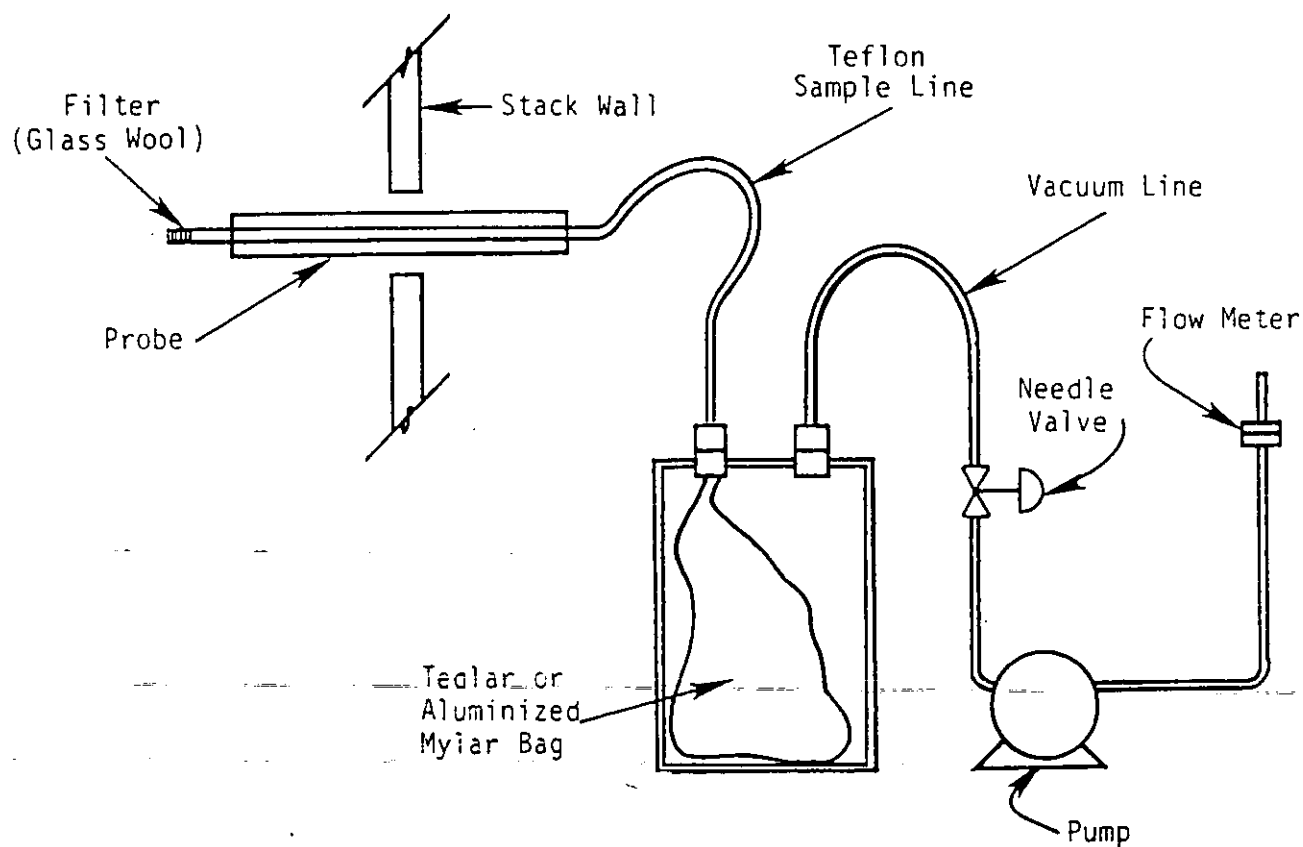
Sampling Procedure: Samples are collected using a lung-type sampling system shown in the attached figure. In this system, a bag is placed in a sealed container and the container is evacuated. Flue gas enters the bag as it expands to fill the container. Sampling rate is monitored by a rotameter on the container exhaust. This system allows sample collection without exposing the sample to pumps, flowmeters, oils, etc.

Analytical Procedure: In the analytical phase, gaseous carbon compounds from the tank are fractionated on a chromatographic column, eluting in the order: carbon monoxide, methane, carbon dioxide, non-methane hydrocarbons. All resulting vapors are passed through oxidizers where they are combusted to carbon dioxide, then converted to methane and measured by flame ionization detection. CO₂, CO, CH₄, and total gaseous non-methane hydrocarbons are reported separately.

This method provides lower detection limits than the standard TCA procedure, which uses GC/NDIR. Since this method does not use a steel condensate trap, it eliminates positive interferences that have been associated with carbon dioxide dissolved in water frozen in the condensate trap and released during analysis.

The TCA/FID method is appropriate for combustion sources and ambient sampling where low concentrations of hydrocarbons are expected.

Carnot subcontracts TCA analysis to qualified local laboratories experienced in the analytical procedures.



Sample Train for Determination of Hydrocarbons
by SCAQMD Micro TCA Method

Method: Ammonia

Principle: Ammonia emissions are determined by collecting a dry, metered volume of flue gas containing ammonia vapor in dilute sulfuric acid solution. The ammonia concentration of the sample is then determined by ion selective electrode or colorimetric spectrophotometry.

Sampling Procedure: The ammonia sampling probe/train arrangement used during the test program is shown schematically in the following figure.

A sample is extracted through a glass probe fitted with a quartz wool plug or filter used to remove particulate matter. The plug is located and/or heated to avoid condensation of moisture at the plug. The sample is then passed through four impingers. The first two impingers are filled with 100 ml of 0.1 N sulfuric acid (H_2SO_4), the third is empty, and the fourth is filled with silica gel.

After each sample run, the quartz wool plug is removed and placed in a sample bottle. If a filter is used, it is generally saved but not analyzed. The impingers, glass probe, and sampling train glassware are washed with dilute H_2SO_4 into a separate sample bottle. The sample bottles containing the impinger wash solution and the quartz wool plug or filter are returned to the laboratory for analysis.

Analytical Procedure: Ammonia in source test samples is analyzed by ion selective electrode or colorimetrically. Source test samples are generally at low levels and titrations for ammonia are not applicable. The following sections discuss the two applicable analytical techniques.

Ion Selective Electrode

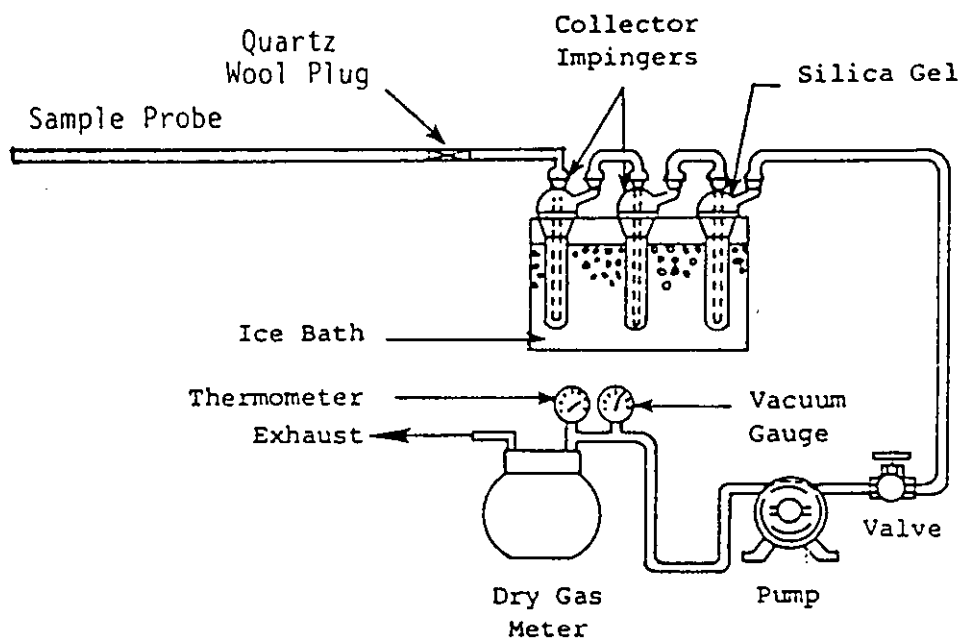
The ammonia samples are analyzed using an Orion Research Model 940 Microprocessor Ionanalyzer equipped with an ammonia ion selective electrode. The ammonia electrode is a glass electrode and reference electrode mounted behind a gas permeable membrane that separates the sample solution from the internal filling solution. After the addition of sodium hydroxide, ammonia in the sample diffuses across the electrode membrane. The measured pH change in the internal electrode solution is proportional to the concentration of ammonia in the sample solution.

The ammonia concentrations of the sample solutions are measured in units of ppm NH_3 by weight with the specific ion analyzer. By using the NH_3 concentration in ppm by weight, measuring the liquid volume of the sample solution, and obtaining the volume of the flue gas sample, the stack flue gas NH_3 concentration in ppm by volume is calculated using the equation:

$$NH_3 \text{ ppmV} = 0.049 \frac{(\text{ppm wt } NH_3 \text{ soln}) (\text{liq. vol., ml})}{\text{DSCF (at } 60^\circ\text{F) of sampled flue gas}}$$

Colorimetric Spectrophotometry

In the analytical phase, the resulting ammonium sulfate is mixed with Nessler reagent, forming a yellow-brown compound with a maximum absorbance in the 440 nm range. The ammonia concentration in the sample is determined colorimetrically by comparison to a standard calibration curve. Care will be taken to dilute the sample to the optimum observed range. If turbidity exists upon addition of Nessler reagent, the option of distillation or ion selective electrode will be used. Distillation will remove any aromatic and aliphatic amines along with other organic and inorganic compounds which can cause interference with the analysis.



Ammonia sampling probe/train arrangement.

APPENDIX B
QUALITY ASSURANCE

Appendix B.1
Quality Assurance Program Summary

QUALITY ASSURANCE PROGRAM SUMMARY AND ARB CERTIFICATION

Carnot ensures the quality and validity of its emission measurement and reporting procedures through a rigorous quality assurance (QA) program. The program is developed and administered by an internal QA Officer and encompasses seven major areas:

1. Development and use of an internal QA manual.
2. QA reviews of reports, laboratory work, and field testing.
3. Equipment calibration and maintenance.
4. Chain of custody.
5. Training.
6. Knowledge of current test methods.
7. Agency certification.

Each of these areas is discussed individually below.

Quality Assurance Manual. Carnot has prepared a QA Manual according to EPA guidelines. The manual serves to document and formalize all of Carnot's QA efforts. The manual is constantly updated, and each member of the Source Test Division is required to read and understand its contents. The manual includes details on the other six QA areas discussed below.

QA Reviews. Carnot's review procedure includes review of each source test report by the QA Officer, and spot check reviews of laboratory and field work.

The most important review is the one that takes place before a test program begins. The QA Officer works closely with Source Test Division personnel to prepare and review test protocols. Test protocol review includes selection of appropriate test procedures, evaluation of any interferences or other restrictions that might preclude use of standard test procedures, and evaluation and/or development of alternate procedures.

Equipment Calibration and Maintenance. The equipment used to conduct the emissions measurements is maintained according to the manufacturer's instructions to ensure proper operation. In addition to the maintenance program, calibrations are carried out on each measurement device according to the schedule outlined by the California Air Resources Board (CARB). The schedule for maintenance and calibrations are given in Tables B-1 and B-2. Quality control checks are also conducted in the field for each test program. The following is a partial list of checks made as part of each CEM system test series.

- Sample acquisition and conditioning system leak check.
- 2-point analyzer calibrations (all analyzers)
- 3-point analyzer calibrations (analyzers with potential for linearity errors).
- Complete system calibration check ("dynamic calibration" through entire sample system).

- Periodic analyzer calibration checks (once per hour) are conducted at the start and end of each test run. Any change between pre- and post-test readings are recorded.
- All calibrations are conducted using gases certified by the manufacturer to be $\pm 1\%$ of label value (NBS traceable).

Calibration and CEM performance data are fully documented, and are included in each source test report.

Chain of Custody. Carnot maintains full chain of custody documentation on all samples and data sheets. In addition to normal documentation of changes between field sample custodians, laboratory personnel, and field test personnel, Carnot documents every individual who handles any test component in the field (e.g., probe wash, impinger loading and recovery, filter loading and recovery, etc.).

Samples are stored in a locked area to which only Source Test Division personnel have access. Neither other Carnot employees nor cleaning crews have keys to this area.

Data sheets are copied immediately upon return from the field, and this first generation copy is placed in locked storage. Any notes made on original sheets are initialed and dated.

Training. Personnel training is essential to ensure quality testing. Carnot has formal and informal training programs which include:

1. Attendance at EPA-sponsored training courses.
2. Enrollment in EPA correspondence courses.
3. A requirement for all technicians to read and understand Carnot's QA Manual.
4. In-house training and QA meetings on a regular basis.
5. Maintenance of training records.

Knowledge of Current Test Methods. With the constant updating of standard test methods and the wide variety of emerging test methods, it is essential that any qualified source tester keep abreast of new developments. Carnot subscribes to services which provide updates on EPA and CARB reference methods, and on EPA, CARB and SCAQMD rules and regulations. Additionally, source test personnel regularly attend and present papers at testing and emission-related seminars and conferences. Carnot personnel maintain membership in the Air Pollution Control Association, the Source Evaluation Society, and the ASME Environmental Control Division.

AGENCY CERTIFICATION

Carnot is certified by the CARB as an independent source test contractor for gaseous and particulate measurements. Carnot also participates in EPA QA audit programs for Methods 5, 6 and 7.

TABLE B-1
SAMPLING INSTRUMENTS AND EQUIPMENT CALIBRATION SCHEDULE
As Specified by the CARB

Instrument Type	Frequency of Calibration	Standard of Comparison or Method of Calibration	Acceptance Limits
Orifice Meter (large)	12 months	Calibrated dry test meter	$\pm 2\%$ of volume measured
Dry Gas Meter	12 months or when repaired	Calibrated dry test meter	$\pm 2\%$ of volume measured
S-Type Pitot (for use with EPA-type sampling train)	6 months	EPA Method 2	Cp constant (+5%) over working range; difference between average Cp for each leg must be less than 2%
Vacuum Gauges Pressure Gauges	6 months	Manometer	$\pm 3\%$
Field Barometer	6 months	Mercury barometer	$\pm 0.2''$ Hg
Temperature Measurement	6 months	NBS mercury thermometer or NBS calibrated platinum RTD	$\pm 4^{\circ}\text{F}$ for $< 400^{\circ}\text{F}$ $\pm 1.5\%$ for $> 400^{\circ}\text{F}$
Temperature Readout Devices	6 months	Precision potentiometer	$\pm 2\%$ full scale reading
Analytical Balance	12 months (check prior to each use)	Should be performed by manufacturer or qualified laboratory	± 0.3 mg of stated weight
Probe Nozzles	12 Months	Nozzle diameter check micrometer	Range $< \pm 0.10$ mm for three measurements
Continuous Analyzers	Depends upon use, frequency and performance	As specified by manufacturers operating manuals, EPA NBS gases and/or reference methods	Satisfy all limits specified in operating specifications

TABLE B-2
EQUIPMENT MAINTENANCE SCHEDULE
Based on Manufacturer's Specifications and Carnot Experience

Equipment	Performance Requirement	Maintenance Interval	Corrective Action
Pumps	1. Absence of leaks 2. Ability to draw manufacturer required vacuum and flow	Every 500 hours of operation or 6 months, whichever is less	1. Visual inspection 2. Clean 3. Replace worn parts 4. Leak check
Flow Measuring Device	1. Free mechanical movement 2. Absence of malfunction	Every 500 hours of operation or 6 months, whichever is less After each test, if used in H ₂ S sampling or other corrosive atmospheres	1. Visual inspection 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero, span gas	As required by the manufacturer	As recommended by manufacturer
Integrated Sampling Tanks	Absence of leaks	Depends on nature of use	1. Steam clean 2. Leak check
Mobile Van Sampling Systems	Absence of leaks	Depends on nature of use	1. Change filters 2. Change gas dryer 3. Leak check 4. Check for system contamination
Sampling Lines	Sample degradation less than 2%	After each test or test series	Blow filtered air through line until dry

Appendix B.2
ARB Certification

State of California
AIR RESOURCES BOARD

Executive Order G-767

Approval to Carnot
To Conduct Testing as an Independent Contractor

WHEREAS, the Air Resources Board ("Board"), pursuant to Section 41512 of the California Health and Safety Code, has established the procedures contained in Section 91200-91220, Title 17, California Code of Regulations, to allow the use of independent testers for compliance tests required by the Board; and

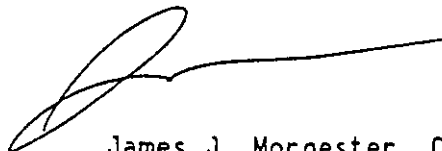
WHEREAS, pursuant to Sections 91200-91220, Title 17, California Code of Regulations, the Executive Officer has determined that Carnot meets the requirements of the Board for conducting ARB Test Methods 1, 2, 3, 4, 5, 6, 8, 10, and 100 (NOx, O2) when the following conditions are met:

1. Carnot conducts ARB Test Method 100 for O2 using a Teledyne 326 analyzer with either a A5 or a B1 sensor, or a paramagnetic analyzer.

NOW, THEREFORE, BE IT ORDERED that Carnot is granted an approval, from the date of execution of this order, until June 30, 1993 to conduct the tests listed above, subject to compliance with Section 91200-91220, Title 17, California Code of Regulations.

BE IT FURTHER ORDERED that during the approved period the Executive Officer or his or her authorized representative may field audit one or more tests conducted pursuant to this order for each type of testing listed above.

Executed this 10TH day of August 1992, at Sacramento, California.



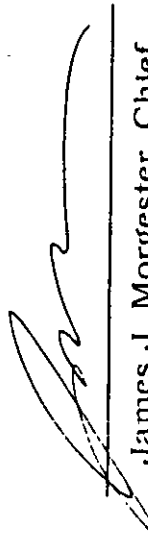
James J. Morgester, Chief
Compliance Division

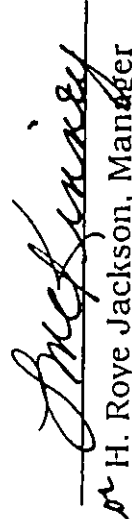
State of California
Air Resources Board
Approved Independent Contractor

Carnot

This is to certify that the company listed above has been approved
by the Air Resources Board to conduct compliance testing,
pursuant to Section 91207, Title 17, California Code of Regulations,
until June 30, 1993, for those test methods listed below:

ARB Source Test Methods:
1, 2, 3, 4, 5, 6, 8, 10, 100 (NOx, O2),


James J. Morgester, Chief
Compliance Division


for H. Roye Jackson, Manager
Field Evaluation Section

Appendix B.3
Calibration Data

CARNOT SPAN GAS RECORD

CLIENT/LOCATION: SCE 1 Unit 2 DATE: 10-6-92
BY: CHF

GAS	SPAN CYLINDER		AUX. SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO	ALM009761	99.992		
NOx	IL2595	90.52 / 100.2	ALM22747	222.4 / 183.4
O ₂	AAL12047	4.990	ALM12263	7.926
CO	IL2958	55.84	ALM12624	90.79
CO ₂	AAL12047	15.00	ALM12263	22.15 88.6
SO ₂				

CARNOT INSTRUMENT LINEARITY

	ANALYZER				
	O ₂	CO ₂	CO	NOx	SO₂ CO
ANALYZER RANGE	0-10%	0-25%	0-100	0-250 ppm	0-500 ppm
SET TO HIGH STD (80-90% OF RANGE)	7.926	22.15	90.79	222.4	
ACTUAL VALUE OF LOW STD	4.990	15.00	55.84	90.52	
AS-FOUND LOW STD (50-60% OF RANGE)	4.999	15.1	55.0	90.00	
DIFFERENCE IN % OF FULL SCALE					

% ERROR CALCULATION:

$$\frac{(\text{AS FOUND} - \text{ACTUAL VALUE OF SPAN})}{\text{RANGE}} \times 100$$

ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIP CHART).

CARNOT SPAN GAS RECORD

CLIENT/LOCATION: SCE DATE: 10-7-92

BY: CHF

New O₂ Bottle

GAS	SPAN CYLINDER		AUX. SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO				
NO _x				
O ₂	ALM02682	4.973	ALM12263	7.926
CO				
CO ₂	ALM02682	14.98		22.15
SO ₂				

CARNOT INSTRUMENT LINEARITY

	ANALYZER				
	O ₂	CO ₂	CO	NO _x	SO ₂
ANALYZER RANGE	0-10%	0-25%			
SET TO HIGH STD (80-90% OF RANGE)	7.926	22.15			
ACTUAL VALUE OF LOW STD	4.973	14.98			
AS-FOUND LOW STD (50-60% OF RANGE)	5.02	15.10			
DIFFERENCE IN % OF FULL SCALE					

% ERROR CALCULATION:

$$\frac{(\text{AS FOUND} - \text{ACTUAL VALUE OF SPAN})}{\text{RANGE}} \times 100$$

ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIP CHART).

CARNOT SPAN GAS RECORD

CLIENT/LOCATION: SCE / Alamitos 2 DATE: 10-8-92
BY: CHF

GAS	SPAN CYLINDER		AUX. SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO				
NOx	ALMO 2600	49.20	IL 2595	90.52
O ₂				
CO				
CO ₂				
SO ₂				

CARNOT INSTRUMENT LINEARITY

	ANALYZER				
	O ₂	CO ₂	CO	NOx	SO ₂
ANALYZER RANGE				0-100 ppm	
SET TO HIGH STD (80-90% OF RANGE)				90.52	
ACTUAL VALUE OF LOW STD				49.86	
AS-FOUND LOW STD (50-60% OF RANGE)				50.4	
DIFFERENCE IN % OF FULL SCALE					

% ERROR CALCULATION:

$$\frac{(\text{AS FOUND} - \text{ACTUAL VALUE OF SPAN})}{\text{RANGE}} \times 100$$

ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIP CHART).

CARNOT

SUBJECT Portugal OL LINEAR, HY JOB NO. 1259

SHEET NO. of

COMPUTED BY EF DATE 10/6/92 CHECKED BY DATE
Run - 259

10/6/92

ALM 015786 12.66

ALM 026660 9.973

Set 20.9

AS FOUND 12.7 0.02%

AS FOUND 5.0 0.11%

ZERO 0.1 0.4%

10/6/92

Set 20.9

AS FOUND 12.7 0.2%

AS FOUND 5.1 0.5%

ZERO 0.1 0.4%

CARNOT

SUBJECT Portable O₂ Linerity JOB NO. 1259V

SHEET NO. of

COMPUTED BY EF DATE 10/7/92 CHECKED BY DATE
Range 25%

10/7/92

ALM 015788 12.66

ALM 026680 4.973

Set 20.9

As found 12.8

0.6 %

As found 5.2

0.9 %

Zero 0.1

0.4 %

10/7/92

Set 20.9

As found 12.7

0.2 %

As found 5.1

0.5 %

Zero 0.1

0.4 %

CARNOT

SUBJECT Port 46k O₂ Linearity JOB NO. 125

SHEET NO. 1 of 1

COMPUTED BY EF DATE 10/8/92 CHECKED BY Ben DATE 25/9

10/8/92

Set 20.9

12.7

12.6 0.2%

5.1

12.6 0.2%

12.6 0.2%

0.1

0.4%

10/8/92

Set 20.9

12.7

0.4%

5.1

0.5%

0.1

0.4%

139595



2600 CAJON BLVD., SAN BERNARDINO, CA 92411

ATTEN JIM MULLIGAN

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES

REFERENCE STD

MAKE/MODEL/SERIAL NO.
'THERMO-ELECTRON
10 AR 14853-15

NITRIC OXIDE

Component	Date	Units	mv
Z		R	T
R		Z	T
Z		T	R
Mean Test Assay			
Date	Units	mv	
Z	R	T	
R	Z	T	
Z	T	R	
Mean Test Assay			

Approved By: 



Scott Specialty Gases, Inc.

2600 CAJON BLVD., SAN BERNARDINO, CA 92411

CARNOT

ATTN: RICH MADRIGAL
15991 RED HILL AVE
SUITE 110
TUSTIN

CA 92680

FAX 714-887-0549
PHONE: 714-887-2571

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 07/27/92
Our Project No: 20636
Your P.O. No: 8641
Page 1 of 1
Expiration Date: 1/94

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES

Cylinder No. ALM026583

Cylinder Pressure 2050 PSIG

Certified Accuracy $\pm 1\%$ % NIST Traceable

REFERENCE STD

CERTIFIED
CONC

48.73 PPM

SRM/CRM NO.

GMIS TRACEABLE
TO CRM1684B

CYL. NO.

ALM003664

CONC.

97.73 PPM

MAKE/MODE/SERIAL NO.

THERMO-ELECTRON
10AR 14853-150

GAS ANALYZER

LAST CAL
DATE

04/23/92

ANALYTICAL
PRINCIPLE

CHEMI-LUMINESCENT

100% Per Traceability Protocol No.

1 Procedure No. G1

COMPONENTS

NITRIC OXIDE

NOX

49.86 PPM

NITROGEN

ALANCE GAS

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

NITRIC OXIDE

Component	Date	Units	mv
Analysis Date	07/14/92		
0.00	R	96.97	T 48.29
96.95	Z	-0.35	T 48.48
-0.27	T	48.28	R 96.95
Mean Test Assay		07/21/92	48.84 PPM
Analysis Date	07/21/92	Units	mv
0.00	R	96.40	T 47.72
96.33	Z	-0.20	T 47.93
-0.04	T	48.02	R 96.28
Mean Test Assay			48.62 PPM

Component	Date	Units	mv
Z	R		T
R	Z		T
Z	T		R
Mean Test Assay			
Date		Units	mv
Z	R		T
R	Z		T
Z	T		R
Mean Test Assay			

Component	Date	Units	mv
Z	R		T
R	Z		T
Z	T		R
Mean Test Assay			
Date		Units	mv
Z	R		T
R	Z		T
Z	T		R
Mean Test Assay			

Chronology: Date _____
Assay _____

Analyst G. KING

Approved By: C. Lange
A.F. LANGE, Ph.D., MANAGER, QA



FAX 714-887-0549
PHONE: 714-887-2571

Shipped From: Scott
Date Shipped: 07/27/92
SAN BERNARDINO, CA

2600 CAJON BLVD., SAN BERNARDINO, CA 92411

CARNOT

ATTN: RICH MADRICAL
15991 RED HILL AVE
SUITE 110
TUSTIN

CA 92680

CERTIFICATE OF ANALYSIS -- EPA PROTOCOL GASES

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES

Certified Per Traceability Protocol No. 1 Procedure No. G1

Cylinder No. ALM012609 Cylinder Pressure 2000 PSIG

Certified Accuracy +1% % NIST Traceable

REFERENCE STD

**CERTIFIED
COMPONENTS
CONC**

SRM/CRM NO.	CYL. NO.	CONC.
GM15 TRACEABLE TO SRM2636	AAL657	252.0 PPM

GAS ANALYZER

MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
HORIBA AIA-24	06/03/92	INFRA-RED

BALANCE GAS **NITROGEN**

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

CARBON MONOXIDE

CARBON MONOXIDE		
Component	First Analysis Date 07/15/92	Units
Z	00.00	R 95.0
R	95.0	Z 00.04
Z	00.06	T 37.1
		R 95.0
		Mean Test Assay 91.05 PPM
CARBON MONOXIDE		
Component	Second Analysis Date 07/22/92	Units
Z	00.00	R 95.0
R	95.0	Z 00.01
Z	00.02	T 36.9
		R 95.0
		Mean Test Assay 90.53 PPM

Component	Date	Units	mv
Z	_____	R	_____
R	_____	Z	_____
Z	_____	T	_____
Mean Test Assay			
		Units	mv
Z	_____	R	_____
R	_____	Z	_____
Z	_____	T	_____
Mean Test Assay			

Component	Date	Units	mv
Z		R	T
R		Z	T
Z		T	R

Mean Test Assay			
Component	Date	Units	mv
Z		R	T
R		Z	T
Z		T	R

Chronology: Date

Assay

Analyst M. JOHNSON

Approved By:

A. F. LANGE, Ph.D., MANAGER, O.A.



Scott Specialty Gases, Inc.

Shipped From: 2600 CAJON BLVD.
SAN BERNARDINO CA 92411
Phone: 714-887-2571 Fax: 714-887-0549

C E R T I F I C A T E O F A N A L Y S I S

CARNOT
ATTN: RICK MADRIGAL
15991 RED HILL AVE
SUITE 110
TUSTIN

CA 92680

PROJECT #: 02-21908
PO#: 8957
ITEM #: 0202C3000701AL
DATE: 10/02/92

CYLINDER #: ALM026680
FILL PRESSURE: 2000 PSIG

ANALYTICAL ACCURACY: +/-1%

COMPONENT	REQUESTED GAS		ANALYSIS	
	CONC	MOLES	(MOLES)	
CARBON DIOXIDE	15.	PCT	14.98	PCT
OXYGEN	5.	PCT	4.973	PCT
NITROGEN		BAL		BAL

CARNOT 10/1/92
CERTIFIED TO HAVE BEEN BLENDED
AND VERIFIED TO BE CORRECT BY
ANALYSIS.

GRAVIMETRIC MASTER GAS -
AGAINST NIST CERTIFIED WEIGHTS
INDEPENDENT LABORATORY

ANALYST:

JOSEPH DE LA TORRE

APPROVED BY:

DR ARNOLD LANGE PH D

PLUMSTEADVILLE, PENNSYLVANIA / TROY, MICHIGAN / HOUSTON, TEXAS / DURHAM, NORTH CAROLINA
SOUTH PLAINFIELD, NEW JERSEY / FREMONT, CALIFORNIA / WAKEFIELD, MASSACHUSETTS / LONGMONT, COLORADO
BATON ROUGE, LOUISIANA



Scott Specialty Gases, Inc.

Shipped
From:

2600 CAJON BLVD.

Phone: 714-887-2571

SAN BERNARDINO

Fax: 714-887-0549

CA 92411-0000

C E R T I F I C A T E O F A N A L Y S I S

CARNOT
MIKE SCHMITT
15991 RED HILL AVE
SUITE 110
TUSTIN

CA 92680

PROJECT #: 02-17313
PO#: 7477
ITEM #: 0202C3000701AL
DATE: 12/16/91

CYLINDER #: ALM015788

ANALYTICAL ACCURACY: +/-1%

COMPONENT	REQUESTED GAS	ANALYSIS
	CONC MOLES	(MOLES)
CARBON DIOXIDE	15. PCT	15.23 PCT
OXYGEN	12.5 PCT	12.66 PCT
NITROGEN	BAL	BAL

CYLINDER PRESSURE 1915 PSI
CERTIFIED TO HAVE BEEN BLENDED
AND VERIFIED TO BE CORRECT BY
ANALYSIS:

GRAVIMETRIC MASTER GAS -
AGAINST NIST CERTIFIED WEIGHTS
INDEPENDENT LABORATORY

ANALYST:

M. Johnson
MAYNARD JOHNSON

APPROVED BY:

A. Lange
DR ARMAND LANGE, PhD



Scott Specialty Gases, Inc.

Shipped
From:

2600 CAJON BLVD.

SAN BERNARDINO

CA 92411

Phone: 714-887-2571

Fax: 714-887-0549

CERTIFICATE OF ANALYSIS

CARNOT

ATTN: RICH MADRIGAL

15991 RED HILL AVE

SUITE 110

TUSTIN

CA 92680

PROJECT #: 02-20636

PO#: 8641

ITEM #: 0202C3013601AL

DATE: 7/15/92

CYLINDER #: ALM012263

FILL PRESSURE: 1900 PSIG

ANALYTICAL ACCURACY: +/-1%

COMPONENT	REQUESTED GAS		ANALYSIS	
	CONC	MOLES	(MOLES)	
CARBON DIOXIDE	22.5	PCT	22.15	PCT
OXYGEN	8.	PCT	7.926	PCT
NITROGEN		BAL		BAL

CARNOT 7/16 BIN 1
CERTIFIED TO HAVE BEEN BLENDED
AND VERIFIED TO BE CORRECT BY
ANALYSIS.

GRAVIMETRIC MASTER GAS -
AGAINST NIST CERTIFIED WEIGHTS
INDEPENDENT LABORATORY

ANALYST:

M.S.

MAYNARD JOHNSON

APPROVED BY:

A. Lange

DR ARMAND LANGE PHD



Scott Specialty Gases, Inc.

Shipped
from:

2600 CAJON BLVD.
Phone: 714-887-2571

SAN BERNARDINO
Fax: 714-887-0549

CA 92411-0000

CERTIFICATE OF ANALYSIS

CARNOT
JIM MULLIGAN
15991 RED HILL AVE
SUITE 110
TUSTIN

CA 92680

PROJECT #: 02-18807
FOH: 7477-B #1
ITEM #: 0202C3000701AL
DATE: 3/18/92

CYLINDER #: AAL12047

ANALYTICAL ACCURACY: +/-1%

COMPONENT

CARBON DIOXIDE
OXYGEN
NITROGEN

REQUESTED GAS

CONC MOLES

15. PCT
5. PCT
BAL

ANALYSIS

(MOLES)

15.00 PCT
4.990 PCT
BAL

CYLINDER PRESSURE 1900 PSI
CERTIFIED TO HAVE BEEN BLENDED
AND VERIFIED TO BE CORRECT BY
ANALYSIS.

GRAVIMETRIC MASTER GAS -
AGAINST NIST CERTIFIED WEIGHTS
INDEPENDENT LABORATORY

ANALYST:

MAYNARD JOHNSON

APPROVED BY:

DR ARMAND LANGE PHD

DRY GAS METER CALIBRATION

RESULTS

FIELD METER			TEST METER				RESULTS					
VOLUME cu.ft.	TEMP. a 'F	DELTA H "H2O	TIME min.	VOLUME cu.ft.	TEMP. 'F	PRESS. "H2O	Q cfm	Y	H0	AVE. Y	AVG. H0	
6.189	82.0	0.50	15	6.254	76.0	0.15	0.413	1.022	1.61	1.0281	1.60	
6.218	90.0	0.50	15	6.251	76.0	0.15	0.415	1.032	1.59			
6.208	91.0	0.50	15	6.223	76.0	0.15	0.414	1.031	1.60			
6.163	80.0	0.80	12	6.285	76.0	0.25	0.514	1.027	1.64	1.0399	1.64	
6.094	87.0	0.80	12	6.247	76.0	0.25	0.508	1.046	1.63			
6.113	90.0	0.80	12	6.243	76.0	0.25	0.509	1.047	1.63			
5.601	91.0	1.00	10	5.725	76.0	0.30	0.560	1.050	1.68	1.0497	1.68	
5.612	92.0	1.00	10	5.729	76.0	0.30	0.561	1.050	1.67			
5.637	94.0	1.00	10	5.728	76.0	0.30	0.564	1.049	1.67			
5.570	87.0	2.00	7	5.671	76.0	0.55	0.796	1.035	1.69	1.0338	1.73	
5.481	90.0	2.00	7	5.532	76.0	0.55	0.783	1.032	1.76			
5.539	92.0	2.00	7	5.580	76.0	0.55	0.791	1.034	1.73			
5.801	93.0	3.00	6	5.828	76.0	0.75	0.967	1.030	1.74	1.0336	1.74	
5.789	95.0	3.00	6	5.824	76.0	0.75	0.965	1.036	1.74			
5.803	95.0	3.00	6	5.835	76.0	0.75	0.967	1.035	1.73			
AVERAGE Yd =											1.0370	1.68
											*****	*****

DRY GAS METER CALIBRATION DATA

TEST METER ID. ES-13

TEST METER Y. _____

DATE LAST CALIB. _____

TE 9-11-92 BY ASG

LD DRY GAS METER ID. ES-19

BAROMETRIC PRESSURE (P_b) _____ (IN. Hg)

METER LEAK CHECK VAC. 2.1" H₂O INIT. ASG

TEST METER: _____

ΔH	FIELD DRY GAS METER										TEMPERATURES, °F						PRESSURE IN. H ₂ O
	FINAL VOLUME	INITIAL VOLUME	VOLUME (V ₂ - V ₁)	INLET				OUTLET		AVERAGE	INLET BEG.	END	OUTLET BEG.	END	AVERAGE		
				BEG.	END	BEG.	END	BEG.	END								
0.50	508.825	502.636	6.189	79	91	78	81	82	12.16	15:12.31	15:12.31	15:12.31	15:12.31	15:12.31	.15		
	515.043	508.825	6.218	94	96	83	85	90	12.32	15:12.47	15:12.47	15:12.47	15:12.47	15:12.47	.15		
	521.251	515.043	6.208	93	97	86	88	91	12.48	15:12.53	15:12.53	15:12.53	15:12.53	15:12.53	.15		
	527.788	521.251	6.537	76	90	75	78	80	14.20	12:14.32	12:14.32	12:14.32	12:14.32	12:14.32	.25		
0.80	533.802	527.788	6.014	90	96	79	83	87	14.33	12:14.45	12:14.45	12:14.45	12:14.45	12:14.45	.25		
	539.995	533.802	6.193	92	99	83	86	90	14.46	12:14.58	12:14.58	12:14.58	12:14.58	12:14.58	.25		
	546.001	540.400	5.601	91	100	86	88	91	15.01	10:15.11	10:15.11	10:15.11	10:15.11	10:15.11	.30		
	551.613	546.001	5.612	91	101	86	89	92	15.12	10:15.22	10:15.22	10:15.22	10:15.22	10:15.22	.30		
1.00	557.250	551.613	5.637	96	102	89	90	94	15.23	10:15.33	10:15.33	10:15.33	10:15.33	10:15.33	.30		
	563.421	557.851	5.570	84	94	84	84	87	15.51	07:15.58	07:15.58	07:15.58	07:15.58	07:15.58	.55		
	568.902	563.421	5.481	92	98	84	85	90	15.59	07:16.06	07:16.06	07:16.06	07:16.06	07:16.06	.55		
	574.441	568.902	5.539	95	100	86	87	92	16.07	07:16.14	07:16.14	07:16.14	07:16.14	07:16.14	.55		
2.00	580.898	575.095	5.803	96	102	87	88	93	16.16	06:16.23	06:16.23	06:16.23	06:16.23	06:16.23	.75		
	586.685	580.898	5.787	98	103	88	89	95	16.23	06:16.29	06:16.29	06:16.29	06:16.29	06:16.29	.75		
	592.488	586.685	5.803	99	103	89	90	95	16.30	06:16.36	06:16.36	06:16.36	06:16.36	06:16.36	.75		
	598.000	592.488	5.512	99	103	89	90	95	16.36	06:16.36	06:16.36	06:16.36	06:16.36	06:16.36	.75		

CARNOT

CARNOT
 CALIBRATED BY DE
 DATE 10/09/92
 FIELD GAS METER I.D. 71-4
 INITIAL Yd 1.004
 INITIAL H@ 1.881

POST TEST DRY GAS METER CALIBRATION CHECK
 DATA ENTRY BY DE
 BAROMETRIC PRESSURE 29.91
 TEST MEETER ES-13
 TEST METER Y (Yt) 1.0014
 TEST METER LAST CAL. 12/16/91

FIELD METERR					TEST METER			RESULTS	
VOLUME cu.ft.	TEMP.a IN	TEMP OUT	DELTA "H2O	TIME min.	VOLUME cu.ft.	TEMP. 'F	Q cfm	Y	H@
5.367	72.0	71.0	1.00	10	5.444	71.0	0.537	1.013	1.89
5.376	79.5	74.0	1.00	10	5.432	73.0	0.538	1.015	1.91
5.479	81.5	76.5	1.00	10	5.416	74.0	0.548	0.995	1.92

AVERAGES 1.008 1.91

PASS - INDIVIDUAL Yd VALUES ACCEPTABLE
 PASS - INDIVIDUAL DELTA H@ VALUES ACCEPTABLE
 PASS - POST TEST Yd WITHIN LIMITS

CARNOT
 CALIBRATED BY DE
 DATE 10/09/92
 FIELD GAS METER I.D. 71-5
 INITIAL Yd 1.004
 INITIAL H@ 1.881

POST TEST DRY GAS METER CALIBRATION CHECK
 DATA ENTRY BY DE
 BAROMETRIC PRESSURE 29.91
 TEST MEETER ES-13
 TEST METER Y (Yt) 1.0014
 TEST METER LAST CAL. 12/16/91

FIELD METERR					TEST METER			RESULTS	
VOLUME cu.ft.	TEMP.a IN	TEMP OUT	DELTA "H2O	TIME min.	VOLUME cu.ft.	TEMP. 'F	Q cfm	Y	H@
5.698	70.5	70.0	1.00	10	5.832	76.0	0.570	1.010	1.68
5.700	73.5	70.5	1.00	10	5.831	76.5	0.570	1.012	1.69
5.684	76.5	73.0	1.00	10	5.786	77.5	0.568	1.010	1.71
AVERAGES								1.011	1.70

PASS - INDIVIDUAL Yd VALUES ACCEPTABLE
 PASS - INDIVIDUAL DELTA H@ VALUES ACCEPTABLE
 PASS - POST TEST Yd WITHIN LIMITS

DRY GAS METER CALIBRATION

FIELD GAS METER I.D. SCE N.OUTLET TEST METER ES-13

DATE	TEST METER LAST CAL.	12/16/91	1.0014 = Yt
9/16/92			

BAROMETRIC PRESSURE	29.96
---------------------	-------

FIELD METER			TEST METER				RESULTS					
VOLUME cu. ft.	TEMP. a 'F	DELTA H "H2O	TIME min.	VOLUME cu. ft.	TEMP. 'F	PRESS. "H2O	Q cfm	Y	H ϕ	AVE. Y	AVG. H ϕ	
5.391	92.0	0.50	15	5.131	74.0	0.10	0.359	0.984	2.33	0.9894	2.34	
5.360	96.0	0.50	15	5.107	74.0	0.10	0.357	0.992	2.34			
5.376	97.0	0.50	15	5.112	74.0	0.10	0.358	0.992	2.33			
7.624	96.0	0.80	12	7.129	74.0	0.30	0.635	0.973	1.23	0.9750	1.48	
7.262	100.0	0.80	12	6.784	75.0	0.30	0.605	0.977	1.35			
6.224	99.0	0.80	12	5.809	75.0	0.30	0.519	0.975	1.84			
7.759	100.0	1.00	10	7.213	75.0	0.50	0.776	0.972	1.03	0.9702	1.04	
7.800	100.0	1.00	10	7.231	76.0	0.50	0.780	0.968	1.03			
7.789	101.0	1.00	10	7.234	76.0	0.50	0.779	0.971	1.03			
8.820	92.0	2.00	7	8.293	76.0	1.00	1.260	0.965	0.78	0.9697	0.78	
8.849	99.0	2.00	7	8.270	76.0	1.00	1.264	0.971	0.77			
8.836	100.0	2.00	7	8.257	76.0	1.00	1.262	0.973	0.78			
9.690	101.0	3.00	6	9.033	76.0	1.60	1.615	0.970	0.71	0.9700	0.72	
9.699	103.0	3.00	6	9.146	77.0	1.60	1.617	0.983	0.69			
9.724	102.0	3.00	6	8.949	77.0	1.60	1.621	0.957	0.73			
AVERAGE Yd =											0.9748	1.27
											*****	*****

DRY GAS METER CALIBRATION DATA

DATE 9-16-92 BY Rob M.

TEST METER ID. ES-13

FIELD DRY GAS METER ID SCE/North Outlet

TEST METER Y. _____

BAROMETRIC PRESSURE (P) 29.92 (IN. Hg) METER LEAK CHECK VAC. 10" INIT. RA DATE LAST CALIB. _____

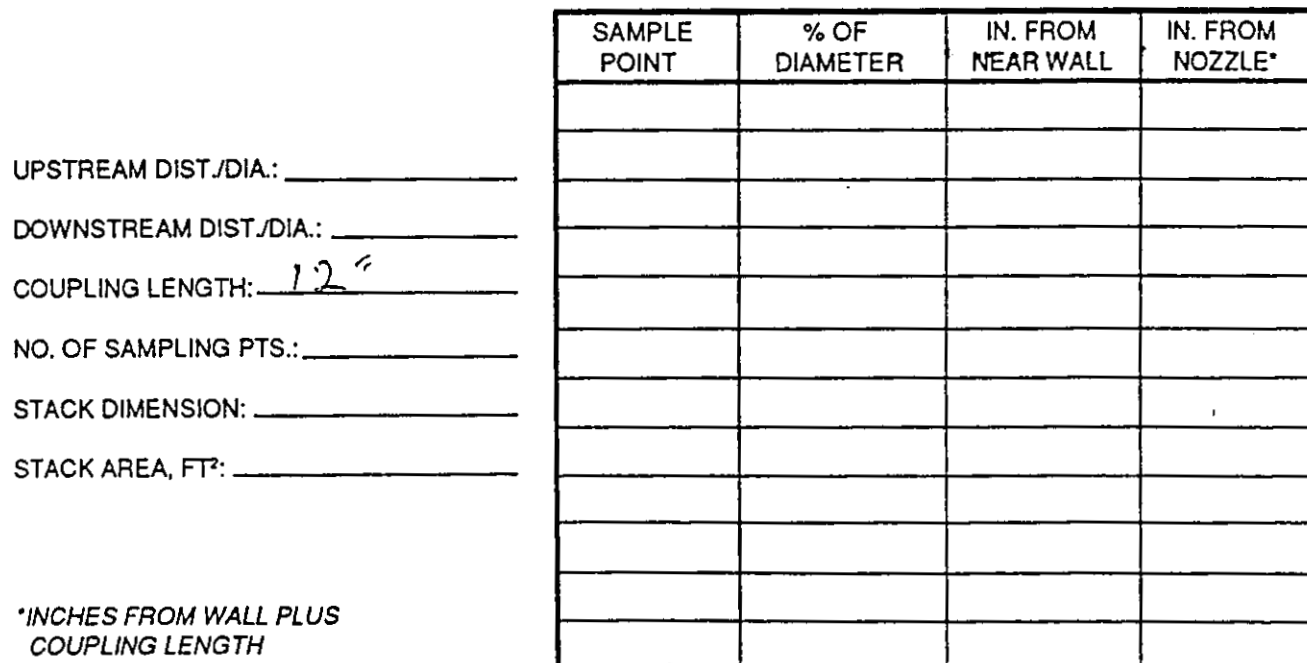
ΔH	FIELD DRY GAS METER										TIME (0)MIN.	TEST METER				
	FINAL VOLUME	INITIAL VOLUME	VOLUME (V ₁) IN ³	TEMPERATURES, °F			VOLUME (V ₂) IN ³	INITIAL VOLUME	FINAL VOLUME	TEMPERATURES, °F						
				INLET DEG.	OUTLET DEG.	AVERAGE				INLET DEG.		OUTLET DEG.	AVERAGE			
0.50	831.332	825.941	5.391	101	113	76	92	005.131	0.00	5.131	74	74	74	74	1.0	
	836.692	831.332	5.36	111	117	78	96	010.238	005.131	5.107	74	74	74	74	1.0	
	842.068	836.692	5.376	115	119	78	97	015.350	010.238	5.112	74	74	74	74	1.0	
0.80	850.042	842.468	7.624	110	119	78	96	007.129	0.00	7.129	74	74	74	74	1.30	
	857.354	850.042	7.262	119	125	78	100	013.913	007.129	6.784	75	75	74	74	1.30	
	863.578	857.354	6.224	121	122	77	99	019.722	013.913	5.809	75	76	74	74	1.30	
1.00	871.883	864.164	7.759	121	126	76	100	007.213	0.00	7.213	76	76	74	75	1.50	
	879.663	871.883	7.80	122	124	76	100	014.444	007.213	7.231	76	76	75	75	1.50	
	887.452	879.663	7.789	121	128	76	101	021.678	014.444	7.234	76	76	75	75	1.50	
2.00	917.458	908.638	8.82	98	116	78	92	008.293	0.00	8.293	76	76	75	75	1.0	
	926.307	917.458	8.849	116	124	78	99	016.563	008.293	8.27	76	76	75	75	1.0	
	935.143	926.307	8.836	120	127	78	100	024.820	016.563	8.257	76	76	75	75	1.0	
3.00	945.342	935.852	9.690	125	128	76	101	009.033	0.00	9.033	76	77	75	76	1.60	
	955.241	945.542	9.699	127	132	76	103	018.179	009.033	9.146	77	77	76	76	1.60	
	964.965	955.241	9.724	127	133	75	102	027.128	018.179	8.949	77	77	76	76	1.60	

CARNOT

APPENDIX C
DATA SHEETS

Appendix C.1
Sample Locations

PLANT: SCE/Alamitos DATA BY: Rob M.
DATE: 10-7-92
TEST LOCATION: Units #1 & 2



Appendix C.2
Unit Data

UNIT DATA

 Client: _____
 Unit: _____

 Location: _____
 Data by: _____

TEST #	1-1	1-2	2-2	3-2
DATE	10/6/92	10/6/92	10/6/92	10/6/92
TIME		1040	1235	1310
LOAD MW		1.6		1.6
AUX. LOAD		7.4		8.2
UREA ON/OFF		OFF		OFF
UREA MODE		5		2
UREA FLOW GPM				
UREA H ₂ O FLOW GPM				
UREA H ₂ O PRES. PSI				4.1/5.1
UREA HEADER PRES. PSI				205.0
TANK		10/6/92		2147.4
O ₂ % EAST		1.4		1.2
O ₂ % WEST		1.2		1.5
STM. PRES PSI		1724		1842
FUEL FLOW 10 ⁶ SCFH	1.7	1.7	1.7	1.7
FUEL				
WP/FURN dP				
ID FAN EAST (AMPS)				
FD FAN EAST (AMPS)				
ID FAN WEST (AMPS)				
FD FAN WEST (AMPS)				

*INCORRECT READING OF FUEL FLOW METER
 READING 1.7 SCFH

FGR (AMPS)	210	070	210	270
BOOS	15-14	15-14	15-14	14-15
APH OUT EAST °F	332.2		334.1	335
APH OUT WEST °F	345.4		343.6	345
TBCT # 1005	W-15-14-14	14		

NOTES:

UNIT DATA

Client: SEL
 Unit: ALPHA TOS #2

Location: _____
 Data by: WDE/EE

TEST #	3-2	4-2	4-2	5-2
DATE	10/6/92	10/6/92	10/6/92	10/6/92
TIME	1437	1545	1705	1745
LOAD MW	16.5	16.6	16.6	16.5
AUX. LOAD	2.2	2.3	2.3	2.3
UREA ON/OFF	YES	ON	ON	ON
UREA MODE	—	4	4	4
UREA FLOW GPM	1.1	0.62/0.60	0.62/0.60	0.62/0.60
UREA H ₂ O FLOW GPM	1.1	17.8/17.8	17.2/17.2	17.1
UREA H ₂ O PRES. PSI	3.1/30.5/30.5	3.1/30.5/30.5	3.1/30.5/30.5	3.3/30.5/30.5
UREA HEADER PRES. PSI	30.5	30.4	30.5	30.5
TANK / LEVEL	105/47.7	102/42.3	102/38.6	102/29.5
O ₂ % EAST	1.6	1.6	1.5	1.5
O ₂ % WEST	1.4	1.4	1.4	1.4
STM. PRES PSI	1845	1846	1847	1846
FUEL FLOW 10 ⁶ SCF	1.70	1.71	1.70	1.71
FUEL	NAT GAS	NAT GAS	NAT GAS	NAT GAS
WP/FURN dP	6.2	6.2	6.2	6.2
ID FAN EAST (AMPS)	132	138	138	132
FD FAN EAST (AMPS)	71	71	71	71
ID FAN WEST (AMPS)	135	135	136	135
FD FAN WEST (AMPS)	72	72	72	72

FGR (AMPS)	270	270	270	
BOOS	14-15	14-15	14-15	14-15
APH OUT EAST °F 8	337	341	340	340
APH OUT WEST °F 7	347	348	349	348
TEST #				

NOTES:

UNIT DATA

Client: SCS
 Unit: ALAN - 1 S #2

Location:
 Data by: MDE/EF

TEST #	5-2			
DATE	10/6/92			
TIME	1300			
LOAD MW	133			
AUX. LOAD	8.3			
UREA ON/OFF	ON			
UREA MODE	4			
UREA FLOW GPM	0/1.59/1.5			
UREA H ₂ O FLOW GPM	17.2/15.7			
UREA H ₂ O PRES. PSI	3.2/2.2/2.1			
UREA HEADER PRES. PSI	27.5			
TANK	12/12/12			
O ₂ % EAST	10.5			
O ₂ % WEST	10.4			
STM. PRES PSI	124.4			
FUEL FLOW 10 ⁶ SCF	1.70			
FUEL	147.34			
WP/FURN dP	3.2			
ID FAN EAST (AMPS)	56			
FD FAN EAST (AMPS)	71			
ID FAN WEST (AMPS)	136			
FD FAN WEST (AMPS)	71			

FGR (AMPS)	270			
BOOS	14-15			
APH OUT EAST °F 8	340			
APH OUT WEST °F 7	347			
TEST				

NOTES:

UNIT DATA

 Client: SUN
 Unit: 2

 Location: 11/14/92
 Data by:

TEST #	6-2	6-2	7-2	7-2
DATE	11/7/92	10/7/92	10/7/92	10/7/92
TIME	8:55	7:10	11:10	12:15
LOAD MW	137	137	138	138
AUX. LOAD	7.5	7.5	7.5	7.5
UREA ON/OFF	OFF	OFF	OFF	
UREA MODE	0	1	2	0
UREA FLOW GPM			310/3	0.0/0.0/0.0
UREA H ₂ O FLOW GPM			11/2	0.0/0.0/0.0
UREA H ₂ O PRES. PSI		11/1/11/11	3.2/7.5/13.0	3.3/7.6/14.0
UREA HEADER PRES. PSI		142.1	142.1	144.5
TANK / LEVEL IN.	102/50.7	102/50.7	102/50.7	102/50.8
O ₂ % EAST	2.2	2.5	2.2	2.5
O ₂ % WEST	2.2	2.5	2.5	2.5
STM. PRES PSI	102.1	102.1	102.1	104.1
FUEL FLOW 10 ⁶ SCF	1.35	1.35	1.35	1.35
FUEL	102.1	102.1		
WP/FURN dP	-4.7	-4.7	-4.7	+4.7
ID FAN EAST (AMPS)	115	115	115	115
FD FAN EAST (AMPS)	65	65	65	64
ID FAN WEST (AMPS)	120	120	120	120
FD FAN WEST (AMPS)	67	67	67	67

FGR (AMPS)	250	256	255	255
BOOS	13,14/15,16	13,14/15,16	13,14,15,16	13,14/15,16
APH OUT EAST °F	305.9	303.5	303	303.1
APH OUT WEST °F	350.6	351.1	351	350.9
TEST #				

NOTES:

UNIT DATA

Client: SCE
 Unit: ALANITJS #2

Location: ALANITO S
 Data by: UDE/EF

TEST #	8-2	8-2	9-2	9-2
DATE	10/7/92	10/7/92	10/7/92	10/7/92
TIME	1335	1500	1540	1705
LOAD MW	137	137	132	138
AUX. LOAD	7.6	7.6	7.6	7.6
UREA ON/OFF	ON	ON	ON	ON
UREA MODE	3	3	3	3
UREA FLOW GPM	201/207/202	201/207/202	201/207/202	201/207/202
UREA H ₂ O FLOW GPM	2/7.8/2	2/7.8/2	20/7.1/2	2/7.1/2
UREA H ₂ O PRES. PSI	3.1/30.1/3.1	3.1/30.1/3.1	3.1/30.1/3.1	3.1/30.1/3.1
UREA HEADER PRES. PSI	95.3	96.6	96.9	96.3
TANK / LEVEL IN.	102/48.4	106/43.9	102/41.3	102/33.2
O ₂ % EAST	2.1	2.0	2.2	2.2
O ₂ % WEST	2.4	2.5	2.5	2.4
STM. PRES PSI	1841	1843	1847	1845
FUEL FLOW 10 ⁶ SCFH	1.35	1.35	1.35	1.35
FUEL	100.245	100.245	100.245	100.245
WP/FURN dP	4.8	4.5	4.5	4.7
ID FAN EAST (AMPS)	116	116	116	115
FD FAN EAST (AMPS)	54	54	64	55
ID FAN WEST (AMPS)	160	120	125	150
FD FAN WEST (AMPS)	67	67	66	67

FGR (AMPS)	255	255	250	255
BOOS	13-16	13-16	13/4/1512	13-16
APH OUT EAST °F 8	308	309	310.9	313
APH OUT WEST °F 7	353	355	356.1	356
TEST #				

NOTES:

UNIT DATA

 Client: _____
 Unit: _____

 Location: _____
 Data by: _____

TEST #	10-2	10-2	11-2	11-2
DATE	5/14/72	10/8/72	10/8/72	11/1/72
TIME	3:55	3:10	11:05	3:10
LOAD MW	24.0	24.0	24.0	24.0
AUX. LOAD	1.2	1.2	1.2	1.2
UREA ON/OFF	ON	ON	ON	ON
UREA MODE	1	1	1	1
UREA FLOW GPM	1000	1000	1000	1000
UREA H ₂ O FLOW GPM	1000	1000	1000	1000
UREA H ₂ O PRES. PSI	100	100	100	100
UREA HEADER PRES. PSI	100	100	100	100
TANK	100	100	100	100
O ₂ % EAST	100	100	100	100
O ₂ % WEST	100	100	100	100
STM. PRES PSI	100	100	100	100
FUEL FLOW 10 ⁵ SCF	1.0	1.0	1.0	1.0
FUEL	1.0	1.0	1.0	1.0
WP/FURN dP	1.0	1.0	1.0	1.0
ID FAN EAST (AMPS)	1.0	1.0	1.0	1.0
FD FAN EAST (AMPS)	1.0	1.0	1.0	1.0
ID FAN WEST (AMPS)	1.0	1.0	1.0	1.0
FD FAN WEST (AMPS)	1.0	1.0	1.0	1.0

FGR (AMPS)	32.1	32.1	32.3	32.0
BOOS	14, 115/12	14, 115/12	14, 115/12	13, 115/12
APH OUT EAST °F	271.6	271.2	270.1	270.8
APH OUT WEST °F	271.2	271.2	273.4	275.2
TEST #				

NOTES:

UNIT DATA

Client: _____
 Unit: _____

Location: _____
 Data by: _____

TEST #	12-1	12-2	12-3	12-4
DATE	12-1	12-2	12-3	12-4
TIME	12-1	12-2	12-3	12-4
LOAD MW	12-1	12-2	12-3	12-4
AUX. LOAD	12-1	12-2	12-3	12-4
UREA ON/OFF	12-1	12-2	12-3	12-4
UREA MODE	12-1	12-2	12-3	12-4
UREA FLOW GPM	12-1	12-2	12-3	12-4
UREA H ₂ O FLOW GPM	12-1	12-2	12-3	12-4
UREA H ₂ O PRES. PSI	12-1	12-2	12-3	12-4
UREA HEADER PRES. PSI	12-1	12-2	12-3	12-4
TANK	12-1	12-2	12-3	12-4
O ₂ % EAST	12-1	12-2	12-3	12-4
O ₂ % WEST	12-1	12-2	12-3	12-4
STM. PRES PSI	12-1	12-2	12-3	12-4
FUEL FLOW 10 ⁶ SCF	12-1	12-2	12-3	12-4
FUEL	12-1	12-2	12-3	12-4
WP/FURN dP	12-1	12-2	12-3	12-4
ID FAN EAST (AMPS)	12-1	12-2	12-3	12-4
FD FAN EAST (AMPS)	12-1	12-2	12-3	12-4
ID FAN WEST (AMPS)	12-1	12-2	12-3	12-4
FD FAN WEST (AMPS)	12-1	12-2	12-3	12-4

FGR (AMPS)	52.0	37.0	7.2	5.0
BOOS	317.5	310.5	12.4	2.1
APH OUT EAST °F	389.0	290.1	290.0	272.4
APH OUT WEST °F	341.3	340.3	347.0	341.3
TEST #				

NOTES:

Appendix C.3
CEM Data

CARNOT

PAGE 1 OF 1

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCE, Unit 2CONDITION: 165 MW No VrenDATE: 10-6-97OPERATOR: CHFTEST NUMBER: 1-7-CFMTEST LOCATION: Exhaust

TEST NO.	TIME		SAMPLE POINT/ CONDITION	DRY, UNCORRECTED						CORRECTED TO % DRY		
				O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx
SPAN GAS CONCENTRATION												
			AS FOUND ANAL SPAN	4.99	15.00	55.84	10.52					
		958	SYSTEM ZERO	.05	0.0	0.0	0.5					
			SYSTEM SPAN	4.93	14.75	56.0	87.2					
	BEGIN	1012	Start									
	END	1017	All Pres.	2.64	10.12	0.9	135.3					
	BEGIN	1017										
	END	1022		2.74	10.24	0.7	139.5					
	BEGIN	1022										
	END	1027		2.86	10.00	.8	142.5					
	BEGIN	1027										
	END	1032		2.88	10.00	.8	143.8					
	BEGIN	1032										
	END	1037		2.90	10.00	.7	144.5					
	BEGIN	1037	NOx Probe									
	END	1042	/NO				107	101.3	5.75			
	BEGIN	----										
	END	----										
	BEGIN	----										
	END	----										
	BEGIN	----										
	END	----										
	BEGIN	----										
	END	----										
	BEGIN	----										
	END	----										
	BEGIN	----										
	END	----										
			SYSTEM ZERO	.06	.03	0.2	1.75					
			SYSTEM SPAN	4.94	14.58	55.4	87.5					
RAW AVERAGE				2.804	10.03	0.70	141.12					
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

CARNOT

REFERENCE METHOD GASEOUS MEASUREMENTS

PAGE ____ OF ____

CLIENT/LOCATION: SCE Unit 2

CONDITION: 165 MW No Urea

DATE: 10-1-12

OPERATOR: CHF

TEST NUMBER: 2-2-CEM

TEST LOCATION: Exhaust

TEST NO.	TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED						CORRECTED TO ____%____ DRY			
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN										
	1113	SYSTEM ZERO	.03	0.0	0.0	.75						
		SYSTEM SPAN	49.8	14.8	55.84	87.5						
	BEGIN 1130 END 1135	Start All K ₂ O	2.64	10.3	1.0	136.0						
	BEGIN 1135 END 1140		2.62	10.3	0.9	136.0						
	BEGIN 1140 END 1145		2.60	10.3	0.8	136.3						
	BEGIN 1145 END 1150		2.60	10.3	0.8	135.8						
	BEGIN 1150 END 1155		2.60	10.3	0.9	135.5						
	BEGIN 1155 END 1200	End	2.54	10.3	0.8	135.5						
	BEGIN 1200 END 1205	NO ₂ P ₂ O ₅				105	96.3	8.75				
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
		SYSTEM ZERO	0.07	0.0	0.0	1.0						
		SYSTEM SPAN	4.96	14.8	55.84	88.0						
RAW AVERAGE												
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCE Unit 2CONDITION: 165 ft w 11, 2111DATE: 10-6-92OPERATOR: CHPTEST NUMBER: 2-2-CEMTEST LOCATION: Exhaust

TEST NO.	TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO ____%____ DRY		
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL SPAN	7.926	22.15								
	1241	SYSTEM ZERO	0.2	0.0	0.0	0.5						
		SYSTEM SPAN	7.80	21.68	53.84	90.0						
	BEGIN 1315 END 1320	Start NOx Probe	2.45	10.4	1.5	143.8						
	BEGIN 1320 END 1325		2.42	10.4	1.6	142.8						
	BEGIN 1325 END 1330		2.40	10.4	1.9	141.0						
	BEGIN 1330 END 1335		2.40	10.4	1.9	141.0						
	BEGIN 1335 END 1340		2.37	10.4	2.0	140.2						
	BEGIN 1340 END 1345		2.39	10.4	2.5	140.0						
	BEGIN 1345 END 1350	NOx Probe No reads				106.8	98	8.8				
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
		SYSTEM ZERO	0.03	0.0	0.0	0.5						
		SYSTEM SPAN	7.90	21.6	53.8	91.6						
RAW AVERAGE												
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCFCONDITION: 165MW Urea ONDATE: 10-6-92OPERATOR: CHFTEST NUMBER: 4-2-CFM

TEST LOCATION: _____

TEST NO.	TIME.	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO % DRY		
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN	7.93	22.15	55.84	90.52						
	1605	SYSTEM ZERO	.05	0.0	0.0	1.25						
		SYSTEM SPAN	7.83	22.0	56	88.5						
	BEGIN 1615 END 1620	AS FOUND	2.4	10.5	3.8	104.8						
	BEGIN 1620 END 1625		2.4	10.5	3.2	105.0						
	BEGIN 1625 END 1630		2.4	10.5	3.8	124.2						
	BEGIN 1630 END 1635		2.42	10.5	3.5	105.8						
	BEGIN 1635 END 1640		2.42	10.5	3.7	106.5						
	BEGIN 1640 END 1645		2.41	10.45	3.1	107						
	BEGIN END	NOx P.P.M. NO ₂ P.P.M.				81.3	76.0	5.3				
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
		SYSTEM ZERO	0.05	0.0	0.4	1.25						
	1700	SYSTEM SPAN	7.8	21.93	55.84	87.5						
RAW AVERAGE												
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

102-0

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCECONDITION: 165 MW Urea ONDATE: 10-6-92OPERATOR: CHFTEST NUMBER: 5-2-CFM

TEST LOCATION: _____

TEST NO.	TIME.	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO % DRY		
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN										
	1805	SYSTEM ZERO	.02	0.0	0.1	.75						
		SYSTEM SPAN	7.85	22.05	55.7	89.5						
	BEGIN 1815 END 1820	Start A.I.P. probe	2.45	10.5	5.8	103.6						
	BEGIN 1820 END 1825		2.41	10.5	5.4	103.3						
	BEGIN 1825 END 1830		2.41	10.5	6.2	102.8						
	BEGIN 1830 END 1835		2.4	10.5	5.8	102.5						
	BEGIN 1835 END 1840		2.4	10.5	6.5	102.5						
	BEGIN 1840 END 1845		2.4	10.5	6.0	101.8						
	BEGIN END											
	BEGIN 1855 END	NOx/NO				78.3	73.0	5.3				
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
	1847	SYSTEM ZERO	.02	0.0	0.1	.50						
		SYSTEM SPAN	7.90	21.98	55.84	90.75						
RAW AVERAGE												
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCF AlumCONDITION: 140MW Vren OFFDATE: 10-7-92OPERATOR: CHFTEST NUMBER: 6-2-CFM

TEST LOCATION: _____

TEST NO.	TIME.	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO % ____ DRY		
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN	4.97	14.98	55.6	12.5						
	900	SYSTEM ZERO	0.3	0.0	.3	.75						
		SYSTEM SPAN	4.97	14.75	55.84	88.25						
	BEGIN 910 END 915	Start NIP-200	3.39	9.83	1.0	80.0						
	BEGIN 915 END 920		3.35	9.8	1.0	80.0						
	BEGIN 920 END 925		3.35	9.8	1.0	80.8						
	BEGIN 925 END 930		3.37	9.8	1.0	81.25						
	BEGIN 930 END 935		3.38	9.8	1.0	81.5						
	BEGIN 935 END 940		3.38	9.8	1.0	80.8						
	BEGIN 940 END 945											
	BEGIN 945 END 950											
	BEGIN 950 END 955											
	BEGIN 955 END 960	NOx 80.8				47.0	43.8	3.2				
	BEGIN 960 END 965											
	BEGIN 965 END 970											
	BEGIN 970 END 975											
	BEGIN 975 END 980											
		SYSTEM ZERO	.02	0.0	.3	.75						
		SYSTEM SPAN	4.97	14.7	55.9	88.3						
RAW AVERAGE												
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCE AlamitosCONDITION: 140 mW Upn OFFDATE: 10-7-97OPERATOR: CHFTEST NUMBER: 7-2-CEM

TEST LOCATION: _____

TEST NO.	TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED						CORRECTED TO _____%____, DRY			
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN										
		SYSTEM ZERO	.02	0.0	.2	.50						
		SYSTEM SPAN	4.92	14.75	55.5	53.0						
	BEGIN 1130 END 1135		3.62	9.68	0.8	80.8						
	BEGIN 1135 END 1140		3.62	9.68	0.7	80.7						
	BEGIN 1140 END 1145		3.61	9.68	0.7	80.8						
	BEGIN 1145 END 1150		3.61	9.7	0.7	80.8						
	BEGIN 1150 END 1155		3.61	9.7	.7	80.8						
	BEGIN 1155 END 1200	End	3.61	9.7	.7	80.8						
	BEGIN END											
	BEGIN END											
	BEGIN 1220 END 1225	NOx from 110 mW				46.2	44.5	1.8				
	BEGIN END											
	BEGIN END											
	BEGIN END											
		SYSTEM ZERO	.02	.05	.2	.50						
		SYSTEM SPAN	4.91	14.70	55.94	87.5						
RAW AVERAGE												
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCF / AL 2CONDITION: 140 mm Urea ONDATE: 10-7-92OPERATOR: CHFTEST NUMBER: 8-2-CEM

TEST LOCATION: _____

TEST NO.	TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO % DRY		
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN										
	1345	SYSTEM ZERO	0.2	0.0	.23	.25						
		SYSTEM SPAN	4.88	14.75	55.84	89.25						
	BEGIN 1400 END 1405	Span	3.48	9.75	1.7	68.8						
	BEGIN 1405 END 1410		3.46	9.75	1.5	69.5						
	BEGIN 1410 END 1415		3.48	9.75	1.5	69.5						
	BEGIN 1415 END 1420		3.4	1.75	1.5	69.8						
	BEGIN 1420 END 1425		3.47	9.75	1.5	70.0						
	BEGIN 1425 END 1430	Span	3.46	9.75	1.4	70.0						
	BEGIN END											
	BEGIN END											
	BEGIN 1445 END	NO ₂ probe				37.5	36.25	1.25				
	BEGIN END											
	BEGIN END											
	BEGIN END											
	1432	SYSTEM ZERO	0.2	0.0	.2	.75						
		SYSTEM SPAN	4.87	14.75	55.84	89.25						
RAW AVERAGE			3.4	9.75	56	89.25						
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCF / L12CONDITION: INDRAW VENT ONDATE: 10-7-92OPERATOR: CHFTEST NUMBER: 9-2-CEM

TEST LOCATION: _____

TEST NO.	TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED						CORRECTED TO % ____ DRY			
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN										
	1609	SYSTEM ZERO	01	00	.2	.5						
		SYSTEM SPAN	4.96	14.8	55.8	90.52						
	BEGIN 1620 END 1625	25.1 1.11022	2.60	9.75	1.2	71.3						
	BEGIN 1625 END 1630		2.58	9.75	1.1	71.3						
	BEGIN 1630 END 1635		3.6	9.75	1.1	71.3						
	BEGIN 1635 END 1640		3.56	9.75	1.01	72.0						
	BEGIN 1640 END 1645		3.54	9.75	1.2	72.2						
	BEGIN 1645 END 1650	7.1	3.52	9.75	1.3	72.2						
	BEGIN END											
	BEGIN END	No Flow				28.75	37.5	1.3				
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
		SYSTEM ZERO	1.02	0.0	.2	.5						
		SYSTEM SPAN	4.95	14.82	55.84	90.25						
RAW AVERAGE												
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCE/AlamedaCONDITION: 40 MV Urn. ONDATE: 10-8-93OPERATOR: CHFTEST NUMBER: 10-2-CEM

TEST LOCATION: _____

TEST NO.	TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO % DRY		
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN										
		SYSTEM ZERO	.02	0.0	0.3	.3						
		SYSTEM SPAN	4.97	14.93	55.84	48.5						
	BEGIN 905 END 910	Start Analyze	7.3	7.62	0.9	86.5						
	BEGIN 910 END 915		7.3	7.65	0.9	86.5						
	BEGIN 915 END 920		7.25	7.65	0.9	85.5						
	BEGIN 920 END 925		7.28	7.65	0.9	85.5						
	BEGIN 925 END 930		7.35	7.65	0.9	86.5						
	BEGIN 930 END 935	End	7.29	7.65	0.9	88.0						
	BEGIN END											
	BEGIN END											
	BEGIN END	Nox Probe				54.5	SI	3.5				
	BEGIN END											
	BEGIN END											
	BEGIN END											
		SYSTEM ZERO	.03	0.0	0.5	.25						
		SYSTEM SPAN	4.97	14.85	55.84	48.0						
RAW AVERAGE			✓									
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCE A14 2CONDITION: 40 MW Urea ONDATE: 10-8-92OPERATOR: CHFTEST NUMBER: 142-CFM

TEST LOCATION: _____

TEST NO.	TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO % _____, DRY		
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN				49.6						
	10416	SYSTEM ZERO	.03	0.0	.1	.3						
		SYSTEM SPAN	4.98	14.8	55.84	46.5						
	BEGIN 1115 END 1120	Start # B11F...	7.42	7.55	2.8	90.5						
	BEGIN 1120 END 1125		7.40	7.55	2.8	91.0						
	BEGIN 1125 END 1130		7.42	7.55	2.8	90.5						
	BEGIN 1130 END 1135		7.40	7.55	2.8	89.5						
	BEGIN 1135 END 1140		7.4	7.55	.8	90.0						
	BEGIN 1140 END 1145	End	7.4	7.55	.8	90.0						
	BEGIN END											
	BEGIN END											
	BEGIN 1210 END	1105				55	52	3.0				
	BEGIN END											
	BEGIN END											
	BEGIN END											
		SYSTEM ZERO	.02	0.0	.1	1.7						
		SYSTEM SPAN	5.02	14.9	56.8	49.5						
RAW AVERAGE				7.55	2.8							
CORRECTED AVERAGE												
COMMENTS:												

CARNOT

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCE / A12 2CONDITION: 40mw Urea OffDATE: 10-8-92OPERATOR: CHFTEST NUMBER: 12-2-CEMTEST LOCATION: HSAPH

TEST NO.	TIME	SAMPLE POINT/ CONDITION	250 Range DRY, UNCORRECTED						CORRECTED TO % DRY			
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN				90.52						
	1335	SYSTEM ZERO	.03	0.0	0.0	0.25						
		SYSTEM SPAN	4.99	14.8	55.84	87.0						
	BEGIN 1345 END 1350	Start A12 Probes	732	7.53	.3	104.0						
	BEGIN 1350 END 1355		730	7.55	0.3	103.0						
	BEGIN 1355 END 1400		730	7.55	0.4	103.8						
	BEGIN 1400 END 1405		732	7.51	.3	103.8						
	BEGIN 1405 END 1410		730	7.55	.3	103.5						
	BEGIN 1410 END 1415	End	739	7.55	.3	103.8						
	BEGIN 1415 END 1420											
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
	BEGIN END											
	1420	SYSTEM ZERO	.02	0.0	0.0	.25						
		SYSTEM SPAN	4.97	14.8	55.7	85.6						
RAW AVERAGE						86	8.6					
CORRECTED AVERAGE												
COMMENTS:												

262

CARNOT

CARNOT

PAGE ____ OF ____

REFERENCE METHOD GASEOUS MEASUREMENTS

CLIENT/LOCATION: SCE Ala 2CONDITION: 40 mm V. in offDATE: 10 5-77OPERATOR: CHPTEST NUMBER: 13-2-CEMTEST LOCATION: HSAPH

TEST NO.	TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO % DRY		
			O ₂	CO ₂	CO	NOx	NO	NO ₂	SO ₂	CO	NOx	SO ₂
SPAN GAS CONCENTRATION												
		AS FOUND ANAL. SPAN										
	1514	SYSTEM ZERO	.03	0.0	.1	0.0						
		SYSTEM SPAN	4.99	14.75	55.84	86.25						
	BEGIN 1525 END 1530	5 ft. P	7.36	7.5	.4	105						
	BEGIN 1530 END 1535		7.40	7.5	.4	104						
	BEGIN 1535 END 1540		7.35	7.5	.4	104						
	BEGIN 1540 END 1545		7.32	7.5	.4	102.5						
	BEGIN 1545 END 1550		7.30	7.5	.4	103.0						
	BEGIN 1550 END 1555	End	7.31	7.5	.4	103.3						
	BEGIN END											
	BEGIN END											
	BEGIN END	NOx Probe				68.3	64.3	2.0				
	BEGIN END											
	BEGIN END											
	BEGIN END											
		SYSTEM ZERO	.02	0.0	.1	.50						
		SYSTEM SPAN	5.00	14.7	55.84	87.5						
RAW AVERAGE			7.3	7.5	.4	103						
CORRECTED AVERAGE												
COMMENTS:												

Appendix C.4
Particulate

CARNOT

CLIENT 356/A/A/Am/205 UNIT 1-2-PM METHOD 5.3 PAGE 1 OF 1
 SAMPLE LOCATION 356/A/A/Am/205 TEST NO. 432-223 AMB. TEMP., °F 72 PROJECT # 12598
 OPERATOR/ASSISTANT S.M. METER VOL. (START/END) 432-223 DATE 10/6/92

PRE-TEST DATA:
 Barometric Press., in. Hg. 30.05
 Assumed Stack Press. 1.0
 Assumed Moisture 2.5
 Assumed Molecular Wt. 2.5
 Assumed ΔP 1.0
 Assumed ΔH 1.0
 Stack Diameter, in. 8.4
 Sample Time: Total 14 per point
 Total of Traverse Points 14
 $\Delta H =$ 78 x ΔP

EQUIPMENT INFO:
 Motor No. 71-4
 Motor, Yd. 1.004
 CFM @ $\Delta H = 1.0$ 0.57
 Pilot ID, Cp 0.57
 O₂/CO₂ Method 0.57
 Teflon Connecting 0.57
 Line (Y/N) 0.57
 Probe: Mat'l 0.57 Length 0.57
 Nozzle: Mat'l 0.57 Diam. 0.57
 Filter: No. 0.57 Mat'l 0.57

POST TEST INFO:
 Filter Appearance 0.57
 Impinger Appearance 0.57
 Silica Gel Spent (Y/N) 0.57

TEMPERATURES, °F

METER	IN		OUT	
	79	77	81	77
79	79	77	81	77
81	81	77	82	77
82	82	77	82	77
84	84	77	84	77
86	86	77	86	77
87	87	78	87	78
83	83	78	83	78
86	86	78	86	78
88	88	79	88	79
89	89	80	89	80
91	91	81	91	81
93	93	83	93	83

STATIC PRESS. INWG

IMP.	OUT	OVEN	IMP.	OUT	VAC.
56	54	55	55	55	15
54	54	55	55	55	10
55	55	55	55	55	10
55	55	55	55	55	10
60	60	60	60	60	15
64	64	64	64	64	16
65	65	65	65	65	17
63	63	63	63	63	11
64	64	64	64	64	9
64	64	64	64	64	9
65	65	65	65	65	9
63	63	63	63	63	12
63	63	63	63	63	12
64	64	64	64	64	12

CHAIN OF CUSTODY INFORMATION

Impingers Loaded	Impingers Recovered	Filter Loaded	Filter Recovered	Probe Wash
CHIF	CHIF	CHIF	CHIF	CHIF

TEST SUMMARY

Calculated by: JEH
 Checked by: JEH
 Sample Vol., c.i. 414.316
 Stack Press., inwg 1.55
 ΔH , inwg 1.55
 ΔP , inwg 1.55
 Meter Temp., °F 314.5
 Stack Temp., °F 314.5
 Water Collected, g 77
 O₂/CO₂ 77
 Comments:

CARNOT

CLIENT SEE ALAMITOS

SAMPLE LOCATION CSAPM

OPERATOR/ASSISTANT

SAMPLE TRAIN TEST DATA

UNIT 2 TEST NO. 2-2-PM METHOD S.3 PAGE 1 OF 2
 TEST CONDITION ORCA OFF AMB. TEMP., °F 1 PROJECT # 12598
 METER VOL. (START/END) 476.821 DATE

PRE-TEST DATA:
 Barometric Press., in. Hg. 30.01
 Assumed Stack Press. +4.0
 Assumed Moisture 2.5
 Assumed Molecular Wt. 1.3
 Assumed ΔP 1.00
 Assumed ΔH 5.00
 Stack Diameter, in. 8.4
 Sample Time: Total 6
 per point
 Total of Traverse Points 14

EQUIPMENT INFO:
 Meter No. 7112
 Motor, Yd. 11.0
 CFM @ ΔH = 1.0 56.6
 Pilot ID, Cp -
 O₂/CO₂ Method -
 Teflon Connecting Line (Y/N) -
 Probe: YES
 Nozzle: TRBW
 Filter: B
 Length 55
 Diam. 1.37
 No. 113-766
 Mat'l 1.00

POST TEST INFO:
 Filter Appearance 113-766
 Impinger Appearance 1.00
 Silica Gel Spent (Y/N) 1.00

SAMPLE TRAIN LEAK CHECK:
 Pre-Test 0.04 18 5.0
 Post-Test - - -
 QEM Vac. Pilot Init.

PRE-TEST CALIBRATION CHECK:
 Meter - Meter Temp. -
 Time ΔH Reading In Out
 Init. - - - -
 Final - - - -

ΔH = 1.6 x ΔP

SAMPLE POINT	TIME	METER CONDITIONS				TEMPERATURES, °F				O ₂	VAC.	STATIC PRESS. inwg	CHAIN OF CUSTODY INFORMATION
		ΔP	ΔH	METER READING	STACK	PROBE	METER IN	METER OUT	OVEN	IMP. OUT			
7	1115	1.0	1.8	476.821	337		52	51		200	4		Impingers Loaded 89
6	1121	1.8	1.54	478.612	338		54	52		62	18		Impingers Recovered
5	1127	1.9	1.65	481.026	346		55	52		61	25		Filter Loaded
4	1133	1.8	1.54	485.157	350		56	53		64	24		Filter Recovered
3	1139	2.6	1.4	488.871	357		58	53		65	23		Probe Wash
2	1145	3.4	1.4	493.750	324		97	54		68	23		TEST SUMMARY
1	1151	2.5	1.4	496.87	321		56	72		68	23		Calculated by:
500	1157			501.405									Checked by:
													Sample Vol., c.l.
													Stack Press., inwg
													ΔH, inwg
													ΔP, inwg
													Meter Temp., °F
													Stack Temp., °F
													Water Collected, g
													O ₂ /CO ₂
													Comments:

SAMPLE TRAIN TEST DATA

CLIENT SCC / HARRIS UNIT 2 TEST NO. 3-2-8m METHOD 5 PAGE 1 OF 1
 SAMPLE LOCATION 506-021 AMB. TEMP., °F 50.0 PROJECT # 101815
 OPERATOR/ASSISTANT SR METER VOL. (START/END) 506-021 DATE 10/8/15

PRE-TEST DATA:

Barometric Press., in. Hg. 29.74
 Assumed Stack Press. 0.0
 Assumed Moisture 0.0
 Assumed Molecular Wt. 0.0
 Assumed ΔP 0.0
 Assumed ΔH 0.0
 Stack Diameter, in. 6.3113
 Sample Time: Total 6.3113 per point 0.0
 Total of Traverse Points 0.0

$\Delta H = 72 \times \Delta P$

EQUIPMENT INFO:

Meter No. 1110
 Meter, Yd. 1110
 CFM @ $\Delta H = 1.0$ 5610
 Pilot ID, Cp 5610
 O₂/CO₂ Method 517.6
 Teflon Connecting 78.2
 Line (Y/N) 78.2
 Probe: 101
 Length 55
 Nozzle: 517.6
 Diam. 45-16.5
 Filter: 45-16.5

IMP.

#1 1110 #2 1110 #3 1110 #4 1110 #5 1110
 Total 1110
 POST TEST INFO:
 Filter Appearance 55
 Impinger Appearance 517.6
 Silica Gel Spent (Y/N) 45-16.5

WL (g)

#1 1110 #2 1110 #3 1110 #4 1110 #5 1110
 Total 1110
 POST TEST INFO:
 Filter Appearance 55
 Impinger Appearance 517.6
 Silica Gel Spent (Y/N) 45-16.5

SAMPLE TRAIN LEAK CHECK:

GEM Vac. 0.0 Pilot 0.0 Init. 0.0
 Pre-Test 0.0 Post-Test 0.0

PRE-TEST CALIBRATION CHECK:

Meter Meter Meter
 Time ΔH Reading In Out
 Init. 0.0 Final 0.0

SAMPLE POINT	TIME	METER CONDITIONS				TEMPERATURES, °F				STATIC PRESS. lwg	CHAIN OF CUSTODY INFORMATION	
		ΔP	ΔH	METER READING	STACK	PROBE	METER IN	METER OUT	OVEN	IMP. OUT	O ₂	VAC.
1	1308	1.5	1.6	506.021	336		53	52		24.0	8.0	7
2	1312	1.0	1.1	505.008	340		54	53		44		8
3	1319	1.4	1.5	512.425	335		58	57		44		7
4	1334	2.1	2.2	512.625	324		55	53		64	7.4	10
5	1330	3.4	3.5	518.432	324		103	55		44		12
6	1342	2.5	2.6	525.618	318		102	55		64	7.7	5
7	1358	1.6	1.7	523.1351	314		104	54		63	7.2	7
8	1404			535.125								
9	1407	1.8	1.9	535.125	330		55	54		41	7.2	4
10	1413	0.4	0.5	537.651	336		100	95		45	7.0	4
11	1419	2.5	2.6	540.112	334		110	95		63	7.2	8
12	1425	3.2	3.3	541.410	328		105	96		63	7.6	5
13	1431	1.0	1.1	548.610	323		105	96		64	7.4	6
14	1437	1.3	1.4	561.531	325		104	96		64	7.2	6
15	1442	1.0	1.1	554.051	324		104	94		64		6
16	1449			557.485								
TEST SUMMARY											Calculated by: <u>497</u>	
											Checked by:	
											Sample Vol., c.i. <u>51.468</u>	
											Stack Press., lwg	
											ΔH , lwg <u>1.56</u>	
											ΔP , lwg <u>1.5247</u>	
											Meter Temp., °F <u>57.2</u> 97.15	
											Stack Temp., °F <u>72.9</u>	
											Water Collected, g <u>125.6</u>	
											O ₂ /CO ₂ <u>7.4</u>	
											Comments: <u>CLAYCO-1, 10</u>	

CARNOT

CLIENT SE, Aguilar
SAMPLE LOCATION SAH
OPERATOR/ASSISTANT

SAMPLE TRAIN TEST DATA

UNIT 2 TEST NO. 4-2-PM METHOD 5.3 PAGE 1 OF 1
TEST CONDITION 06-9-01 AMB. TEMP., °F 1 PROJECT # 12558
METER VOL. (START/END) 55.7-71.0 DATE

PRE-TEST DATA:
Barometric Press., in. Hg. 30.05
Assumed Stack Press. 15.0
Assumed Moisture 15.0
Assumed Molecular Wt. 28
Assumed ΔP 6.3
Assumed ΔH 84
Stack Diameter, in. 6.3
Sample Time: Total 6.3 per point
Total of Traverse Points 14
 $\Delta H = 72 \times \Delta P$

EQUIPMENT INFO:
Meter No. 714
Motor, Yd. 10.5
CFM @ $\Delta H = 1.0$ 10.5
Pilot ID, Cp 0.84
O₂/CO₂ Method 7.0
Teflon Connecting 6.3
Line (Y/N) 6.3
Probe: 6.3
Nozzle: 6.3
Filter: 6.3

IMP. METER W/L(Start) W/L(End)
#1 DF 40 791.7 616.5 175.2
#2 DF 14.0 613.0 549.0 14.0
#3 528.9 528.9 528.9 3.4
#4 56 647.6 272.2 20.4
#5 56 647.6 272.2 20.4
Total 56
POST TEST INFO:
Filter Appearance 24.0
Impinger Appearance 24.0
Silica Gel Spent (Y/N)

SAMPLE TRAIN LEAK CHECK:
CEM Vac. 18 Pilot 18 Inlet 18
Pro-Test 18 Post-Test 18
PRE-TEST CALIBRATION CHECK:
Time ΔH Meter Reading Meter Temp. In Out
Init. 18 18 18 18 18
Final 18 18 18 18 18

SAMPLE POINT	TIME	METER CONDITIONS				TEMPERATURES, °F				STATIC PRESS. lwg	CHAIN OF CUSTODY INFORMATION				
		ΔP	ΔH	METER READING	STACK	PROBE	METER		OVEN				IMP. OUT	O ₂	VAC.
							IN	OUT							
7	1530	1.68	1.45	55.7	710	340	55	54			8.4	4	Impingers Loaded	57	
6	1536	1.78	1.52	50.0	31	341	100	74			8.0	4	Impingers Recovered	CF	
5	1542	2.1	2.22	56.3	45	342	102	99			7.4	8	Filter Loaded	54	
4	1548	4.1	2.55	56.7	170	341	105	100			7.0	12	Filter Recovered	54/CF	
3	1554	3.4	2.44	57.3	121	339	103	102			7.4	11	Probe Wash	JM	
2	1600	1.8	1.27	57.5	216	336	116	102					TEST SUMMARY		
1	1606	2.0	1.7	58.4	38	28	116	104					Calculated by:		
stop	1612			58.5									Checked by:	55.840	
7	1418	75	154	58.5	540		109	105			1.7	7	Sample Vol., c.i.	55.840	
6	1634	1.08	75	57.1	744		111	106			1.6	4	Stack Press., lwg	1.369	
5	1630	2.5	1.80	57.4	678		111	106			7.0	8	ΔH, lwg	1.78	
4	1636	1.00	1.0	57.5	652		115	106			7.5	8	Meter Temp., °F	106.82	
3	1642	5.0	1.44	60.3	450		115	108			7.8	7	Stack Temp., °F	337.3	
2	1648	1.8	1.06	60.6	448		115	108			7.4	7	Water Collected, g	213.0	
1	1654	1.3	93	61.0	412		114	104			7.4	7	O ₂ /CO ₂	7.4	
stop	1700			61.3	251								Comments:		

CARNOT

CLIENT CEI Alvarado
SAMPLE LOCATION CEAPTH
OPERATOR/ASSISTANT A. Wall, J. J. J.

SAMPLE TRAIN TEST DATA

UNIT 2 TEST NO. 6-2-PM METHOD S.3 PAGE 1 OF 1
TEST CONDITION Wet off AMB. TEMP., °F 87.1 PROJECT # 12528
METER VOL. (START/END) 662.555 1 487.104 DATE 12/13

PRE-TEST DATA: 3001
Barometric Press., in. Hg. 29.0
Assumed Stack Press. 1.5
Assumed Moisture 2.8
Assumed Molecular Wt. 1.5
Assumed ΔP 0.15
Assumed ΔH 6.0
Stack Diameter, in. 6.0
Sample Time: Total 6.0 per point 1.0
Total of Traverse Points 4
ΔH = 70 x ΔP

EQUIPMENT INFO:
Meter No. 71-4
Meter Yd. 1.5004
CFM @ ΔH = 1.0 0.54
Pilot ID, Cp 0.34
O/CO, Method 1.00
Teflon Connecting Line (Y/N) 1.00
Probe: 1.00 Length 8.5
Nozzle: 1.00 Diam. 0.155
Filter: 1.00 No. 47-448 Malt

IMP. Malt Wt(End) Wt(Start) Wt(0)
#1 4.0 674.7 677.7 10.10
#2 16.0 525.3 525.0 43
#3 0 525.3 524.7 0.6
#4 50 703.7 695.8 7.9
#5 _____
Total 118.7

POST TEST INFO:
Filter Appearance _____
Impinger Appearance _____
Silica Gel Spent (Y/N) _____

SAMPLE TRAIN LEAK CHECK:
CEM Yac End Init
Pre-Test 6.00 1.7 01 1711
Post-Test 6.00 1.1 01 1712

PRE-TEST CALIBRATION CHECK:
Time ΔH Meter Meter Temp.
Init _____
Final _____

SAMPLE POINT	TIME	METER CONDITIONS			TEMPERATURES, °F							CHAIN OF CUSTODY INFORMATION			
		ΔP	ΔH	METER READING	STACK	PROBE	METER		OVEN	IMP. OUT	O ₂	VAC.	STATIC PRESS. inwg		
							IN	OUT							
7	8:30	1.84	.58	662.555	352		73	71		65	77	3		Impingers Loaded	CE
6	8:36	.61	.42	665.165	301		72	72		60		3		Impingers Recovered	CH
5	8:42	1.1	.71	667.135	283		75	73		53	75	3		Filter Loaded	CH
4	8:48	1.04	.51	670.152	504		81	74		52	64	4		Filter Recovered	CH
3	8:54	1.02	.84	673.512	308		83	75		54	70	4		Probe Wash	
2	9:00	.93	.68	676.142	302		84	76		57	67	4		TEST SUMMARY	
1	9:06	1.13	.91	679.220	300		85	77		57	62	4		Calculated by: JM	
Stop	9:12			681.512										Checked by:	
		1												Sample Vol., cl. 355.305	
7	9:30	1.13	.91	681.872	287		84	80		55	5	4		Stack Press., inwg 7.8	
6	9:36	.73	.51	684.166	298		86	81		53	7.9	4		ΔH, inwg 28.0	274
5	9:42	.50	.35	686.515	294		88	82		52	8.2	4		ΔP, inwg 8.5	
4	9:48	.67	.46	689.240	292		90	82		53	8.3	3		Meter Temp., °F 81.5	
3	9:54	.52	.36	691.125	280		92	84		53	8.4	3	7.4	Stack Temp., °F 300.2	
2	10:00	.41	.42	693.412	285		93	84		40	8.7	3		Water Collected, g	
1	10:06	.85	.53	695.301	285		93	84		58	8.8	3		O/CO, 8.4	
Stop	10:12			697.504										Comments:	

CARNOI

SAMPLE TRAIN TEST DATA

CLIENT UNIT TEST NO. 5-2-84 METHOD DATE 10/1/84 PAGE 1 OF 1

SAMPLE LOCATION TEST CONDITION AMB. TEMP., °F PROJECT # 100000

OPERATOR/ASSISTANT METER VOL. (START/END) 6/13.655 1 662.046 DATE 10/1/84

PRE-TEST DATA:

Barometric Press., in. Hg. 15
 Assumed Stack Press. 15
 Assumed Moisture 15
 Assumed Molecular Wt. 15
 Assumed ΔP 15
 Assumed ΔH 15
 Stack Diameter, in. 6.64
 Sample Time: Total per point
 Total of Traverse Points per point

$\Delta H = 75 \times \Delta P$

EQUIPMENT INFO:

Meter No. 1104
 Meter, Yd. 1104
 CFM @ $\Delta H = 1.0$ 1104
 Pilot ID, Cp 1104
 O/CO₂ Method 1104
 Teflon Connecting 1104
 Line (Y/N) 1104
 Probe: 1104
 Nozzle: 1104
 Filter: 1104

TEMP.

Imp.	Mtd	Wt(End)	Wt(Start)	Wt(0)
#1	4.0	737.2	584.9	152.3
#2	11.0	587.1	580.8	8.3
#3	5.0	518.6	516.4	2.2
#4	5.0	724.0	723.8	0.2
#5				
Total				

POST TEST INFO:

Impinger Appearance 1750
 Filter Appearance 1750
 Impinger Appearance 1750
 Silica Gel Spent (Y/N) 1750

SAMPLE TRAIN LEAK CHECK:

CEM 15 Vac. 24 Pilot 57
 Pre-Test 4005
 Post-Test 4005

PRE-TEST CALIBRATION CHECK:

Time 15 Meter 15 Meter Temp. 15
 ΔH 15 Reading 15 In 15 Out 15

SAMPLE POINT	TIME	METER CONDITIONS			TEMPERATURES °F				STATIC PRESS., inHg	CHAIN OF CUSTODY INFORMATION
		ΔP	ΔH	METER READING	STACK	PROBE	METER IN	METER OUT		

7	1142	51	65	613.655	325		100	33		66	74	4		Impingers Loaded
6	1746	55	69	616.634	330		100	37		58	65	3		Impingers Recovered
5	1752	14	65	615.700	326		101	33		60	70	5		Filter Loaded
4	1758	15	65	623.045	316		102	35		60	70	7		Filter Recovered
3	1804	40	100	626.647	210		104	71		61	71	6		Probe Wash
2	1810	11	82	630.531	314		103	37		61	50	4		TEST SUMMARY
1	1816	54	70	633.465	318		102	37		41		4		Calculated by:
stop	1822			636.548										Checked by:
7	1825	101	105	636.541	322		45	95		62	44	4		Sample Vol., c.l.
1	1831	100	120	640.987	325		45	95		60	70	6		Stack Press., inHg
5	1837	15	112	644.135	320		45	93		60	72	5		ΔH , inHg
4	1843	103	111	647.18	324		48	92		41	70	5		ΔP , inHg
3	1849	105	125	651.324	301		47	91		41	70	6		Meter Temp., °F
2	1853	104	105	655.871	314		47	90		64	40	6		Stack Temp., °F
1	1901	12	105	658.686	310		40	85		64	40	6		Water Collected, g
stop	1907			662.046										O/CO ₂

Comments:

CARNOT

SEE / Alvarado

CLIENT SEE / Alvarado
SAMPLE LOCATION SEE / Alvarado
OPERATOR/ASSISTANT SEE / AlvaradoSAMPLE TRAIN TEST DATA
UNIT 2 TEST NO. 3.2-PM
TEST CONDITION DECA AMB. TEMP., °F 74.1
METER VOL. (START/END) 74.1/95.1METHOD S. 3 PROJECT # 10-8-72
DATE 10-8-72

PRE-TEST DATA:

Barometric Press., in. Hg. 29.05
Assumed Stack Press. 14
Assumed Moisture 2.8
Assumed Molecular Wt. 1.0
Assumed ΔP 1.0
Assumed ΔH 1.0
Stack Diameter, in. 1.0
Sample Time: Total 1.0
per point 1.0
Total of Traverse Points 1.0
 $\Delta H = 74.1 \times \Delta P$

EQUIPMENT INFO:

Meter No. 71-4
Meter Yd. 1.0
CFM @ $\Delta H = 1.0$ 0.54
Pilot ID, Cp 0.54
O₂/CO₂ Method 7.0
Teflon Connecting Line (Y/N) 7.0
Probe: Length 7.0
Nozzle: Matl 7.0
Diam. 7.0
No. 7.0
Matl 7.0

IMD.

#1 1.0 1.0 1.0 1.0 1.0
#2 1.0 1.0 1.0 1.0 1.0
#3 1.0 1.0 1.0 1.0 1.0
#4 1.0 1.0 1.0 1.0 1.0
#5 1.0 1.0 1.0 1.0 1.0

POST TEST INFO:

Filter Appearance 1.0
Impinger Appearance 1.0
Silica Gel Spent (Y/N) 1.0

SAMPLE TRAIN LEAK CHECK:

CFM 1.0 YAC 1.0 Pilot 1.0 Init 1.0
Pre-Test 1.0 1.0 1.0 1.0
Post-Test 1.0 1.0 1.0 1.0

PRE-TEST CALIBRATION CHECK:

Time 1.0 Meter 1.0 Meter Temp. 1.0
Init. 1.0 Reading 1.0 In 1.0 Out 1.0
Final 1.0

SAMPLE POINT	TIME	METER CONDITIONS			TEMPERATURES, °F					O ₂	VAC.	STATIC PRESS. inwg	CHAIN OF CUSTODY INFORMATION	
		ΔP	ΔH	METER READING	STACK	PROBE	METER		OVEN					IMP. OUT
							IN	OUT						
7	13:37	36	41	744.757	343		33	34				3	Impingers Loaded	0.1.1
8	13:33	46	46	777.215	345		35	35				3	Impingers Recovered	0.1.5
5	13:35	78	57	149.004	344		37	35				3	Filter Loaded	0.1.7
4	13:45	18	133	751.430	333		60	36				2	Filter Recovered	0.1.8
3	13:51	13	76	755.481	337		105	76				5	Probe Wash	0.1.12
2	13:57	72	57	760.028	334		107	73				4	TEST SUMMARY	
1	14:03	75	57	762.150	336		106	58				4	Calculated by:	
Stew 1	14:09			764.676									Checked by:	
7	14:15	84	61	764.478	350		101	101				4	Sample Vol. cl.	4/c. 055
6	14:21	58	64	767.461	350		106	101				4	Stack Press. inwg	
5	14:27	11	84	769.424	349		104	102				5	ΔH, inwg	1.0361.054
4	14:33	25	215	772.710	346		108	104				9	Meter Temp. °F	102.4 ✓
3	14:39	37	244	777.741	342		113	104				11	Stack Temp. °F	244.58 344
2	14:45	25	192	783.216	338		115	106				9	Water Collected, g	154.2 ✓
1	14:51	78	206	787.512	317		116	126				5	O ₂ /CO ₂	8/14
Stew 1	14:57			771.036									Comments:	

SAMPLE TRAIN TEST DATA

CLIENT SCC / Maintenance UNIT 7-2-DM TEST NO. 7-2-DM METHOD 5.2 PAGE 1 OF 1
 SAMPLE LOCATION SCC TEST CONDITION AMB. TEMP. °F PROJECT # 1072152
 OPERATOR/ASSISTANT J. Williams METER VOL. (START/END) 494.205 / 746.768 DATE 10/2/15

PRE-TEST DATA:

Barometric Press., in. Hg. 30.1
 Assumed Stack Press. 0.0
 Assumed Moisture 0.0
 Assumed Molecular Wt. 0.0
 Assumed ΔP 0.0
 Assumed ΔH 0.0
 Stack Diameter, in. 1.0
 Sample Time: Total 0.0 per point 0.0
 Total of Traverse Points 0.0

EQUIPMENT INFO:

Motor No. 71
 Motor, Yd. 1.0
 CFM @ $\Delta H = 1.0$ 5.0
 Pilot ID, Cp 0.0
 O₂/CO₂ Method 0.0
 Teflon Connecting Line (Y/N) 0.0
 Probe: Matt Length 0.0
 Nozzle: Matt Diam. 0.0
 Filter: No. Matt 0.0

LOG

#	Matt	Wt(End)	Wt(Start)	Wt(0)
#1	1.0	715.8	515.7	140.1
#2	1.0	517.0	517.0	3.9
#3	1.0	516.6	516.6	1.6
#4	1.0	746.6	735.8	10.8
#5				
Total				156.4

POST TEST INFO:
 Filter Appearance 0.0
 Impinger Appearance 0.0
 Silica Gel Spent (Y/N) 0.0

SAMPLE TRAIN LEAK CHECK:

Pre-Test 0.0 15 0.0 5.0
 Post-Test 0.0 10 0.0 4.0

PRE-TEST CALIBRATION CHECK:

Time ΔH Meter Reading Meter Temp. In Out
 Init. 0.0 0.0 0.0 0.0
 Final 0.0 0.0 0.0 0.0

SAMPLE POINT	TIME	METER CONDITIONS		TEMPERATURES, °F				STATIC PRESS. INWG	CHAIN OF CUSTODY INFORMATION
		ΔP	ΔH	METER READING	STACK	PROBE	METER IN OUT	OVEN	
7	11:06	45	48	698.005	346	1	92 51	720	Impingers Loaded 6145
6	11:08	81	57	700.050	348	1	92 50	64	Impingers Recovered
5	11:08	2.2	1.56	702.712	348	1	95 92	64	Filter Loaded
4	11:14	3.0	2.2	706.5	341	1	101 51	59	Filter Recovered
3	11:20	5.7	2.6	706.654	340	1	103 94	59	Probe Wash
2	11:28	1.5	1.85	717.130	333	1	105 95	40	TEST SUMMARY
1	11:32	1.9	1.4	721.745	332	1	105 95	40	Calculated by: <u>CS</u>
Stop	11:38			726.040					Checked by: <u>CS</u>
7	11:42	48	57	726.070	341	1	106 95	46	Sample Vol., cl. <u>46503</u>
6	11:46	63	53	728.136	342	1	97 94	62	Stack Press., inwg
5	11:52	84	62	731.641	342	1	97 94	62	ΔH , inwg <u>1.134</u>
4	11:58	2.0	1.18	733.142	337	1	96 94	63	ΔP , inwg <u>1.4204</u>
3	12:04	1.1	0.91	736.861	334	1	97 94	63	Meter Temp., °F <u>339</u>
2	12:10	0.88	0.65	737.871	332	1	95 94	64	Stack Temp., °F <u>339</u>
1	12:40	75	55	742.615	332	1	95 94	65	Water Collected, g <u>15.4</u>
Stop	12:52			747.768					O ₂ /CO ₂ <u>8.00</u>

CARNOT

SAMPLE TRAIN TEST DATA

CLIENT CEC / Alcantara UNIT 7-2-PM TEST NO. 744.768 METHOD 5.2 PAGE 1 OF 1
 SAMPLE LOCATION CEC / Alcantara TEST CONDITION AMB. TEMP., °F PROJECT # 1072/34
 OPERATOR/ASSISTANT 3/21/2020 METER VOL (START/END) 15.2/25.1 DATE 10/21/20

EQUIPMENT INFO:
 Motor No. 714
 Motor, Yd. 1000
 CFM @ ΔH = 1.0 8.0
 Pilot ID, Cp 5.0
 O₂/CO₂ Method 5.0
 Teflon Connecting Line (Y/N) 5.0
 Probe: 5.0
 Nozzle: 5.0
 Filter: 5.0

POST TEST INFO:
 Filter Appearance 5.0
 Impinger Appearance 5.0
 Silica Gel Spent (Y/N) 5.0

PRE-TEST CALIBRATION CHECK:
 Time ΔH Meter Reading Meter Temp. In Out
 Init. 5.0 5.0 5.0 5.0
 Final 5.0 5.0 5.0 5.0

SAMPLE TRAIN LEAK CHECK:
 Pre-Test 5.0 5.0 5.0 5.0
 Post-Test 5.0 5.0 5.0 5.0

SAMPLE POINT	TIME	METER CONDITIONS			TEMPERATURES, °F				STATIC PRESS. iwq	CHAIN OF CUSTODY INFORMATION	
		ΔP	ΔH	METER READING	PROBE	METER IN	METER OUT	OVEN			
7	1106	4.5	1.5	698.205	346	92	91	1	4	Impingers Loaded	1.13
6	1107	4.1	1.5	700.250	348	92	90	1	4	Impingers Recovered	1.13
5	1108	2.2	1.5	702.712	348	95	92	1	6	Filter Loaded	1.13
4	1114	3.0	2.2	706.5	347	101	91	1	8	Filter Recovered	1.13
3	1120	5.7	2.6	711.654	340	103	94	1	11	Probe Wash	1.13
2	1126	1.5	1.5	717.120	333	105	95	1	5	TEST SUMMARY	1.13
1	1132	1.9	1.4	721.764	332	105	96	1	8	Calculated by: <u>CEC</u>	1.13
Stop	1138			726.040						Checked by: <u>CEC</u>	1.13
7	1140	4.6	1.5	726.090	341	104	95	1	3	Sample Vol., c.t. <u>46503</u>	1.13
6	1146	4.5	1.5	728.136	342	97	94	1	7	Stack Press., iwq	1.13
5	1152	4.4	1.2	731.651	342	97	94	1	3	ΔH, iwq <u>1.13</u>	1.13
4	1158	2.0	1.0	733.142	337	96	94	1	3	ΔP, iwq <u>1.4204</u>	1.13
3	1204	1.1	1.1	736.861	334	97	94	1	4	Meter Temp., °F <u>73.9</u>	1.13
2	1210	1.8	1.5	737.811	332	99	94	1	4	Stack Temp., °F <u>73.4</u>	1.13
1	1220	7.5	1.5	742.618	332	98	94	1	4	Water Collected, g <u>2.00</u>	1.13
Stop	1232			747.768						O ₂ /CO ₂ <u>2.00</u>	1.13
										Comments:	1.13

CARNOT

SAMPLE TRAIN TEST DATA

CLIENT SE / Minutec UNIT 2 TEST NO. 822-PM METHOD 5.23 PAGE 1 OF 1
 SAMPLE LOCATION SEA TEST CONDITION SEA AMB. TEMP., °F 74.1 PROJECT # 10-8-72
 OPERATOR/ASSISTANT SEA METER VOL. (START/END) 74.1/85.1 DATE 10-8-72

PRE-TEST DATA:
 Barometric Press., in. Hg. 29.05
 Assumed Slack Press. 7.2
 Assumed Moisture 14
 Assumed Molecular Wt. 28
 Assumed ΔP 1.0
 Assumed ΔH 1.0
 Slack Diameter, in. 1.0
 Sample Time: Total 1.0 per point 1.0
 Total of Traverse Points 1.0

EQUIPMENT INFO:
 Motor No. 71-4
 Motor, Yd. 1.004
 CFM @ $\Delta H = 1.0$ 0.94
 Pilot ID, Cp 0.54
 O₂/CO₂ Method SEA
 Teflon Connecting Line (Y/N) SEA
 Probe: Marti SEA Length SEA
 Nozzle: Marti SEA Diam. SEA
 Filter: No. SEA Marti SEA

POST TEST INFO:
 Filter Appearance SEA
 Impinger Appearance SEA
 Silica Gel Spent (Y/N) SEA

IMD. Malt WL(Start) WL(End) WL(a)
 #1 1.16 1.16 1.16
 #2 1.16 1.16 1.16
 #3 1.16 1.16 1.16
 #4 1.16 1.16 1.16
 #5 1.16 1.16 1.16
 Total 1.16

PRE-TEST CALIBRATION CHECK:
 Meter Reading 159.2
 Time ΔH 159.2
 Meter Temp. In Out 159.2

SAMPLE TRAIN LEAK CHECK:
 Pre-Test CEM Vac. Pilot Init. SEA
 Post-Test CEM Vac. Pilot Init. SEA

SAMPLE POINT	TIME	METER CONDITIONS			TEMPERATURES, °F				O ₂	VAC.	STATIC PRESS. lwg	CHAIN OF CUSTODY INFORMATION
		ΔP	ΔH	METER READING	PROBE	METER IN	METER OUT	OVEN				
7	13.17	56	4.1	774.751	343	93	94			3		Impingers Loaded C 1.1
6	13.33	66	4.6	777.218	345	95	95		8.2	3		Impingers Recovered C 1.1
5	13.35	78	5.7	777.028	344	97	95			3		Filter Loaded C 1.1
4	13.45	1.8	1.33	751.820	333	100	96		8.5	5		Filter Recovered C 1.1
3	13.51	1.3	1.6	756.481	337	105	96		9.0	5		Probe Wash C 1.1
2	13.57	76	5.1	760.028	334	107	95		8.9	4	9.2	TEST SUMMARY
1	14.03	78	5.7	762.150	350	106	95		8.6	4		Calculated by:
SEA	14.09			764.678								Checked by:
7	14.15	136	6.6	764.678	350	106	101		8.2	4		Sample Vol., c.f. 4/6.085
6	14.21	158	6.4	767.621	350	106	101		7.4	4		Slack Press., lwg
5	14.27	1.1	6.1	769.424	349	108	102		7.4	5		ΔH , lwg 1.0761.0543
4	14.33	2.8	2.15	772.710	346	108	104		7.4	9		ΔP , lwg 1.2-14
3	14.35	3.7	2.84	777.141	342	113	104		7.7	11		Meter Temp., °F 102.4
2	14.45	2.5	1.72	783.216	338	115	106		8.1	9		Slack Temp., °F 241.5
1	14.51	78	6.06	787.512	337	116	106		8.4	5		Water Collected, g 159.2
SEA	14.57			771.036								O ₂ /CO ₂ SEA
												Comments:

CARNOT

CLIENT SCC/Alumitos
 SAMPLE LOCATION SCC/PH
 OPERATOR/ASSISTANT JAN

SAMPLE TRAIN TEST DATA

UNIT 2 TEST NO. 9-2-14 METHOD 5.3 PAGE 1 OF 1
 TEST CONDITION SCC/PH AMB. TEMP. °F 125.98 PROJECT # 12598
 METER VOL. (START/END) 791.261 1830.450 DATE 10-7-52

PRE-TEST DATA:
 Barometric Press., in. Hg. 29.99
 Assumed Stack Press. 0
 Assumed Moisture 0
 Assumed Molecular Wt. 28
 Assumed ΔP 10
 Assumed ΔH 172
 Stack Diameter, in. 6.57
 Sample Time: Total 44 per point
 Total of Traverse Points 14

EQUIPMENT INFO:
 Meter No. 71-0
 Meter, Yd. 10.0
 CFM @ $\Delta H = 1.0$ 0.50
 Pilot ID, Cp 0.34
 O₂/CO₂ Method YES
 Teflon Connecting Tested
 Line (Y/N) 8
 Probe: Matl 35 Length 14
 Nozzle: Matl 0.155 Diam. 47-451
 Filter: No. 0.155 Matl 47-451

POST TEST INFO:
 Filter Appearance 35
 Impinger Appearance 0.155
 Silica Gel Spent (Y/N) 47-451

PRE-TEST CALIBRATION CHECK:
 Meter Reading In Out
 Time ΔH Meter In Out
 Init. Final

SAMPLE TRAIN LEAK CHECK:
 CEM Vac. Pilot Init.
 Pre-Test 0.02 15 28 144
 Post-Test 0.02 10 28 144

SAMPLE POINT	TIME	METER CONDITIONS				TEMPERATURES, °F				O ₂	VAC.	STATIC PRESS. iwg	CHAIN OF CUSTODY INFORMATION
		ΔP	ΔH	METER READING	STACK	PROBE	METER IN	METER OUT	OVEN	IMP. OUT			
7	1725	5.5	79	781.200	305	1	103	100		100	4		Impingers Loaded CH
6	1540	9.4	76	773.301	304		100	102		100	4	7.5	Impingers Recovered CH
5	1547	5.5	65	756.218	204		100	103		100	4		Filter Loaded CH
4	1553	1.1	0.91	744.005	302		114	105		100	4		Filter Recovered CH
3	1800	1.1	1.1	802.432	294		116	106		100	4		Probe Wash CH
2	1806	1.1	1.1	806.341	294		118	107		100	4		TEST SUMMARY
1	1812	5.1	73	805.646	254		120	108		100	4		Calculated by:
Gray	1818			812.000									Checked by:
7	1824	1.5	52	817.000	303		115	110		100	4		Sample Vol., c.f. 39.244
6	1828	0.4	43	814.300	303		115	111		100	4		Stack Press., iwg 1.9
5	1834	6.4	51	816.550	298		117	112		100	4		ΔH , iwg 0.716
4	1840	9.0	66	815.050	296		115	112		100	4		ΔP , iwg 0.872
3	1841	6.2	57	821.624	294		120	112		100	4		Meter Temp., °F
2	1843	6.5	54	824.561	264		120	112		100	4		Stack Temp., °F
1	1848	1.1	51	827.445	254		121	113		100	4		Water Collected, g
Gray	1854			820.150									O ₂ /CO ₂
													Comments: 102.06

CARNOT

CLIENT SEI Alaska
 SAMPLE LOCATION C59th
 OPERATOR/ASSISTANT Mulligan

SAMPLE TRAIN TEST DATA

UNIT 2 TEST NO. 11-2-PM METHOD 5.3 PAGE 1 OF 1
 TEST CONDITION vac AMB. TEMP., °F 74 PROJECT # 12590
 METER VOL. (START/END) 548.620 DATE 10-5-92

PRE-TEST DATA:
 Barometric Press., in. Hg. 29.98
 Assumed Stack Press. 1.00
 Assumed Moisture 1.00
 Assumed Molecular Wt. 3.5
 Assumed ΔP 0.10
 Assumed ΔH 1.00
 Stack Diameter, in. 6.5
 Sample Time: Total 54 per point 14
 Total of Traverse Points 14
 ΔH = 282 x ΔP 23

EQUIPMENT INFO:
 Meter No. 100
 Meter, Yd. 100
 CFM @ ΔH = 1.0 0.575
 Pilot ID, Cp 0.85
 O₂/CO₂ Method 100
 Teflon Connecting Line (Y/N) 7-472
 Probe: Marti Length 8
 Nozzle: Marti Diam. 0.250
 Filter: No. 47-453 Marti

POST TEST INFO:
 Impinger Appearance 55
 Silica Gel Spent (Y/N) 47-453

SAMPLE TRAIN LEAK CHECK:
 CFM Vac. Pilot Init.
 Pre-Test 0.02 17 04 141
 Post-Test 0.05 10 141

PRE-TEST CALIBRATION CHECK:
 Meter Meter Temp.
 Time ΔH Reading In Out
 Init. Final

SAMPLE POINT	TIME	METER CONDITIONS				TEMPERATURES, °F						STATIC PRESS. Inwg	CHAIN OF CUSTODY INFORMATION		
		ΔP	ΔH	METER READING	STACK	PROBE	METER		OVEN	IMP. OUT	O ₂			VAC.	
							IN	OUT							
7	1105	24	1.2	548.620	336		90	84		64	11.3	2	9.0	Impingers Loaded	CF
6	1111	20	1.52	551.110	335		95	84		60	11.6	2		Impingers Recovered	
5	1117	23	1.60	553.81	335		98	80		58	11.5	2		Filter Loaded	CF
4	1123	21	1.58	556.741	330		99	80		58	11.4	2		Filter Recovered	CF
3	1129	18	47	559.123	335		99	91		60	11.5	2		Probe Wash	JM
2	1135	23	1.0	562.00	335		99	91		61	11.5	2		TEST SUMMARY	
1	1141	27	10	564.610	321		100	91		61	11.5	2		Calculated by: JM	
sneg	1147			566.831										Checked by:	
7	1151	55	1.4	566.681	336		95	91		65	11.4	5		Sample Vol., c.f. 35.735	
6	1157	28	1.4	571.440	336		104	92		58	11.7	5		Stack Press., Inwg 5.0	
5	1203	24	1.55	573.61	336		100	92		62	11.7	2		ΔH, Inwg 0.707	
4	1209	20	1.46	577.60	336		100	92		63	11.7	3		ΔP, Inwg 0.318	
3	1215	14	1.2	579.21	337		98	92		64	11.5	2		Meter Temp., °F 141.75	
2	1221	15	1.03	581.238	337		97	92		67	11.5	4		Stack Temp., °F 335.4	
1	1227	56	1.28	584.141	336		103	92		62	11.7	4		Water Collected, g	
sneg	1233			588.405										O ₂ /CO ₂ 11.5 / 5.5	
														Comments:	

CARNOT

CLIENT See / H. H. H. H. H.
SAMPLE LOCATION See / H. H. H. H. H.
OPERATOR/ASSISTANT J. M. M. M. M.

SAMPLE TRAIN TEST DATA

UNIT 2 TEST NO. 12-7-78 METHOD 5-3 PAGE 1 OF 1
TEST CONDITION 40 M. V. / 100 M. A. M. B. TEMP. °F PROJECT # 63
METER VOL. (START/END) 588.835 DATE 10-8-78

PRE-TEST DATA:
Barometric Press., in. Hg. 29.9
Assumed Stack Press. 9.1
Assumed Moisture 1.5
Assumed Molecular Wt. 25.5
Assumed ΔP .43
Assumed ΔH .87
Stack Diameter, in. 6.5
Sample Time: Total 64 per point 5
Total of Traverse Points 14

EQUIPMENT INFO:
Meter No. 71-4
Meter, Yd. 1.0040
CFM @ $\Delta H = 1.0$.540
Pilot ID, Cp .84
O₂/CO₂ Method Point
Teflon Connecting Line (Y/N) Yes
Probe: Mat'l 18
Nozzle: Mat'l 10
Filter: No. CS Mat'l 47-484

POST TEST INFO:
Filter Appearance Impinger Appearance
Silica Gel Spent (Y/N) CS

SAMPLE TRAIN LEAK CHECK:
CEM Vac. Init
Pre-Test 1005 52
Post-Test 1005 52

PRE-TEST CALIBRATION CHECK:
Meter Reading Init Final
Time ΔH Init Final

SAMPLE POINT	TIME	METER CONDITIONS			TEMPERATURES, °F				STATIC PRESS. hwg	CHAIN OF CUSTODY INFORMATION	
		ΔP	ΔH	METER READING	PROBE	METER IN	METER OUT	OVEN			
7	1215	.149	.112	588.835	337	104	93	1		Impingers Loaded	Impingers Recovered
6	1321	.135	.103	572.471	338	108	94	1		Impingers Loaded	Impingers Recovered
5	1327	.17	.140	595.468	338	105	94	1		Filter Loaded	Filter Recovered
4	1333	.11	.10	578.625	338	102	95	1		Probe Wash	TEST SUMMARY
3	1339	.19	.140	599.871	338	100	94	1		Calculated by: <u>gfr</u>	Checked by: <u>gfr</u>
2	1345	.15	.135	602.276	338	101	95	1		Sample Vol., c.i. <u>34.68</u>	Stack Press., iwg <u>15.1</u>
1	1357	.61	.145	604.165	338	99	94	1		ΔH , iwg <u>0.529</u>	ΔP , iwg <u>0.271</u>
stop	1357			605.689						Meter Temp., °F <u>95.96</u>	Stack Temp., °F <u>337.64</u>
7	1359	.14	.133	608.689						Water Collected, g	O ₂ /CO ₂
6	1405	.11	.125	610.340	338	95	93	1		Comments:	
5	1411	.18	.141	612.476	338	95	92	1			
4	1417	.13	.129	614.752	337	96	91	1			
3	1423	.17	.138	616.745	337	95	90	1			
2	1429	.14	.132	619.015	337	94	90	1			
1	1435	.27	.161	620.850	337	94	90	1			
stop	1441			623.548							

CARNOT

SAMPLE TRAIN TEST DATA

CLIENT Case/Plummet UNIT 2 TEST NO. 13-2-PM METHOD S-3 PAGE 1 OF 1
 SAMPLE LOCATION Line 100 ft AMB. TEMP., °F 74 PROJECT # 24
 OPERATOR/ASSISTANT S. Mulligan METER VOL. (START/END) 623.732 DATE 10-8-92

PRE-TEST DATA:
 Barometric Press., in. Hg. 30.00
 Assumed Stack Press. 0.0
 Assumed Moisture 0.0
 Assumed Molecular Wt. 32
 Assumed ΔP 0.0
 Assumed ΔH 0.0
 Stack Diameter, in. 0.75
 Sample Time: Total 0.0 per point 0.0
 Total of Traverse Points 0.0
 $\Delta H = 2.76 \times \Delta P$ 7.60

EQUIPMENT INFO:
 Meter No. 58-19
 Meter, Yd. 1.0
 CFM @ $\Delta H = 1.0$ 0.0
 Pilot ID, Cp 0.0
 O₂/CO₂ Method Line
 Teflon Connecting Line
 Probe: Line Line (Y/N) Line
 Length Line
 Nozzle: Line Matl Line
 Filter: Line No. Line Matl Line

POST TEST INFO:
 Filter Appearance Line
 Impinger Appearance Line
 Silica Gel Spent (Y/N) Line

IMP. # 1 2 3 4 5 **Total**
 Imp. 11.0 11.0 9 56 300.8
 Matl 11.0 11.0 9 56
 Wt (Start) 572.2 613.2 502.2 790.8
 Wt (End) 286.4 613.2 502.2 790.8
 Wt (G) 11.0 0.0 0.0 0.0

SAMPLE TRAIN LEAK CHECK:
 CFM 0.0015 Vac. 0.0040 Pilot 0.0040 Init. 0.0040
 Pre-Test 0.0015 Post-Test 0.0040

PRE-TEST CALIBRATION CHECK:
 Meter Reading 0.0040 Meter Temp. 0.0040
 Inma ΔH 0.0040 In Out 0.0040
 Init. 0.0040 Final 0.0040

SAMPLE POINT	TIME	METER CONDITIONS			TEMPERATURES, °F				STATIC PRESS. lwg	CHAIN OF CUSTODY INFORMATION	
		ΔP	ΔH	METER READING	PROBE	METER IN	METER OUT	OVEN			
7	15:15	1.5	2.42	623.724	284	107	90		6	Impingers Loaded	Impingers Recovered
6	15:21	1.5	1.65	623.724	284	106	92		5	Filter Loaded	Filter Recovered
5	15:27	1.5	1.65	623.724	284	106	94		5	Probe Wash	TEST SUMMARY
4	15:33	1.5	1.65	623.724	284	106	95		5	Calculated by:	Checked by:
3	15:39	1.5	1.65	623.724	284	106	97		5	Sample Vol., c.f.	Stack Press., lwg
2	15:45	1.5	1.65	623.724	284	106	98		5	ΔH , lwg	ΔP , lwg
1	15:51	1.5	1.65	623.724	284	106	99		5	Meter Temp., °F	Stack Temp., °F
stop	15:57	1.5	1.65	623.724	284	106	99		5	Water Collected, g	O ₂ /CO ₂
7	15:58	1.5	1.65	623.724	284	107	101		5	Comments:	
6	16:05	1.5	1.65	623.724	284	114	102		5		
5	16:11	1.5	1.65	623.724	284	110	103		5		
4	16:17	1.5	1.65	623.724	284	113	105		5		
3	16:23	1.5	1.65	623.724	284	113	103		5		
2	16:29	1.5	1.65	623.724	284	113	101		5		
1	16:35	1.5	1.65	623.724	284	112	103		5		
stop	16:41	1.5	1.65	623.724	284	112	103		5		

Appendix C.5
Hydrocarbon

**CARNOT
TEDLAR BAG SAMPLE DATA**

CLIENT/PROJECT: SCE/Alamitos

DATE: 10-6-92 UNIT: #2 BY: Rob M.

	BAG ID <u>1-2-NH3</u>	BAG ID <u>2-2</u>	BAG ID <u>3-2-NH3</u>
TEST NO.	<u>1-2</u>	<u>2-2</u>	<u>3-2</u>
SAMPLE RATE			
START TIME	<u>1012</u>	<u>1130</u>	<u>1316</u>
STOP TIME	<u>1032</u>	<u>1150</u>	<u>1336</u>
SAMPLE LOCATION	<u>W-CSAPH</u>	<u>E-CSAPH</u>	<u>E-CSAPH</u>

DATE: 10-6-92 UNIT: #2 BY: Rob M.

	BAG ID <u>4-2-NH3</u>	BAG ID <u>5-2-NH3</u>	BAG ID <u> </u>
TEST NO.	<u>4-2-NH3</u>	<u>5-2 NH3</u>	
SAMPLE RATE			
START TIME	<u>1410</u>	<u>1810</u>	
STOP TIME	<u>1430</u>	<u>1830</u>	
SAMPLE LOCATION	<u>E-CSAPH</u>	<u>W-CSAPH</u>	

NOTES:

CARNOT
TEDLAR BAG SAMPLE DATA

*12598

CLIENT/PROJECT: SCE/Alamitos

DATE: 10-7-92 UNIT: #2 BY: Rob M.

	BAG ID <u>6-2</u>	BAG ID <u>7-2</u>	BAG ID <u>8-2-NH₃</u>
TEST NO.	<u>6-2</u>	<u>7-2</u>	<u>8-2-NH₃</u>
SAMPLE RATE			
START TIME	<u>0917</u>	<u>1126</u>	<u>1400</u>
STOP TIME	<u>0937</u>	<u>1146</u>	<u>1420</u>
SAMPLE LOCATION	<u>W-CSAPH</u>	<u>E-CSAPH</u>	<u>E-CSAPH</u>

DATE: 10-7-92 UNIT: #2 BY: Rob M.

	BAG ID <u>9-2-NH₃</u>	BAG ID _____	BAG ID _____
TEST NO.	<u>9-2-NH₃</u>		
SAMPLE RATE			
START TIME	<u>1615</u>		
STOP TIME	<u>1635</u>		
SAMPLE LOCATION	<u>W-CSAPH</u>		

NOTES:

CARNOT
TEDLAR BAG SAMPLE DATA

CLIENT/PROJECT: SCE/Alamitos

DATE: 10-8-92 UNIT: #2 BY: Rob. M.

	BAG ID <u>10-2-NH₂</u>	BAG ID <u>11-2-NH₂</u>	BAG ID <u>12-2</u>
TEST NO.	<u>10-2-NH₂</u>	<u>11-2-NH₂</u>	<u>12-2-NH₂</u>
SAMPLE RATE			
START TIME	<u>0909</u>	<u>1117</u>	<u>1345</u>
STOP TIME	<u>0929</u>	<u>1137</u>	<u>1405</u>
SAMPLE LOCATION	<u>W-CSAPH</u>	<u>E-CSAPH</u>	<u>-CSAPH</u>

DATE: 10-8-92 UNIT: #2 BY: Rob. M.

	BAG ID <u>13-2-HC</u>	BAG ID _____	BAG ID _____
TEST NO.	<u>13-2-HC</u>		
SAMPLE RATE			
START TIME	<u>1525</u>		
STOP TIME	<u>1545</u>		
SAMPLE LOCATION	<u>-CSAPH</u>	<u>-CSAPH</u>	

NOTES:

Appendix C.6
Ammonia

CARNOT

SAMPLE TRAIN TEST DATA

UNIT #2 TEST NO. 42-1113 METHOD 11, 12, 13 PAGE 1 OF 1
 SAMPLE LOCATION C5APH AMB. TEMP., °F PROJECT # 12598
 OPERATOR/ASSISTANT RN METER VOL. (START/END) DATE 10-6-82

PRE-TEST DATA:

Barometric Press., in. Hg.
 Assumed Stack Press.
 assumed Moisture
 assumed Molecular Wt.
 assumed ΔP
 assumed ΔH
 Stack Diameter, in.
 Sample Time: Total
 per point
 Total of Traverse Points

 $\Delta H =$ X ΔP

EQUIPMENT INFO:

Meter No.
 Meter, Yd.
 CFM @ $\Delta H = 1.0$
 Pilot ID, Cp
 O₂/CO₂ Method
 Teflon Connecting
 Line (Y/N)
 Probe: Matl
 Nozzle: Matl
 Filter: No.
 Matl

Imp. Matl Wt(End) Wt(Start) Wt(g)
 #1 11.234 666.4 777.2
 #2 11.234 593.2 580.1
 #3 1 527.4 523.0
 #4 1 709.2 695.9
 #5
 Total
 POST TEST INFO:
 Filter Appearance
 Impinger Appearance
 Silica Gel Spent (Y/N)

SAMPLE TRAIN LEAK CHECK:

CEM Vac. Pilot Inil
 Pre-Test 0.005 14" - RM
 Post-Test 0.00 10" - RM

PRE-TEST CALIBRATION CHECK:

Meter Meter Meter Temp.
 Inil ΔH Reading In Out
 Inil
 Final

SAMPLE POINT	TIME	METER CONDITIONS			TEMPERATURES, °F				O ₂	VAC.	STATIC PRESS. iwg	CHAIN OF CUSTODY INFORMATION
		ΔP	ΔH	METER READING	PROBE	METER IN	METER OUT	OVEN				
BT-6	1610	1	1.5	836.504	1	88	81	1	-	9.0	1	Impingers Loaded 612
5	1615	1	"	841.6	1	101	80	1	-	9.0	1	Impingers Recovered 612
4	1620	1	"	846.62	1	108	82	1	-	9.0	1	Filter Loaded
3	1624	1	"	851.677	1	115	82	1	-	9.0	1	Filter Recovered
2	1631	1	"	856.76	1	118	84	1	-	9.0	1	Probe Wash 12
1	1636	1	"	861.81	1	120	86	1	-	9.0	1	TEST SUMMARY
STOP	1641	1	"	866.850	1			1			1	Calculated by: 112
												Checked by: 112
												Sample Vol., c.f. 20.116
												Stack Press., iwg
												ΔH , iwg 1.5
												ΔP , iwg
												Meter Temp., °F 95.4
												Stack Temp., °F
												Water Collected, g 1074
												O ₂ /CO ₂ 7.5
												Comments:

(W-61-5304)

CARNOT

SAMPLE TRAIN TEST DATA

CLIENT SCF/Alamitos UNIT 82 TEST NO. 52-NH3 METHOD NH3 Draft PAGE 1 OF 1
SAMPLE LOCATION CSAPH TEST CONDITION 0.00 g AMB. TEMP., °F 1 PROJECT # 12588
OPERATOR/ASSISTANT RM METER VOL. (START/END) 1 DATE 10-8-92

PRE-TEST DATA:
Barometric Press., in. Hg. 30
Assumed Slack Press. 5
Assumed Moisture 6
Assumed Molecular Wt. 30
Assumed ΔP 5
Assumed ΔH 6
Stack Diameter, in. 30
Sample Time: Total 5 per point
Total of Traverse Points 6
ΔH = 30 x ΔP

EQUIPMENT INFO:
Meter No. 1006
Meter, Yd. 1006
CFM @ ΔH = 1.0 1006
Pilot ID, Cp 1006
O₂/CO₂ Method 1006
Teflon Connecting Line (Y/N) 1006
Probe: Marti 1006
Nozzle: Marti 1006
Filter: No. 1006

POST TEST INFO:
Filter Appearance 1006
Impinger Appearance 1006
Silica Gel Spent (Y/N) 1006

IMP. OUT. 1006
Filter Appearance 1006
Impinger Appearance 1006
Silica Gel Spent (Y/N) 1006

WL(Start) 538.7
WL(End) 538.7
Wt. (g) 1006

WL(Start) 538.7
WL(End) 538.7
Wt. (g) 1006

WL(Start) 538.7
WL(End) 538.7
Wt. (g) 1006

WL(Start) 538.7
WL(End) 538.7
Wt. (g) 1006

WL(Start) 538.7
WL(End) 538.7
Wt. (g) 1006

WL(Start) 538.7
WL(End) 538.7
Wt. (g) 1006

SAMPLE POINT	TIME	METER CONDITIONS				TEMPERATURES, °F						STATIC PRESS. lwg	CHAIN OF CUSTODY INFORMATION
		ΔP	ΔH	METER READING	STACK	PROBE	METER		OVEN	IMP. OUT			
							IN	OUT					
W-6	1810	1.5		867.078	1	1	86	86	1	ICE		Impingers Loaded RM	
5	1815	"		872.09	1	1	104	86	1	"		Impingers Recovered C H E	
4	1820	"		877.1	1	1	112	86	1	"		Filter Loaded	
3	1823	"		882.124	1	1	119	86	1	"		Filter Recovered	
2	1831	"		887.15	1	1	118	87	1	"		Probe Wash RM	
1	1836	"		892.1	1	1	120	87	1	"		TEST SUMMARY	
STOP	1841			897.117	1	1						Calculated by: 4	
					1	1						Checked by: 4	
					1	1						Sample Vol., c.i. 20.037	
					1	1						Stack Press., iwg	
					1	1						ΔH, iwg 1.5	
					1	1						ΔP, iwg	
					1	1						Meter Temp., °F 98.1	
					1	1						Stack Temp., °F	
					1	1						Water Collected, g 196.5	
					1	1						O ₂ /CO ₂ 7.3	
					1	1						Comments:	

CARNOT

CLIENT SCE/Alamitos
 SAMPLE LOCATION E-C5A/PH
 OPERATOR/ASSISTANT RM

SAMPLE TRAIN TEST DATA

UNIT 82 TEST NO. 82-14H2 METHOD
 TEST CONDITION AMB. TEMP., °F
 METER VOL. (START/END) 897.314 927.769

PAGE 1 OF 1
 PROJECT # 12598
 DATE 10-7-92

PRE-TEST DATA:
 Barometric Press., in. Hg. 30.05
 Assumed Stack Press. _____
 Assumed Moisture _____
 Assumed Molecular Wt. _____
 Assumed ΔP _____
 Assumed ΔH _____
 Stack Diameter, in. 20
 Sample Time: Total _____
 per point _____
 Total of Traverse Points _____

EQUIPMENT INFO:
 Meter No. _____
 Meter, Yd. _____
 CFM @ ΔH = 1.0 _____
 Pilot ID, Cp _____
 O₂/CO₂ Method _____
 Teflon Connecting _____
 Line (Y/N) _____
 Probe: Marl _____
 Length _____
 Nozzle: Marl _____
 Filter: No. _____
 Marl _____

Imp. Marl Wt. (End) Wt. (Start) Wt. (G)
 #1 4.504 5.874 317.6
 #2 4.504 5.872 587.2
 #3 4.504 5.872 516.3
 #4 5.872 6.940 _____
 #5 _____
 Total _____
 POST TEST INFO:
 Filter Appearance _____
 Impinger Appearance _____
 Silica Gel Spent (Y/N) _____

SAMPLE TRAIN LEAK CHECK:

SEM Vac. Pilot Init
 Pre-Test 0.00 13" RM
 Post-Test 0.00 9" RM

PRE-TEST CALIBRATION CHECK:

Meter Meter Meter Temp.
 Time ΔH Reading In Out
 Init _____
 Final _____

ΔH = _____ x ΔP

SAMPLE POINT	TIME	METER CONDITIONS				TEMPERATURES, °F				O ₂	VAC.	STATIC PRESS. INWG	CHAIN OF CUSTODY INFORMATION
		ΔP	ΔH	METER READING	STACK	PROBE	METER IN	METER OUT	OVEN	IMP. OUT			
E-6	1400	1.5	1.5	897.314			34	76		ICE	8.0		Impingers Loaded <u>RM</u>
5	1405	"	"	902.5			95	78		"	8.0		Impingers Recovered <u>RM</u>
4	1410	"	"	907.56			102	78		"	8.0		Filter Loaded <u>RM</u>
3	1415	"	"	912.641			106	78		"	8.0		Filter Recovered <u>RM</u>
2	1421	"	"	917.71			105	80		"	8.0		Probe Wash <u>RM</u>
1	1426	"	"	922.715			109	79		"	8.0		TEST SUMMARY
STOP	1431			927.769									Calculated by: _____
													Checked by: _____
													Sample Vol., c.f. <u>30.4</u>
													Stack Press., INWG
													ΔH, INWG <u>1.5</u>
													ΔP, INWG
													Meter Temp., °F <u>87.0</u>
													Stack Temp., °F
													Water Collected, g <u>985</u>
													O ₂ /CO ₂ <u>72</u>
													Comments: _____

SAMPLE TRAIN TEST DATA

UNIT # 2 TEST NO. 10-2-2411 METHOD 207.1 PAGE 1 OF 1
 TEST CONDITION AMB. TEMP. °F PROJECT # 12598
 METER VOL. (START/END) 958.515 DATE 10-8-92

VENT INFO:

o. Arch
 d. Arch
 ΔH = 1.0
 p. Arch
 Method Arch
 Line (Y/N) Y
 Length 3'
 Matl 3"
 Matl 3"
 Diam. 3"
 No. 3"
 Matl 3"

POST TEST INFO:

Filter Appearance FLY
 Impinger Appearance FLY
 Silica Gel Spent (Y/N) FLY

SAMPLE TRAIN LEAK CHECK:

Pre-Test 0.002 Vac. 14" Pilot RM
 Post-Test 0.002 Vac. 9" Pilot RM

PRE-TEST CALIBRATION CHECK:

Meter Reading In Out
 Time ΔH Meter Meter Temp.
 Init. Final

ITEMS	TEMPERATURES, °F				STATIC PRESS. InHg	CHAIN OF CUSTODY INFORMATION	
	STACK	PROBE	METER IN	METER OUT			
58.515	✓	✓	80	ICE	8.0	Impingers Loaded	CF
3.66	✓	✓	80	"	8.0	Impingers Recovered	RM
8.79	✓	✓	80	"	8.0	Filter Loaded	✓
23.94	✓	✓	81	"	8.0	Filter Recovered	✓
19.18	✓	✓	80	"	8.0	Probe Wash	RM
34.31	✓	✓	80	"	8.0	TEST SUMMARY	
39.459	✓	✓				Calculated by:	CF
						Checked by:	CF
						Sample Vol., c.f.	35.942
						Stack Press., InHg	✓
						ΔH, InHg	1.5
						ΔP, InHg	✓
						Meter Temp., °F	70.1
						Stack Temp., °F	✓
						Water Collected, g	77.1
						O ₂ /CO ₂	11.6
						Comments:	

Appendix D.1
General Emissions Calculations

EMISSION CALCULATIONS

1. Sample Volume and Isokinetics

- a. Sample gas volume, dscf

$$V_{m\ scd} = 0.03342 V_m \left(P_{bar} + \frac{H}{13.6} \right) \left(\frac{T_{ref}}{T_m} \right) (Y)$$

- b. Water vapor volume, scf

$$V_{w\ scd} = 0.0472 V_{lc} \left(\frac{T_{ref}}{528^\circ R} \right)$$

- c. Moisture content, nondimensional

$$B_{wo} = \frac{V_{w\ scd}}{V_{m\ scd} + V_{w\ scd}}$$

- d. Stack gas molecular weight, lb/lb mole

$$MW_{dry} = 0.44 (\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2)$$

$$MW_{wet} = MW_{dry} (1 - B_{wo}) + 18 (B_{wo})$$

- e. Absolute stack pressure, iwg

$$P_s = P_{bar} + \frac{P_{sg}}{13.6}$$

- f. Stack velocity, ft/sec

$$V_s = 2.90 C_p \sqrt{\Delta PT_s} \sqrt{\left(\frac{29.92}{P_s} \right) \left(\frac{28.95}{MW_{wet}} \right)}$$

- g. Actual stack flow rate, wacfm

$$Q = (V_s)(A_s)(60)$$

- h. Standard stack gas flow rate, dscfm

$$Q_{sd} = Q (1 - B_{wo}) \left(\frac{T_{ref}}{T_s} \right) \left(\frac{P_s}{29.92} \right)$$

- i. Percent isokinetic

$$I = \left(\frac{17.32 (T_s) (V_{m\ scd})}{(1 - B_{wo}) (\Theta) (V_s) (P_s) (D_n^2)} \right) \left(\frac{528^\circ R}{T_{ref}} \right)$$

2. Particulate Emissions

- a. Grain loading, gr/dscf

$$C = 0.01543 \left(\frac{M_n}{V_{std}} \right)$$

- b. Grain loading at 12% CO
- ₂
- , gr/dscf

$$C_{12\%CO_2} = C \left(\frac{12}{\%CO_2} \right)$$

- c. Mass emissions, lb/hr

$$M = C(Q_{sd}) \left(\frac{60 \text{ min/hr}}{7000 \text{ gr/lb}} \right)$$

3. Gaseous Emissions, lb/hr

$$M = (ppm)(10^{-6}) \left(\frac{MW_i \text{ lb/lb mole}}{SV} \right) (Q_{sd})(60 \text{ min/hr})$$

where,

SV = specific molar volume of an ideal gas:

$$SV = 385.3 \text{ ft}^3/\text{lb mole} \quad \text{for } T_{ref} = 528^\circ R$$

$$SV = 379.5 \text{ ft}^3/\text{lb mole} \quad \text{for } T_{ref} = 520^\circ R$$

4. Emissions Rates, lb/10⁶ Btu

- a. Fuel factor at 68 °F, dscf/10
- ⁶
- Btu at 0% O
- ₂

$$F_{68} = \frac{10^6 [3.64(\%H) + 1.53(\%C) + 0.14(\%N) + 0.57(\%S) - 0.46(\%O_{2,fuel})]}{HHV, \text{ Btu/lb}}$$

- b. Fuel factor at 60 °F

$$F_{60} = F_{68} \left(\frac{520^\circ R}{528^\circ R} \right)$$

- c. Gaseous Emissions factor

$$\left(\frac{\text{lb}}{10^6 \text{ Btu}} \right)_i = (ppm)_i (10^{-6}) \left(\frac{MW_i \text{ lb}}{\text{lb mole}} \right) \left(\frac{1}{SV} \right) (F) \left(\frac{20.9}{20.9 - \%O_2} \right)$$

- d. Particulate emission factor

$$\left(\frac{\text{lb}}{10^6 \text{ Btu}} \right) = C \left(\frac{1 \text{ lb}}{7000 \text{ gr}} \right) (F) \left(\frac{20.9}{20.9 - \%O_2} \right)$$

Nomenclature:

A_s	=	stack area, ft ²
B_{wo}	=	flue gas moisture content
$C_{12\% CO_2}$	=	particulate grain loading, gr/dscf corrected to 12% CO ₂
C	=	particulate grain loading, gr/dscf
C_p	=	pitot calibration factor, dimensionless
D_n	=	nozzle diameter, in.
F	=	fuel F factor, dscf/10 ⁶ Btu at 0% O ₂
H	=	orifice pressure differential, iwg
I	=	% isokinetics
M_n	=	mass of collected particulate, mg
M_i	=	mass emissions of species i, lb/hr
MW	=	molecular weight of flue gas
MW_i	=	molecular weight of species i:
		NO _x : 46
		CO : 28
		SO _x : 64
		HC : 16
θ	=	sample time, min.
ΔP	=	average velocity head, iwg = $(\sqrt{\Delta P})^2$
P_{bar}	=	barometric pressure, in.Hg
P_s	=	stack absolute pressure, in.Hg
P_{sg}	=	stack static pressure, iwg

Nomenclature (Continued):

Q	=	wet stack gas flow rate at actual conditions, wacfm
Q_{sd}	=	dry stack gas flow rate at standard conditions, dscfm
SV	=	specific molar volume of an ideal gas at standard conditions, ft ³ /lb mole
T_m	=	meter temperature, °R
T_{ref}	=	reference temperature, °R
T_s	=	stack temperature, °R
V_s	=	stack velocity, ft/sec
V_k	=	volume of liquid collected in impingers, ml
V_m	=	dry meter volume uncorrected, dcf
$V_{m\ std}$	=	dry meter volume at standard conditions, dscf
$V_{w\ std}$	=	volume of water vapor at standard conditions, scf
Y	=	meter calibration coefficient

Appendix D.2
Specific Emissions Calculations

CARNOT EMISSIONS TRAILER **CONTINUOUS GASEOUS MEASUREMENTS SUMMARY**

Client: SCE Alamitos
Unit: #2
Location: HSAPH

Condition: Urea On
Load: 165 MW

	O2%	CO2%	CO ppm	NOx ppm	
Analyzer Range:	10	25	100	250	
Span Value:	7.93	22.15	55.84	90.79	
Test #: 4-2-CEM	Date: 10/6/92				
	O2%	CO2%	CO ppm	NOx ppm	
System Zero	0.05	0.00	0.00	1.25	
System Span	7.83	22.00	56.00	88.50	
Raw Average	2.41	10.49	3.52	105.72	
System Zero	0.05	0.00	0.40	1.25	
System Span	7.80	21.93	55.84	87.50	
Corrected Average	2.41	10.58	3.33	109.34	
System Bias Check					
Zero Pre-test	0.50%	0.00%	0.00%	0.50%	
Zero Post-test	0.50%	0.00%	0.40%	0.50%	
Span Pre-test	-0.96%	-0.60%	0.16%	-0.92%	
Span Post-test	-1.26%	-0.88%	0.00%	-1.32%	
Test #: 5-2-CEM	Date: 10/6/92				
	O2%	CO2%	CO ppm	NOx ppm	
System Zero	0.02	0.00	0.10	0.75	
System Span	7.85	22.05	55.70	89.50	
Raw Average	2.41	10.50	5.95	102.75	
System Zero	0.02	0.00	0.10	0.50	
System Span	7.90	21.98	55.84	90.75	
Corrected Average	2.41	10.56	5.87	103.60	
System Bias Check					
Zero Pre-test	0.20%	0.00%	0.10%	0.30%	
Zero Post-test	0.20%	0.00%	0.10%	0.20%	
Span Pre-test	-0.76%	-0.40%	-0.14%	-0.52%	
Span Post-test	-0.26%	-0.68%	0.00%	-0.02%	
Test Average	2.41	10.57	4.60	106.47	

CARNOT EMISSIONS TRAILER **CONTINUOUS GASEOUS MEASUREMENTS SUMMARY**

Client: SCE Alamitos
Unit: #2
Location: HSAPH

Condition: Urea Off
Load: 138 MW

	O2%	CO2%	CO ppm	NOx ppm
Analyzer Range:	10	25	100	250
Span Value:	4.99	15.00	55.84	90.79
Test #: 6-2-CEM	Date: 10/7/92			
	O2%	CO2%	CO ppm	NOx ppm
System Zero	0.03	0.00	0.30	0.75
System Span	4.97	14.75	55.84	88.25
Raw Average	3.37	9.82	1.00	80.68
System Zero	0.02	0.00	0.30	0.75
System Span	4.93	14.70	55.90	88.30
Corrected Average	3.39	10.00	0.70	82.91
System Bias Check				
Zero Pre-test	0.30%	0.00%	0.30%	0.30%
Zero Post-test	-0.20%	0.00%	0.30%	0.30%
Span Pre-test	-0.20%	-1.00%	0.00%	-1.02%
Span Post-test	-0.60%	-1.20%	0.06%	-1.00%
Test #: 7-2-CEM	Date: 10/7/92			
	O2%	CO2%	CO ppm	NOx ppm
System Zero	0.02	0.00	0.20	0.50
System Span	4.92	14.75	55.50	88.00
Raw Average	3.61	9.69	0.72	80.78
System Zero	0.02	0.05	0.20	0.50
System Span	4.91	14.70	55.84	87.50
Corrected Average	3.66	9.86	0.52	83.54
System Bias Check				
Zero Pre-test	0.20%	0.00%	0.20%	0.20%
Zero Post-test	0.20%	0.20%	0.20%	0.20%
Span Pre-test	-0.70%	-1.00%	-0.34%	-1.12%
Span Post-test	-0.80%	-1.20%	0.00%	-1.32%
Test Average	3.52	9.93	0.61	83.22

CARNOT EMISSIONS TRAILER **CONTINUOUS GASEOUS MEASUREMENTS SUMMARY**

Client: SCE Alamitos
Unit: #2
Location: HSAPH

Condition: Urea Off
Load: 165 MW

	O2%	CO2%	CO ppm	NOx ppm	
Analyzer Range:	10	25	100	250	
Span Value:	4.99	15.00	55.84	90.79	
Test #:	1-2-CEM		Date: 10/6/92		
	O2%	CO2%	CO ppm	NOx ppm	
System Zero	0.05	0.00	0.00	0.50	
System Span	4.93	14.75	56.00	87.30	
Raw Average	2.80	10.03	0.80	141.12	
System Zero	0.06	0.03	0.00	1.75	
System Span	4.94	14.58	55.90	87.50	
Corrected Average	2.81	14.58	0.80	147.32	
System Bias Check					
Zero Pre-test	0.50%	0.00%	0.00%	0.20%	
Zero Post-test	0.60%	0.12%	0.00%	0.70%	
Span Pre-test	-0.60%	-1.00%	0.16%	-1.40%	
Span Post-test	-0.50%	-1.68%	0.06%	-1.32%	
Test #:			Date:		
	O2%	CO2%	CO ppm	NOx ppm	
System Zero					
System Span					
Raw Average					
System Zero					
System Span					
Corrected Average					
System Bias Check					
Zero Pre-test					
Zero Post-test					
Span Pre-test					
Span Post-test					
Test Average					

CARNOT EMISSIONS TRAILER CONTINUOUS GASEOUS MEASUREMENTS SUMMARY

Client: SCE Alamitos
Unit: #2
Location: HSAPH

Condition: Urea Off
Load: 165 MW

	O2%	CO2%	CO ppm	NOx ppm	
Analyzer Range:	10	25	100	250	
Span Value:	7.93	22.15	55.84	90.79	
Test #:	3-2-CEM		Date: 10/6/92		
	O2%	CO2%	CO ppm	NOx ppm	
System Zero	0.02	0.00	0.00	0.50	
System Span	7.80	21.68	55.84	90.00	
Raw Average	2.41	10.40	1.90	141.52	
System Zero	0.03	0.00	0.00	2.50	
System Span	7.90	21.60	55.80	91.60	
Corrected Average	2.42	14.58	1.90	142.36	
System Bias Check					
Zero Pre-test	0.20%	0.00%	0.00%	0.20%	
Zero Post-test	0.30%	0.00%	0.00%	1.00%	
Span Pre-test	-1.26%	-1.88%	0.00%	-0.32%	
Span Post-test	-0.26%	-2.20%	-0.04%	0.32%	
Test #:			Date:		
	O2%	CO2%	CO ppm	NOx ppm	
System Zero					
System Span					
Raw Average					
System Zero					
System Span					
Corrected Average					
System Bias Check					
Zero Pre-test					
Zero Post-test					
Span Pre-test					
Span Post-test					
Test Average					

CARNOT EMISSIONS TRAILER **CONTINUOUS GASEOUS MEASUREMENTS SUMMARY**

Client: SCE Alamitos

Condition: Urea On

Unit: #2

Load: 165 MW

Location: HSAPH

	O2%	CO2%	CO ppm	NOx ppm	
Analyzer Range:	10	25	100	250	
Span Value:	7.93	22.15	55.84	90.79	
Test #:	4-2-CEM		Date: 10/6/92		
	O2%	CO2%	CO ppm	NOx ppm	
System Zero	0.05	0.00	0.00	1.25	
System Span	7.83	22.00	56.00	88.50	
Raw Average	2.41	10.49	3.52	105.72	
System Zero	0.05	0.00	0.40	1.25	
System Span	7.80	21.93	55.84	87.50	
Corrected Average	2.41	10.58	3.33	109.34	
System Bias Check					
Zero Pre-test	0.50%	0.00%	0.00%	0.50%	
Zero Post-test	0.50%	0.00%	0.40%	0.50%	
Span Pre-test	-0.96%	-0.60%	0.16%	-0.92%	
Span Post-test	-1.26%	-0.88%	0.00%	-1.32%	
Test #:	5-2-CEM		Date: 10/6/92		
	O2%	CO2%	CO ppm	NOx ppm	
System Zero	0.02	0.00	0.10	0.75	
System Span	7.85	22.05	55.70	89.50	
Raw Average	2.41	10.50	5.95	102.75	
System Zero	0.02	0.00	0.10	0.50	
System Span	7.90	21.98	55.84	90.75	
Corrected Average	2.41	10.56	5.87	103.60	
System Bias Check					
Zero Pre-test	0.20%	0.00%	0.10%	0.30%	
Zero Post-test	0.20%	0.00%	0.10%	0.20%	
Span Pre-test	-0.76%	-0.40%	-0.14%	-0.52%	
Span Post-test	-0.26%	-0.68%	0.00%	-0.02%	
Test Average	2.41	10.57	4.60	106.47	

CARNOT EMISSIONS TRAILER **CONTINUOUS GASEOUS MEASUREMENTS SUMMARY**

Client: SCE Alamitos
Unit: #2
Location: HSAPH

Condition: Urea Off
Load: 138 MW

	O2%	CO2%	CO ppm	NOx ppm
Analyzer Range:	10	25	100	250
Span Value:	4.99	15.00	55.84	90.79
Test #: 6-2-CEM	Date: 10/7/92			
	O2%	CO2%	CO ppm	NOx ppm
System Zero	0.03	0.00	0.30	0.75
System Span	4.97	14.75	55.84	88.25
Raw Average	3.37	9.82	1.00	80.68
System Zero	0.02	0.00	0.30	0.75
System Span	4.93	14.70	55.90	88.30
Corrected Average	3.39	10.00	0.70	82.91
System Bias Check				
Zero Pre-test	0.30%	0.00%	0.30%	0.30%
Zero Post-test	0.20%	0.00%	0.30%	0.30%
Span Pre-test	-0.20%	-1.00%	0.00%	-1.02%
Span Post-test	-0.60%	-1.20%	0.06%	-1.00%
Test #: 7-2-CEM	Date: 10/7/92			
	O2%	CO2%	CO ppm	NOx ppm
System Zero	0.02	0.00	0.20	0.50
System Span	4.92	14.75	55.50	88.00
Raw Average	3.61	9.69	0.72	80.78
System Zero	0.02	0.05	0.20	0.50
System Span	4.91	14.70	55.84	87.50
Corrected Average	3.66	9.86	0.52	83.54
System Bias Check				
Zero Pre-test	0.20%	0.00%	0.20%	0.20%
Zero Post-test	0.20%	0.20%	0.20%	0.20%
Span Pre-test	-0.70%	-1.00%	-0.34%	-1.12%
Span Post-test	-0.80%	-1.20%	0.00%	-1.32%
Test Average	3.52	9.93	0.61	83.22

CARNOT EMISSIONS TRAILER **CONTINUOUS GASEOUS MEASUREMENTS SUMMARY**

Client: SCE Alamitos
Unit: #2
Location: HSAPH

Condition: Urea On
Load: 138 MW

	O2%	CO2%	CO ppm	NOx ppm	
Analyzer Range:	10	25	100	250	
Span Value:	4.99	15.00	55.84	90.79	
Test #: 8-2-CEM	Date: 10/7/92				
	O2%	CO2%	CO ppm	NOx ppm	
System Zero	0.02	0.00	0.23	0.25	
System Span	4.88	14.75	55.84	89.25	
Raw Average	3.47	9.75	1.52	69.60	
System Zero	0.03	0.00	0.20	0.75	
System Span	4.87	14.70	55.84	89.25	
Corrected Average	3.54	9.93	1.31	70.69	
System Bias Check					
Zero Pre-test	0.20%	0.00%	0.23%	0.10%	
Zero Post-test	0.30%	0.00%	0.20%	0.30%	
Span Pre-test	-1.10%	-1.00%	0.00%	-0.62%	
Span Post-test	-1.20%	-1.20%	0.00%	-0.62%	
Test #: 9-2-CEM	Date: 10/7/92				
	O2%	CO2%	CO ppm	NOx ppm	
System Zero	0.01	0.00	0.20	0.50	
System Span	4.96	14.80	55.84	90.52	
Raw Average	3.57	9.75	1.17	71.72	
System Zero	0.02	0.00	0.20	0.50	
System Span	4.95	14.83	55.84	90.25	
Corrected Average	3.59	9.87	0.97	71.94	
System Bias Check					
Zero Pre-test	0.10%	0.00%	0.20%	0.20%	
Zero Post-test	0.20%	0.00%	0.20%	0.20%	
Span Pre-test	-0.30%	-0.80%	0.00%	-0.11%	
Span Post-test	-0.40%	-0.68%	0.00%	-0.22%	
Test Average	3.57	9.90	1.14	71.31	

CARNOT EMISSIONS TRAILER **CONTINUOUS GASEOUS MEASUREMENTS SUMMARY**

Client: SCE Alamitos
Unit: #2
Location: HSAPH

Condition: Urea On
Load: 40 MW

	O2%	CO2%	CO ppm	NOx ppm
Analyzer Range:	10	25	100	250
Span Value:	4.99	15.00	55.84	49.86
Test #: 10-2-CEM	Date: 10/8/92			
	O2%	CO2%	CO ppm	NOx ppm
System Zero	0.02	0.00	0.30	0.30
System Span	4.97	14.93	55.84	48.50
Raw Average	7.29	7.66	0.90	86.42
System Zero	0.03	0.00	0.50	-0.25
System Span	4.97	14.85	55.84	48.00
Corrected Average	7.33	7.72	0.50	89.32
System Bias Check				
Zero Pre-test	0.20%	0.00%	0.30%	0.12%
Zero Post-test	0.30%	0.00%	0.50%	-0.10%
Span Pre-test	-0.20%	-0.28%	0.00%	-0.54%
Span Post-test	-0.20%	-0.60%	0.00%	-0.74%
Test #: 11-2-CEM	Date: 10/8/92			
	O2%	CO2%	CO ppm	NOx ppm
System Zero	0.03	0.00	0.10	0.30
System Span	4.98	14.80	55.84	48.50
Raw Average	7.41	7.55	0.80	90.25
System Zero	0.02	0.00	0.10	1.70
System Span	5.00	14.90	55.84	49.50
Corrected Average	7.42	7.63	0.70	92.71
System Bias Check				
Zero Pre-test	0.30%	0.00%	0.10%	0.12%
Zero Post-test	0.20%	0.00%	0.10%	0.68%
Span Pre-test	-0.10%	-0.80%	0.00%	-0.54%
Span Post-test	0.10%	-0.40%	0.00%	-0.14%
Test Average	7.38	7.67	0.60	91.02

CARNOT EMISSIONS TRAILER **CONTINUOUS GASEOUS MEASUREMENTS SUMMARY**

Client: SCE Alamitos

Condition: Urea Off

Unit: #2

Load: 40 MW

Location: HSAPH

	O2%	CO2%	CO ppm	NOx ppm
Analyzer Range:	10	25	100	250
Span Value:	4.99	15.00	55.84	90.52
Test #: 12-2-CEM	Date: 10/8/92			
	O2%	CO2%	CO ppm	NOx ppm
System Zero	0.03	0.00	0.00	0.25
System Span	4.99	14.80	55.84	87.00
Raw Average	7.31	7.55	0.32	103.48
System Zero	0.02	0.00	0.00	0.25
System Span	4.97	14.80	55.70	85.60
Corrected Average	7.34	7.65	0.32	108.59
System Bias Check				
Zero Pre-test	0.30%	0.00%	0.00%	0.10%
Zero Post-test	0.20%	0.00%	0.00%	0.10%
Span Pre-test	0.00%	-0.80%	0.00%	-1.41%
Span Post-test	-0.20%	-0.80%	-0.14%	-1.97%
Test #: 13-2CEM	Date: 10/8/92			
	O2%	CO2%	CO ppm	NOx ppm
System Zero	0.03	0.00	0.10	0.00
System Span	4.99	14.75	55.84	86.25
Raw Average	7.34	7.50	0.40	103.30
System Zero	0.02	0.00	0.10	0.50
System Span	5.00	14.70	55.84	87.50
Corrected Average	7.34	7.64	0.30	107.68
System Bias Check				
Zero Pre-test	0.30%	0.00%	0.10%	0.00%
Zero Post-test	0.20%	0.00%	0.10%	0.20%
Span Pre-test	0.00%	-1.00%	0.00%	-1.71%
Span Post-test	0.10%	-1.20%	0.00%	-1.21%
Test Average	7.34	7.65	0.31	108.14

CARNOT

11/24/92

Particulate

SOURCE TEST DATA SUMMARY WORKSHEET

Client/Location.....	SCE	Parameter.....	Urea Off
Unit.....	2	Fuel.....	Natural Gas
Sample Location.....	CSAPH	Data By.....	EF
Test Number.....	1-2-PM	3-2-PM	Average
Reference Temperature, F.....	60	60	
Test Date.....	10/6/92	10/6/92	
Test Method.....	SCAQMD 5.3	SCAQMD 5.3	SCAQMD 5.3
Sample Train.....	71-4	71-4	-
Pitot Factor	0.840	0.840	-
Meter Calibration Factor.....	1.004	1.004	-
Stack Area (sq ft).....	68.43	68.43	-
Sample Time (Min).....	84	84	84
Barometric Pressure (in Hg).....	30.08	29.94	30.08
Nozzle Diam (in).....	0.185	0.194	-
Start/Stop Time.....	900/1027	1305/1449	-
Stack Pressure (iwg).....	5.90	7.10	6.50
Stack Temperature (F).....	314.5	329.0	321.8
Delta P (iwg).....	1.2868	1.5245	1.4057
Meter Volume (acf).....	44.316	51.468	47.892
Meter Temperature (F).....	82.0	97.8	89.9
Meter Pressure (iwg).....	1.157	1.152	1.155
Liquid Volume (ml).....	150.7	185.6	168.2
Stack O2 (%).....	7.7	7.4	7.6
Stack CO2 (%).....	7.8	7.9	7.9
Standard Sample Volume (SCF)	43.034	48.341	45.688
Moisture Fraction.....	0.140	0.151	0.146
Molecular Weight. (wet).....	27.94	27.81	27.87
Stack Gas Velocity (ft/sec).....	77.53	85.44	81.48
Stack Flow Rate (wacfm).....	318,307	350,796	334,551
Stack Flow Rate (dscfm).....	187,400	199,694	193,547
Isokinetic Ratio (%).....	100.18	96.04	98.11
Particulate Catch, mg.....	2.80	1.80	2.30
Grain Loading gr/dscf.....	0.0010	0.0006	0.0008
Grain Loading @ 12% CO2.....	0.0015	0.0009	0.0012
Part emission lb/hr.....	1.61	0.98	1.30

CARNOT

11/24/92

Particulate

SOURCE TEST DATA SUMMARY WORKSHEET

Client/Location.....	SCE	Parameter.....	Urea On
Unit.....	2	Fuel.....	Natural Gas
Sample Location.....	CSAPH	Data By.....	EF
Test Number.....	4-2-PM	5-2-PM	Average
Reference Temperature, F.....	60	60	
Test Date.....	10/6/92	10/6/92	
Test Method.....	SCAQMD 5.3	SCAQMD 5.3	SCAQMD 5.3
Sample Train.....	71-4	71-4	-
Pitot Factor	0.840	0.840	-
Meter Calibration Factor.....	1.004	1.004	-
Stack Area (sq ft).....	68.43	68.43	-
Sample Time (Min).....	84	84	84
Barometric Pressure (in Hg).....	30.05	29.92	30.05
Nozzle Diam (in).....	0.185	0.185	-
Start/Stop Time.....	1530/1700	1740/1907	-
Stack Pressure (iwg).....	6.80	6.50	6.65
Stack Temperature (F).....	310.4	319.6	315.0
Delta P (iwg).....	1.7800	1.4044	1.5922
Meter Volume (acf).....	55.541	48.381	51.961
Meter Temperature (F).....	106.8	97.4	102.1
Meter Pressure (iwg).....	1.369	1.081	1.225
Liquid Volume (ml).....	213.0	175.0	194.0
Stack O2 (%).....	7.4	7.4	7.4
Stack CO2 (%).....	7.9	7.9	7.9
Standard Sample Volume (SCF)	51.548	45.436	48.492
Moisture Fraction.....	0.161	0.152	0.156
Molecular Weight. (wet).....	27.70	27.80	27.75
Stack Gas Velocity (ft/sec).....	91.28	81.61	86.44
Stack Flow Rate (wacfm).....	374,765	335,064	354,915
Stack Flow Rate (dscfm).....	216,630	192,539	204,585
Isokinetic Ratio (%).....	103.81	102.95	103.38
Particulate Catch, mg.....	2.10	2.30	2.20
Grain Loading gr/dscf.....	0.0006	0.0008	0.0007
Grain Loading @ 12% CO2.....	0.0010	0.0012	0.0011
Part emission lb/hr.....	1.17	1.29	1.23

CARNOT

11/24/92

Particulate

SOURCE TEST DATA SUMMARY WORKSHEET

Client/Location.....	SCE	Parameter.....	Urea Off
Unit.....	2	Fuel.....	Natural Gas
Sample Location.....	CSAPH	Data By.....	EF
Test Number.....	6-2-PM	7-2-PM	Average
Reference Temperature, F.....	60	60	
Test Date.....	10/7/92	10/7/92	
Test Method.....	SCAQMD 5.3	SCAQMD 5.3	SCAQMD 5.3
Sample Train.....	71-4	71-4	-
Pitot Factor	0.840	0.840	-
Meter Calibration Factor.....	1.004	1.004	-
Stack Area (sq ft).....	68.43	68.43	-
Sample Time (Min).....	84	84	84
Barometric Pressure (in Hg).....	30.01	30.05	30.01
Nozzle Diam (in).....	0.185	0.185	-
Start/Stop Time.....	0830/1012	1056/1222	-
Stack Pressure (iwg).....	7.80	5.80	6.80
Stack Temperature (F).....	300.2	339.6	319.9
Delta P (iwg).....	0.8762	1.4204	1.1483
Meter Volume (acf).....	35.308	46.503	40.906
Meter Temperature (F).....	81.5	96.1	88.8
Meter Pressure (iwg).....	0.628	1.113	0.871
Liquid Volume (ml).....	118.8	156.4	137.6
Stack O2 (%).....	8.5	8.1	8.3
Stack CO2 (%).....	7.2	7.4	7.3
Standard Sample Volume (SCF)	34.194	43.966	39.080
Moisture Fraction.....	0.139	0.142	0.140
Molecular Weight. (wet).....	27.89	27.87	27.88
Stack Gas Velocity (ft/sec).....	63.36	82.91	73.13
Stack Flow Rate (wacfm).....	260,131	340,393	300,262
Stack Flow Rate (dscfm).....	156,560	193,454	175,007
Isokinetic Ratio (%).....	95.28	99.15	97.22
Particulate Catch, mg.....	0.40	1.10	0.75
Grain Loading gr/dscf.....	0.0002	0.0004	0.0003
Grain Loading @ 12% CO2.....	0.0003	0.0006	0.0005
Part emission lb/hr.....	0.24	0.64	0.44

CARNOT

11/24/92

Particulate

SOURCE TEST DATA SUMMARY WORKSHEET

Client/Location.....	SCE	Parameter.....	Urea On
Unit.....	2	Fuel.....	Natural Gas
Sample Location.....	CSAPH	Data By.....	EF
Test Number.....	8-2-PM	9-2-PM	Average
Reference Temperature, F.....	60	60	
Test Date.....	10/7/92	10/7/92	
Test Method.....	SCAQMD 5.3	SCAQMD 5.3	SCAQMD 5.3
Sample Train.....	71-4	71-4	-
Pitot Factor	0.840	0.840	-
Meter Calibration Factor.....	1.004	1.004	-
Stack Area (sq ft).....	68.43	68.43	-
Sample Time (Min).....	84	84	84
Barometric Pressure (in Hg).....	30.05	30.08	30.05
Nozzle Diam (in).....	0.185	0.185	-
Start/Stop Time.....	1327/1457	1535/1704	-
Stack Pressure (iwg).....	5.20	7.80	6.50
Stack Temperature (F).....	342.3	298.5	320.4
Delta P (iwg).....	1.2140	0.8672	1.0406
Meter Volume (acf).....	46.085	39.244	42.665
Meter Temperature (F).....	102.4	111.9	107.2
Meter Pressure (iwg).....	1.054	0.716	0.885
Liquid Volume (ml).....	159.2	126.3	142.8
Stack O2 (%).....	8.2	7.8	8.0
Stack CO2 (%).....	7.3	7.5	7.4
Standard Sample Volume (SCF)	43.075	36.075	39.575
Moisture Fraction.....	0.147	0.140	0.143
Molecular Weight. (wet).....	27.81	27.90	27.86
Stack Gas Velocity (ft/sec).....	76.92	62.88	69.90
Stack Flow Rate (wacfm).....	315,813	258,176	286,995
Stack Flow Rate (dscfm).....	177,634	155,921	166,778
Isokinetic Ratio (%).....	105.79	100.94	103.36
Particulate Catch, mg.....	3.30	1.60	2.45
Grain Loading gr/dscf.....	0.0012	0.0007	0.0009
Grain Loading @ 12% CO2.....	0.0019	0.0011	0.0015
Part emission lb/hr.....	1.80	0.91	1.36

CARNOT

11/9/92

Particulate

SOURCE TEST DATA SUMMARY WORKSHEET

Client/Location.....	SCE	Parameter.....	Urea On
Unit.....	2	Fuel.....	Natural Gas
Sample Location.....	CSAPH	Data By.....	EF
Test Number.....	10-2-PM	11-2-PM	Average
Reference Temperature, F.....	60	60	
Test Date.....	10/8/92	10/8/92	
Test Method.....	SCAQMD 5.3	SCAQMD 5.3	SCAQMD 5.3
Sample Train.....	71-4	ES-19	-
Pitot Factor	0.840	0.840	-
Meter Calibration Factor.....	1.004	1.000	-
Stack Area (sq ft).....	68.43	68.43	-
Sample Time (Min).....	84	84	84
Barometric Pressure (in Hg).....	30.05	29.98	30.05
Nozzle Diam (in).....	0.220	0.250	-
Start/Stop Time.....	835/1012	1105/1233	-
Stack Pressure (iwg).....	10.00	9.00	9.50
Stack Temperature (F).....	282.2	335.4	308.8
Delta P (iwg).....	0.3706	0.2780	0.3243
Meter Volume (acf).....	33.493	39.735	36.614
Meter Temperature (F).....	86.5	94.8	90.6
Meter Pressure (iwg).....	0.732	0.707	0.720
Liquid Volume (ml).....	107.5	108.0	107.8
Stack O2 (%).....	11.6	11.5	11.6
Stack CO2 (%).....	5.4	5.5	5.5
Standard Sample Volume (SCF)	32.193	37.383	34.788
Moisture Fraction.....	0.134	0.118	0.126
Molecular Weight. (wet).....	27.81	28.00	27.90
Stack Gas Velocity (ft/sec).....	40.64	36.40	38.52
Stack Flow Rate (wacfm).....	166,878	149,461	158,170
Stack Flow Rate (dscfm).....	104,113	88,202	96,157
Isokinetic Ratio (%).....	95.39	101.25	98.32
Particulate Catch, mg.....	0.70	5.50	3.10
Grain Loading gr/dscf.....	0.0003	0.0023	0.0013
Grain Loading @ 12% CO2.....	0.0007	0.0050	0.0028
Part emission lb/hr.....	0.30	1.72	1.01

CARNOT

11/9/92

Particulate

SOURCE TEST DATA SUMMARY WORKSHEET

Client/Location.....	SCE	Parameter.....	Urea Off
Unit.....	2	Fuel.....	Natural Gas
Sample Location.....	CSAPH	Data By.....	EF
Test Number.....	12-2-PM	13-2-PM	Average
Reference Temperature, F.....	60	60	
Test Date.....	10/8/92	10/8/92	
Test Method.....	SCAQMD 5.3	SCAQMD 5.3	SCAQMD 5.3
Sample Train.....	ES-19	ES-19	-
Pitot Factor	0.840	0.840	-
Meter Calibration Factor.....	1.000	1.000	-
Stack Area (sq ft).....	68.43	68.43	-
Sample Time (Min).....	84	84	84
Barometric Pressure (in Hg).....	30.00	30.00	30.00
Nozzle Diam (in).....	0.250	0.250	-
Start/Stop Time.....	1215/1441	1515/1641	-
Stack Pressure (iwg).....	9.10	10.10	9.60
Stack Temperature (F).....	337.6	284.1	310.9
Delta P (iwg).....	0.2098	0.4322	0.3210
Meter Volume (acf).....	34.689	50.145	42.417
Meter Temperature (F).....	96.0	104.7	100.3
Meter Pressure (iwg).....	0.529	1.152	0.841
Liquid Volume (ml).....	91.8	134.3	113.1
Stack O2 (%).....	12.2	11.1	11.6
Stack CO2 (%).....	5.1	5.8	5.5
Standard Sample Volume (SCF).....	32.572	46.428	39.500
Moisture Fraction.....	0.116	0.119	0.117
Molecular Weight. (wet).....	27.99	28.03	28.01
Stack Gas Velocity (ft/sec).....	31.66	43.81	37.73
Stack Flow Rate (wacfm).....	129,975	179,862	154,919
Stack Flow Rate (dscfm).....	76,778	113,817	95,297
Isokinetic Ratio (%).....	101.35	97.45	99.40
Particulate Catch, mg.....	0.70	0.80	0.75
Grain Loading gr/dscf.....	0.0003	0.0003	0.0003
Grain Loading @ 12% CO2.....	0.0008	0.0006	0.0007
Part emission lb/hr.....	0.22	0.26	0.24

CARNOT

11/9/92

Ammonia

SOURCE TEST DATA SUMMARY WORKSHEET

Client/Location.....	SCE	Parameter.....	165 MW
Unit.....	2	Fuel.....	Natural Gas
Sample Location.....	CSAPH	Data By.....	EF
Test Number.....	4-2-NH3	5-2-NH3	Average
Reference Temperature, F.....	60	60	NH3 Draft
Test Date.....	10/6/92	10/6/92	
Test Method.....	NH3 Draft	NH3 Draft	
Sample Train.....	North Outlet	North Outlet	
Meter Calibration Factor.....	0.975	0.975	
Sample Time (Min).....	30	30	
Barometric Pressure (in Hg).....	30.05	29.92	
Start/Stop Time.....	1610/1641	1810/1841	-
Meter Volume (acf).....	30.346	30.039	30.193
Meter Temperature (F).....	95.4	98.1	96.8
Meter Pressure (iwg).....	1.500	1.500	1.500
Liquid Volume (ml).....	107.4	106.3	106.9
Stack O2 (%).....	7.4	7.4	7.4
Stack CO2 (%).....	7.9	7.9	7.9
Standard Sample Volume (SCF)	27.916	27.382	27.649
Moisture Fraction.....	-0.152	0.153	0.152
Molecular Weight. (wet).....	27.81	27.79	27.80
AMMONIA ANALYSIS			
NH3 ppm wt in solution.....	3.61	10.05	6.83
Sample volume (ml).....	630	640	635
NH3 ppmV in flue gas.....	4.0	11.5	7.8
NH3 ppmV @ 3%O2.....	5.3	15.3	10.3

CARNOT

11/9/92

Ammonia

SOURCE TEST DATA SUMMARY WORKSHEET

Client/Location.....	SCE	Parameter.....	138 MW
Unit.....	2	Fuel.....	Natural Gas
Sample Location.....	CSAPH	Data By.....	EF
Test Number.....	8-2-NH3	9-2-NH3	Average
Reference Temperature, F.....	60	60	
Test Date.....	10/7/92	10/7/92	
Test Method.....	NH3 Draft	NH3 Draft	NH3 Draft
Sample Train.....	North Outlet	North Outlet	-
Meter Calibration Factor.....	0.975	0.975	-
Sample Time (Min).....	30	30	30
Barometric Pressure (in Hg).....	30.05	29.99	30.05
Start/Stop Time.....	1400/1431	1615/1646	-
Meter Volume (acf).....	30.455	30.096	30.276
Meter Temperature (F).....	89.0	107.4	98.2
Meter Pressure (iwg).....	1.500	1.500	1.500
Liquid Volume (ml).....	98.5	106.3	102.4
Stack O2 (%).....	8.2	7.8	8.0
Stack CO2 (%).....	7.3	7.5	7.4
Standard Sample Volume (SCF)	28.343	27.047	27.695
Moisture Fraction.....	0.139	0.154	0.147
Molecular Weight. (wet).....	27.90	27.73	27.82
AMMONIA ANALYSIS			
NH3 ppm wt in solution.....	3.25	7.37	5.31
Sample volume (ml).....	580	560	570
NH3 ppmV in flue gas.....	3.3	7.5	5.4
NH3 ppmV @ 3%O2.....	4.6	10.2	7.4

CARNOT

11/9/92

Ammonia

SOURCE TEST DATA SUMMARY WORKSHEET

Client/Location.....	SCE	Parameter.....	40 MW
Unit.....	2	Fuel.....	Natural Gas
Sample Location.....	CSAPH	Data By.....	EF
Test Number.....	10-2-NH3	11-2-NH3	Average
Reference Temperature, F.....	60	60	
Test Date.....	10/8/92	10/8/92	
Test Method.....	NH3 Draft	NH3 Draft	NH3 Draft
Sample Train.....	North Outlet	North Outlet	-
Meter Calibration Factor.....	0.975	0.975	-
Sample Time (Min).....	30	30	30
Barometric Pressure (in Hg).....	30.05	30.05	30.05
Start/Stop Time.....	0900/0931	1116/1147	-
Meter Volume (acf).....	30.944	31.837	31.391
Meter Temperature (F).....	90.1	91.9	91.0
Meter Pressure (iwg).....	1.500	1.500	1.500
Liquid Volume (ml).....	79.7	85.3	82.5
Stack O2 (%).....	11.6	11.5	11.6
Stack CO2 (%).....	5.4	5.5	5.5
Standard Sample Volume (SCF)	28.741	29.474	29.107
Moisture Fraction.....	0.114	0.119	0.116
Molecular Weight. (wet).....	28.03	28.00	28.01
AMMONIA ANALYSIS			
NH3 ppm wt in solution.....	4.01	3.18	3.60
Sample volume (ml).....	595	475	535
NH3 ppmV in flue gas.....	4.1	2.5	3.3
NH3 ppmV @ 3%O2.....	7.8	4.8	6.3

CARNOT

SUBJECT NO_x / NO Concentration JOB NO. 12598

SHEET NO. of

COMPUTED BY LS DATE CHECKED BY DATE

<u>TEST #</u>	<u>NO_x</u>	<u>NO</u>
1-2	107.0	101.3
2-2	105.0	96.3
3-2	106.8	98.0
4-2	81.3	76.0
5-2	78.3	73.0
6-3	47.0	43.8
9-3	46.3	44.5
8-2	37.5	36.3
4-2	38.8	37.5
10-2	54.5	51.0
11-2	53.0	52.0
13-2	68.3	66.3

APPENDIX E
LABORATORY REPORTS

PARTICULATE **SCAQMD 5.3, IN STACK FILTER**

PROJECT # 12598 WATER BLANK mg/ml 0.0020 Front 1/2
 CLIENT/LOCATION SCE Alamitos 2 MeCl₂ BLANK mg/ml 0.0040 Back 1/2
 SAMPLE LOCATION CSAPH SAMPLE DATE 10/16/92
 TEST # 1-2-PM DATA ANALYSIS DATE 10/16/92
 ANALYST INITIALS JRH

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	45-167	0.1020	0.1027	-0.7	—	/	0.5 -0.7
2. PROBE AND NOZZLE WASH	5099	28.68355	28.68245	1.1	0.2 ✓	100/100	0.9 ✓
3. IMPINGER							
a. WATER FRACTION	5120	28.8604	28.85835	2.05 ✓	1.24 ✓	620/310	1.6 ✓
b. ORGANIC EXTRACTION 125 ml MeCl ₂	5108	28.9748	28.9745	0.3	0.17 ✓	620/310	0.3 ✓
						/	.
						/	.
						/	.

TOTAL PARTICULATE = 2.8 mg/L

METHOD OF SAMPLE PREP/NOTES

PARTICULATE SCAQMD 5.3, IN STACK FILTER

PROJECT # 12598 WATER BLANK mg/ml 0.0020 Front 1/2
 CLIENT/LOCATION SCE Alamitos 2 MeCl₂ BLANK mg/ml 0.0013 SAMPLE DATE 10/16/92
 SAMPLE LOCATION CSAPH DATA ANALYSIS DATE 10/19/92
 TEST # 3-2-PM ANALYST INITIALS JRH

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALQUOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	4516 SA	0.10515	0.10515	0.0	-	/	0.0
	45-2008	0.1044	0.1042	0.2		/	0.2
2. PROBE AND NOZZLE WASH	5100	28.54365	28.5425	1.15 ✓	0.16 ✓	78/78	1.0 ✓
3. IMPINGER	5121	28.3984	28.3965	1.75 ✓	1.48 ✓	740/370	0.5 ✓
a. WATER FRACTION							
b. ORGANIC EXTRACTION 125 ml MeCl ₂	5109	28.79395	28.7937	0.25 ✓	0.17 ✓	740/370	0.2 ✓
						/	.
						/	.
						/	.

TOTAL PARTICULATE = 11.9 mg

METHOD OF SAMPLE PREP/NOTES

PARTICULATE **SCAQMD 5.3, IN STACK FILTER**

PROJECT # 12598
CLIENT/LOCATION SCE Alamitos 2
SAMPLE LOCATION CSAPH
TEST # 4-2-PM

WATER BLANK mg/ml 0.0020 Front 1/2
0.0040 Back 1/2
MeCl₂ BLANK mg/ml 0.0013

SAMPLE DATE 10/16/92
DATA ANALYSIS DATE 10/19/92
ANALYST INITIALS JRW

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	45-199	0.1048	0.10425	0.55 ✓	—	/	0.6 ✓
2. PROBE AND NOZZLE WASH	5101	28.56295	28.5616	1.35 ✓	0.24 ✓	120 120 390	1.1 ✓
3. IMPINGER							
a. WATER FRACTION	5122	28.55965	28.55825	1.40 ✓	1.56 ✓	790 390	-0.0 ✓
b. ORGANIC EXTRACTION							
<u>125 ml MeCl₂</u>	5110	27.9675	27.9668	0.35 ✓	0.17 ✓	790 390	0.4 ✓
				.		/	.
				.		/	.
				.		/	.

TOTAL PARTICULATE = 2.1 mg ✓

METHOD OF SAMPLE PREP/NOTES

PARTICULATE **SCAQMD 5.3, IN STACK FILTER**

PROJECT # 12598
 CLIENT/LOCATION SCE Alamitos 2
 SAMPLE LOCATION CSAPH
 TEST # 5-2-PM

WATER BLANK mg/ml 0.0020 Front 1/2
0.0040 Back 1/2
 MeCl₂ BLANK mg/ml 0.0013

SAMPLE DATE 10, 16, 92
 DATA ANALYSIS DATE 10/19/92
 ANALYST INITIALS JRN

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	45-178	0.1058	0.1053	0.5	—	/	0.5
2. PROBE AND NOZZLE WASH	5102	28.4959	28.4952	0.75	0.12	60/60	0.6
3. IMPINGER							
a. WATER FRACTION	5127	28.66175	28.6602	1.55	1.12	510/280	0.9
b. ORGANIC EXTRACTION							
125 ml MeCl ₂	5123	28.2809	28.2806	0.3	0.17	510/280	0.3
						/	.
						/	.
						/	.

TOTAL PARTICULATE = 2.3 mg

METHOD OF SAMPLE PREP/NOTES

PARTICULATE SCAQMD 5.3, IN STACK FILTER

PROJECT # 12598
 CLIENT/LOCATION SCE Alamitos 2
 SAMPLE LOCATION CSAPH
 TEST # 6-2-PM

WATER BLANK mg/ml 0.0020 Front 1/2
0.0040 Back 1/2
 MeCl₂ BLANK mg/ml 0.0013

SAMPLE DATE 10, 7, 92
 DATA ANALYSIS DATE 10, 19, 92
 ANALYST INITIALS JRH

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	47-448	0.1104	0.1104	0.0 ✓	—	/	0.0 ✓
2. PROBE AND NOZZLE WASH	5111	28.4579	28.45745	0.45 ✓	0.34 ✓	168 / 168	0.1 ✓
3. IMPINGER							
a. WATER FRACTION	5128	27.5152	27.5142	1.0 ✓	128 ✓	640 / 320	-0.0 ✓
b. ORGANIC EXTRACTION 125 ml MeCl ₂	5124	30.2839	30.28355	0.35 ✓	0.17 ✓	640 / 320	0.4 ✓
				.		/	.
				.		/	.
				.		/	.

TOTAL PARTICULATE = 0.4 mg

METHOD OF SAMPLE PREP/NOTES

PARTICULATE SCAQMD 5.3. IN STACK FILTER

PROJECT # 12598 WATER BLANK mg/ml 0.0020 Front
 CLIENT/LOCATION SCE Alamitos 2 MeCl₂ BLANK mg/ml 0.0040 Back
 SAMPLE LOCATION CSAPH SAMPLE DATE 10, 17, 92
 TEST # 7-2-PM DATA ANALYSIS DATE 10, 19, 92
 ANALYST INITIALS JRW

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	47.449	0.1107	0.1106	0.1 ✓	—	/	0.1 ✓
2. PROBE AND NOZZLE WASH	5112	27.58345	27.58265	0.8 ✓	0.24 ✓	120/120	0.6 ✓
3. IMPINGER							
a. WATER FRACTION	5129	28.17895	28.17785	1.1 ✓	1.2 ✓	610/300	-0.0 ✓
b. ORGANIC EXTRACTION 125 ml MeCl ₂	5125	28.33765	28.3373	0.35 ✓	0.17 ✓	610/300	0.4 ✓
						/	.
						/	.
						/	.

TOTAL PARTICULATE = 1.1 mg ✓

METHOD OF SAMPLE PREP/NOTES

**PARTICULATE
SCAQMD 5.3, IN STACK FILTER**

PROJECT # 12598
 CLIENT/LOCATION SCE Alamitos
 SAMPLE LOCATION CSAPH
 TEST # 8-2-PM

WATER BLANK mg/ml 0.0020 Front/2
0.0040 Back/2
 MeCl₂ BLANK mg/ml 0.0013

SAMPLE DATE 10, 7, 92
 DATA ANALYSIS DATE 10, 19, 92
 ANALYST INITIALS JRW

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALLOQUOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	47450	0.1112	0.11045	0.75	-	1/	0.8
2. PROBE AND NOZZLE WASH	5113	29.82045	29.81895	1.5	0.3	150/150	1.2
3. IMPINGER							
b. WATER FRACTION	5140	29.0521	29.0503	1.8	1.16	590/290	1.3
b. ORGANIC EXTRACTION <u>125 ml MeCl₂</u>	5139	28.5349	28.53485	0.05	0.17	590/290	-0.0
						/	.
						/	.
						/	.

TOTAL PARTICULATE = 3.3 mg

METHOD OF SAMPLE PREP/NOTES

PARTICULATE SCAQMD 5.3, IN STACK FILTER

PROJECT # 12598 WATER BLANK mg/ml 0.0020 Front 1/2
 CLIENT/LOCATION SCE Alamitos 2 MeCl₂ BLANK mg/ml 0.0040 Back 1/2
 SAMPLE LOCATION CSAPH SAMPLE DATE 10.17.92
 TEST # 9-2-PM DATA ANALYSIS DATE 10.19.92
 ANALYST INITIALS JRH

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	47-451	0.1106	0.10995	0.65 ✓	—	/	0.7 ✓
2. PROBE AND NOZZLE WASH	5114	27.70235	27.70155	0.8 ✓	0.2 ✓	98/98	0.6 ✓
3. IMPINGER				✓	✓	640/320	-0.0 ✓
a. WATER FRACTION	5130	27.7438	27.74255	1.25 ✓	1.28 ✓	-320	-0.0 ✓
b. ORGANIC EXTRACTION 125 ml MeCl ₂	5126	28.2293	28.2290	0.3 ✓	0.17 ✓	640/320	0.3 ✓
				.		/	.
				.		/	.
				.		/	.

TOTAL PARTICULATE = 1.6 mg

METHOD OF SAMPLE PREP/NOTES

PARTICULATE **SCAQMD 5.3, IN STACK FILTER**

PROJECT # 12598

WATER BLANK mg/ml 0.0020 Front 1/2
0.0040 Back 1/2

CLIENT/LOCATION SCE Alamitos 2

MeCl₂ BLANK mg/ml 0.0013

SAMPLE DATE 10.8.92

SAMPLE LOCATION CSAPH

DATA ANALYSIS DATE 10.19.92

TEST # 10-2-PM

ANALYST INITIALS JRL

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	47-452	0.11075	0.1107	✓ +0.05	—	/	+0.1
2. PROBE AND NOZZLE WASH	5115	29.0833	29.0827	✓ 0.6	✓ 0.2	98/98	✓ 0.4
3. IMPINGER				✓	✓		
a. WATER FRACTION	5135	28.5015	28.50795	✓ 1.25	✓ 1.28	640/320	✓ -0.0
b. ORGANIC EXTRACTION 125 ml MeCl ₂	5131	28.93725	28.9370	✓ 0.25	✓ 0.17	640/320	✓ 0.2
				.		/	.
				.		/	.
				.		/	.

TOTAL PARTICULATE = 0.7 mg

METHOD OF SAMPLE PREP/NOTES

PARTICULATE **SCAQMD 5.3, IN STACK FILTER**

PROJECT # 12598 WATER BLANK mg/ml 0.0020 Front 1/2
0.0040 Back 1/2
 CLIENT/LOCATION SCE Alamitos 2 MeCl₂ BLANK mg/ml 0.0013 SAMPLE DATE 10/8/92
 SAMPLE LOCATION CSAPH DATA ANALYSIS DATE 10/19/92
 TEST # 11-2-PM ANALYST INITIALS JRH

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	47-453	0.11145	0.1107	0.75 ✓	—	/	0.8
2. PROBE AND NOZZLE WASH	5116	31.44665	31.44665	0.5 ✓	0.12 ✓	62/62	0.4 ✓
3. IMPINGER							
a. WATER FRACTION	5136	27.75735	27.7561	3.25 ✓	1.08 ✓	540/270	2.0 4.3 ✓
b. ORGANIC EXTRACTION 125 ml MeCl ₂	5132	29.8063	29.80615	0.15 ✓	0.17 ✓	540/270	0.0
						/	.
						/	.
						/	.

TOTAL PARTICULATE = 5.5 mg ✓

METHOD OF SAMPLE PREP/NOTES

PARTICULATE **SCAQMD 5.3, IN STACK FILTER**

PROJECT # 12598 WATER BLANK mg/ml 0.0020 Front 1/2
 CLIENT/LOCATION SCE Alamitos 2 MeCl₂ BLANK mg/ml 0.0013 SAMPLE DATE 10/18/92
 SAMPLE LOCATION CSAPH DATA ANALYSIS DATE 10/20/92
 TEST # 12-2-PM ANALYST INITIALS JRH

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	47454	0.10985	0.1095	0.35	—	/	0.4
2. PROBE AND NOZZLE WASH	5117	29.0564	29.05595	0.45	0.3	150/150	0.2
3. IMPINGER							
a. WATER FRACTION	5137	28.9379	28.9389	1.0	1.12	560/280	0.0
b. ORGANIC EXTRACTION 125 ml MeCl ₂	5133	29.66535	29.66515	0.2	0.17	560/280	0.1
				.		/	.
				.		/	.
				.		/	.

TOTAL PARTICULATE = 0.7 mg

METHOD OF SAMPLE PREP/NOTES

PARTICULATE SCAQMD 5.3, IN STACK FILTER

PROJECT # 12598 WATER BLANK mg/ml 0.0020 Front 1/2
 CLIENT/LOCATION SCE Alamitas 2 MeCl₂ BLANK mg/ml 0.0040 Back 1/2 SAMPLE DATE 10.8.92
 SAMPLE LOCATION CSAPH DATA ANALYSIS DATE 10.19.92
 TEST # 13-2-PM ANALYST INITIALS JRH

ITEM	NUMBER	FINAL WEIGHT (g)	TARE WEIGHT (g)	GAIN WEIGHT (mg)	BLANK CORRECTION (mg)	ALIQOT CORRECTION (ml/ml)	NET GAIN (mg/SAMPLE)
1. GLASS FIBER FILTER	47-455	0.1090	0.1093	-0.2 ✓	—	/	-0.2
2. PROBE AND NOZZLE WASH	5118	28.9840	28.9834	0.6 ✓	0.12 ✓	61/61	0.5 ✓
3. IMPINGER							
a. WATER FRACTION	5138	27.83755	27.83635	1.2 ✓	1.08 ✓	540/270	0.2 ✓
b. ORGANIC EXTRACTION 125 ml MeCl ₂	5134	28.9801	28.9799	0.2 ✓	0.17 ✓	540/270	0.1 ✓
						/	.
						/	.
						/	.

TOTAL PARTICULATE = .8 mg (4)

METHOD OF SAMPLE PREP/NOTES



AtmAA Inc.

21354 Nordhoff St., Suite 113, Chatsworth, CA 91311 (818) 718-6070 • FAX (818) 718-9779

environmental consultants
laboratory services

October 14, 1992

RECEIVED

LTR/400/92

OCT 19 1992

4037

CARNOT

Kelly Borkenhagen
CARNOT
15991 Red Hill Ave., Suite 110
Tustin, CA 92680

re: 12598

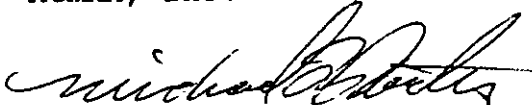
Dear Kelly:

Please find enclosed the laboratory analysis reports, quality assurance summaries, and the original chain of custody forms for nine Tedlar bag samples received on October 7, & 8, 1992.

The samples were analyzed for methane and total gaseous non-methane organics.

Sincerely,

AtmAA, Inc.


Michael L. Porter
Laboratory Director

Encl.
MLP/krp



AtmAA Inc.

21354 Nordhoff St., Suite 113, Chatsworth, CA 91311 (818) 718-6070 • FAX (818) 718-9779

environmental consultants
laboratory services

LABORATORY ANALYSIS REPORT

Methane & Total Gaseous Non-Methane Organics (TGNMO) Analysis in Tedlar Bag Samples

Report Date: October 13, 1992
Client: CARNOT
P.O. No.: 9018
Project No.: 12598
Date Received: October 7, 1992
Date Analyzed: October 7, 1992

ANALYSIS DESCRIPTION

Methane and total gaseous non-methane organics were measured by flame ionization detection/total combustion analysis portion (FID/TCA).

AtmAA Lab No.:	92812-2	92812-3	92812-4	92812-5	92812-6
Sample I.D.:	1-2-HC	2-2-HC	3-2-HC	4-2-HC	5-2-HC
Components:	(Concentration in ppm, v/v)				
Methane	<1	1.27	<1	1.65	<1
TGNMO	13.8	15.2	17.5	18.0	19.4

TGNMO is total gaseous non-methane organics measured and reported as ppm methane.


Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analysis)

Project No.: 12598

Component:	Sample ID	Repeat	Analysis	Mean Conc.	% Diff. From Mean
		Run #1	Run #2		
		(Concentration in ppm, v/v)			
Methane	3-2-HC	<1	<1	---	---
TGNMO	3-2-HC	16.3	18.7	17.5	6.9

A set of 6 Tedlar bag samples laboratory numbers, 92812-(2-6) was analyzed for methane and TGNMO. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean." Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 1 repeat measurement from the sample set of 5 Tedlar bag samples is 6.9%.





AtmAA Inc.

21354 Nordhoff St., Suite 113, Chatsworth, CA 91311 (818) 718-6070 • FAX (818) 718-9779

environmental consultants
laboratory services

LABORATORY ANALYSIS REPORT

Methane & Total Gaseous Non-Methane Organics (TGNMO) Analysis in Tedlar Bag Samples

Report Date: October 14, 1992
Client: CARNOT
P.O. No.: 9022
Project No.: 12598
Date Received: October 8, 1992
Date Analyzed: October 8, 1992

ANALYSIS DESCRIPTION

Methane and total gaseous non-methane organics were measured by flame ionization detection/total combustion analysis portion (FID/TCA).

AtmAA Lab No.:	92822-1	92822-2	92822-3	92822-4
Sample I.D.:	6-2-HC	7-2-HC	8-2-HC	9-2-HC
Components:	(Concentration in ppm, v/v)			
Methane	1.21	<1	<1	<1
TGNMO	14.6	13.6	13.6	13.1

TGNMO is total gaseous non-methane organics measured and reported as ppm methane.


Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analysis)

Project No.: 12598

Component:	Sample ID	Repeat	Analysis	Mean Conc.	% Diff. From Mean
		Run #1	Run #2		
		(Concentration in ppm, v/v)			
Methane	6-2-HC	1.18	1.24	1.21	2.5
TGNMO	6-2-HC	14.7	14.6	14.6	0.34

A set of 4 Tedlar bag samples laboratory numbers, 92822-(1-4) was analyzed for methane and TGNMO. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean." Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 2 repeat measurements from the sample set of 4 Tedlar bag samples is 1.4%.





AtmAA Inc.

21354 Nordhoff St., Suite 113, Chatsworth, CA 91311 (818) 718-6070 • FAX (818) 718-9779

environmental consultants
laboratory services

RECEIVED

OCT 21 1992

CARNOT

October 16, 1992

LTR/406/92
4037

Kelly Borkenhagen
CARNOT
15991 Red Hill Ave., Suite 110
Tustin, CA 92680

re: 12599

Dear Kelly:

Please find enclosed the laboratory analysis report, quality assurance summary, and the original chain of custody form for four Tedlar bag samples received on October 9, 1992.

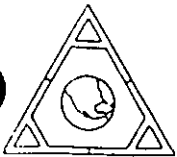
The samples were analyzed for methane and total gaseous non-methane organics.

Sincerely,

AtmAA, Inc.

Michael L. Porter
Laboratory Director

Encl.
MLP/krp



AtmAA Inc.

21354 Nordhoff St., Suite 113, Chatsworth, CA 91311 (818) 718-6070 • FAX (818) 718-9779

environmental consultants
laboratory services

LABORATORY ANALYSIS REPORT

Methane & Total Gaseous Non-Methane Organics (TGNMO) Analysis in Tedlar Bag Samples

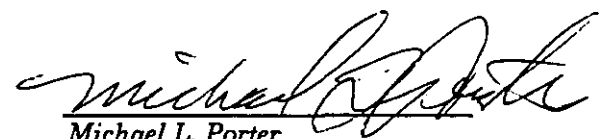
Report Date: October 16, 1992
Client: CARNOT
P.O. No.: 9023
Project No.: 12599
Date Received: October 9, 1992
Date Analyzed: October 9, 1992

ANALYSIS DESCRIPTION

Methane and total gaseous non-methane organics were measured by flame ionization detection/total combustion analysis portion (FID/TCA).

AtmAA Lab No.:	92832-22	92832-23	92832-24	92832-25
Sample I.D.:	10-2-HC	11-2-HC	12-2-HC	13-2-HC
Components:	(Concentration in ppm, v/v)			
Methane	<1	<1	<1	<1
TGNMO	11.1	11.3	10.3	14.8

TGNMO is total gaseous non-methane organics measured and reported as ppm methane.


Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analysis)

Project No.: 12599

	Sample ID	Repeat	Analysis	Mean Conc.	% Diff. From Mean
		Run #1	Run #2		
<u>Component:</u>	(Concentration in ppm, v/v)				
Methane	10-2-HC	<1	<1	---	---
TGNMO	10-2-HC	10.6	11.6	11.1	4.5
	13-2-HC	14.6	14.9	14.8	1.0

A set of 4 Tedlar bag samples laboratory numbers, 92832-(22-25) was analyzed for methane and TGNMO. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean." Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 2 repeat measurements from the sample set of 4 Tedlar bag samples is 2.8%.



**AMMONIA BY NESSLERIZATION
SCAQMD DRAFT METHOD**

CLIENT :	SCE	STORAGE DISK:	LOTUS DATA
LOCATION:	ALAMITOS #2	ANALYST:	JRH
PROJECT :	12598	CALIBRATION DATE:	10/8/92

SAMPLE ANALYSIS:

SAMPLE ID	SAMPLE DATE	ANALYSIS DATE	ALIQOUT FACTOR	ABSORBANCE (OD)	CONC. (ug/ml)	TOTAL VOLUME (ml)
4-2-NH3	10/6/92	10/8/92	8.33	0.021	3.61	630
4-2-NH3SPK(2)	10/6/92	10/8/92	10.00	0.033	5.03	---
5-2-NH3	10/6/92	10/8/92	25.0	0.015	10.0	640
5-2-NH3	10/6/92	10/8/92	25.0	0.016	10.1	640
8-2-NH3	10/7/92	10/8/92	6.25	0.036	3.25	580
9-2-NH3	10/7/92	10/8/92	12.5	0.048	7.37	560
10-2-NH3	10/8/92	10/8/92	6.25	0.057	4.01	595
11-2-NH3	10/8/92	10/8/92	6.25	0.034	3.18	475

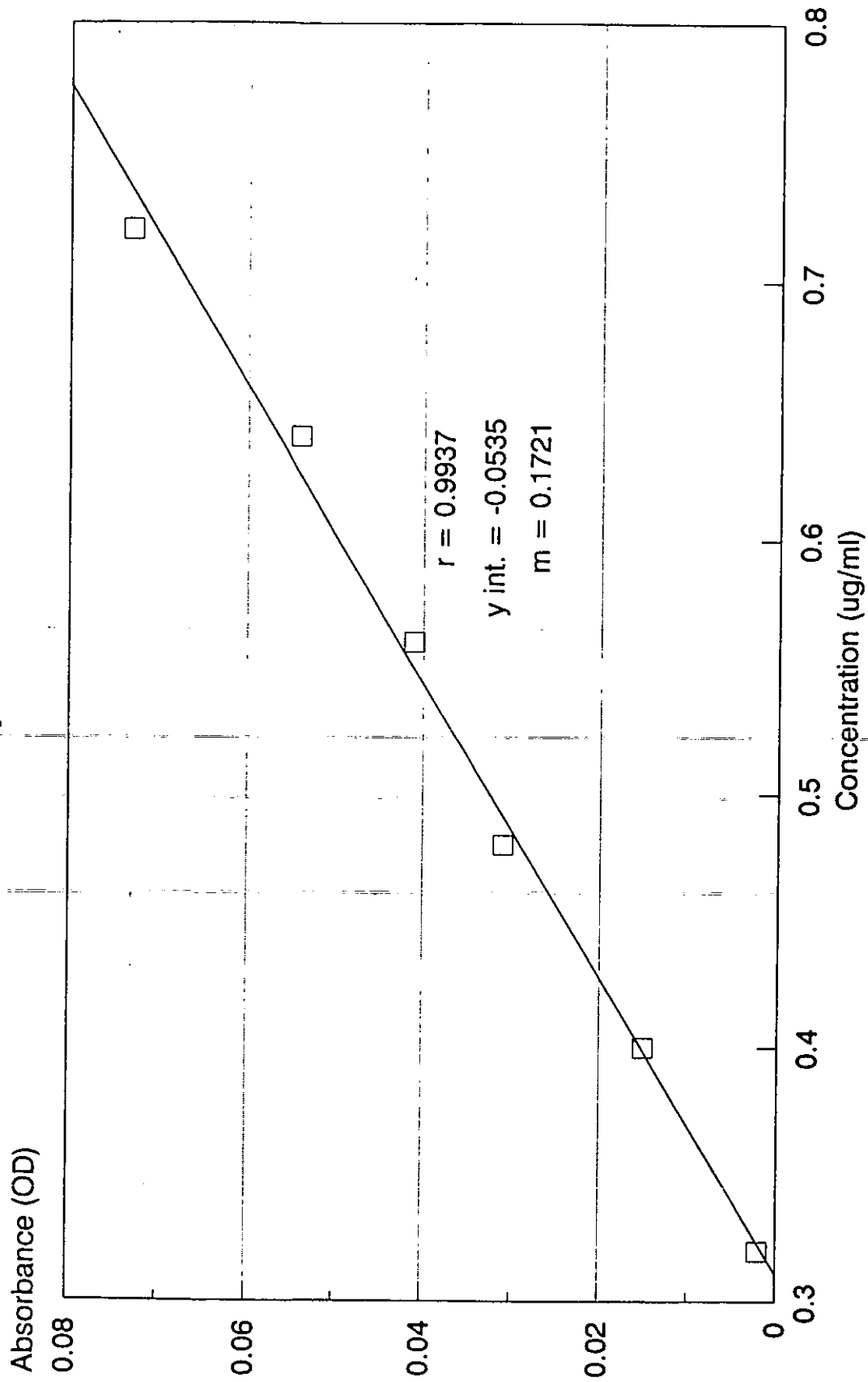
NOTES:

- (1) A 0.48 ug/ml Ricca standard was analyzed periodically during sample analysis.
Range of recovery was 100 to 101 percent. Average recovery was 101 percent.
- (2) 1 ml of 12.1 ug/ml Ricca standard and 4 ml of sample were diluted to 50 ml.
Recovery = (conc. spike - conc. sample)/ conc. std * 100 = 88.43%

AMMONIA CALIBRATION CURVE

Calibration Date: 10/8/92

Analyst: JRH



**AMMONIA BY NESSLERIZATION
SCAQMD DRAFT METHOD**

CLIENT :	SCE	STORAGE DISK:	LOTUS DATA
LOCATION:	ALAMITOS #2	ANALYST:	JRH
PROJECT :	12598	CAL DATE:	10/8/92

STANDARDS:

EXPECTED CONC. (ug/ml)	ABSORBANCE (OD)	ACTUAL CONC. (ug/ml)	RESPONSE FACTOR (mg/OD)
0.00	0.000	0.31	
0.32	0.002	0.32	8.0000
0.40	0.015	0.40	1.3333
0.48	0.031	0.49	0.7742
0.56	0.041	0.55	0.6829
0.64	0.054	0.62	0.5926
0.72	0.073	0.73	0.4932
		AVG	2.2766

Y-Int. = -0.0535
Slope = 0.1721
Corr. = 0.9937

LIMIT OF DETECTION:

SAMPLES	ABSORBANCE (OD)	CONC (ug/ml)
1	0.004	0.33
2	0.006	0.35
3	0.007	0.35
4	0.007	0.35
5	0.008	0.36
6	0.006	0.35
7	0.008	0.36

TRUE VALUE = 0.32
MEAN = 0.3490
STD DEV = 0.0081
MDL = 0.03
REPORTING LIMIT = 0.26

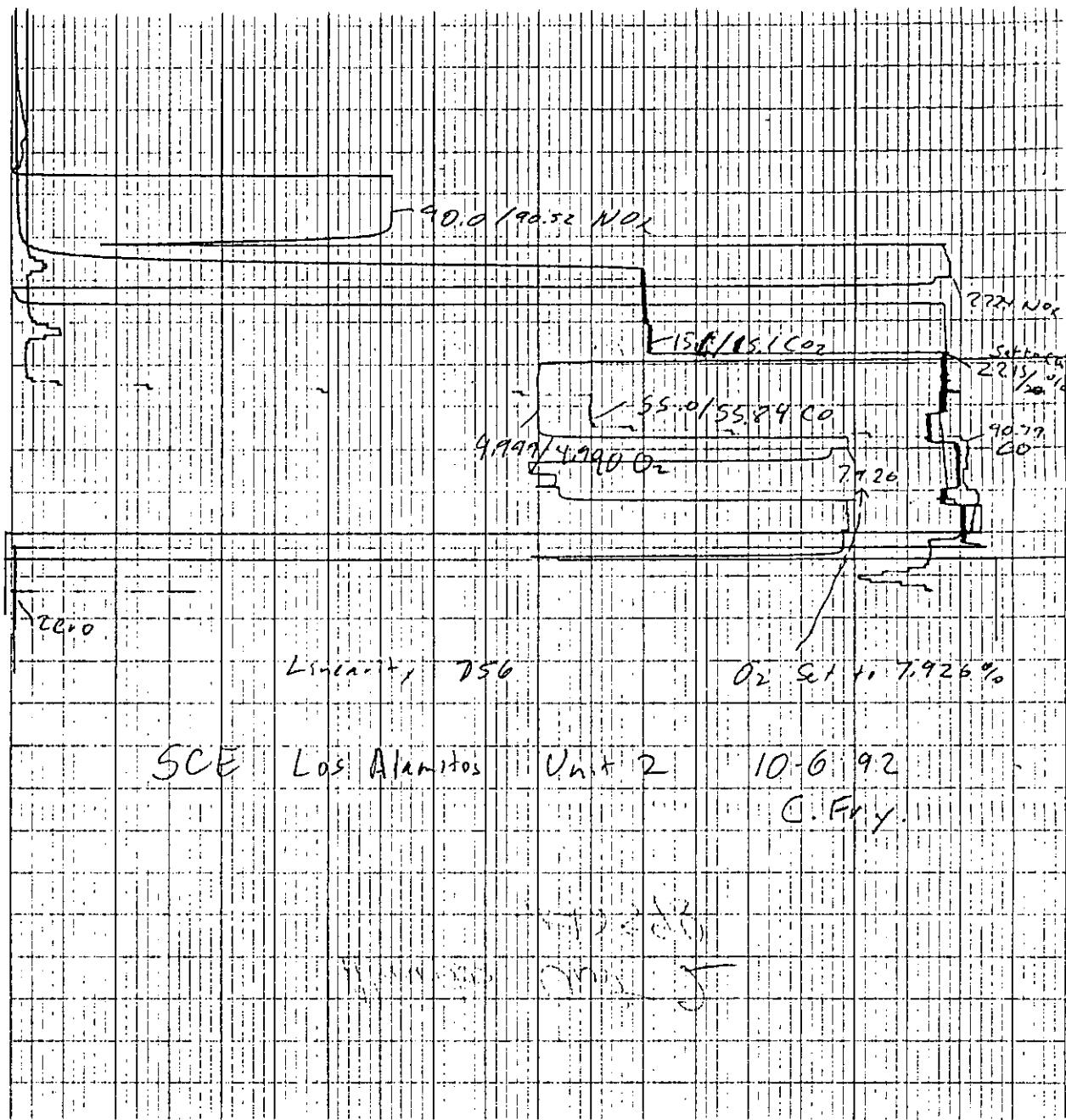
NOTES:

MDL = (3.143*STD DEV OF 7 REPLICATES OF 0.32 ug/ml STD)
RL = (MDL*10)

DUPLICATES:

ANALYSIS DATE	SAMPLE	RESULT 1	RESULT 2	DIFFERENCE (%)
10/8/92	5-2-NH3	10.0	10.1	-1.4%

APPENDIX F
INSTRUMENT STRIP CHARTS



SOLETEC CHART NO. 201-01-25-204

SOLETEC CHART NO. 2

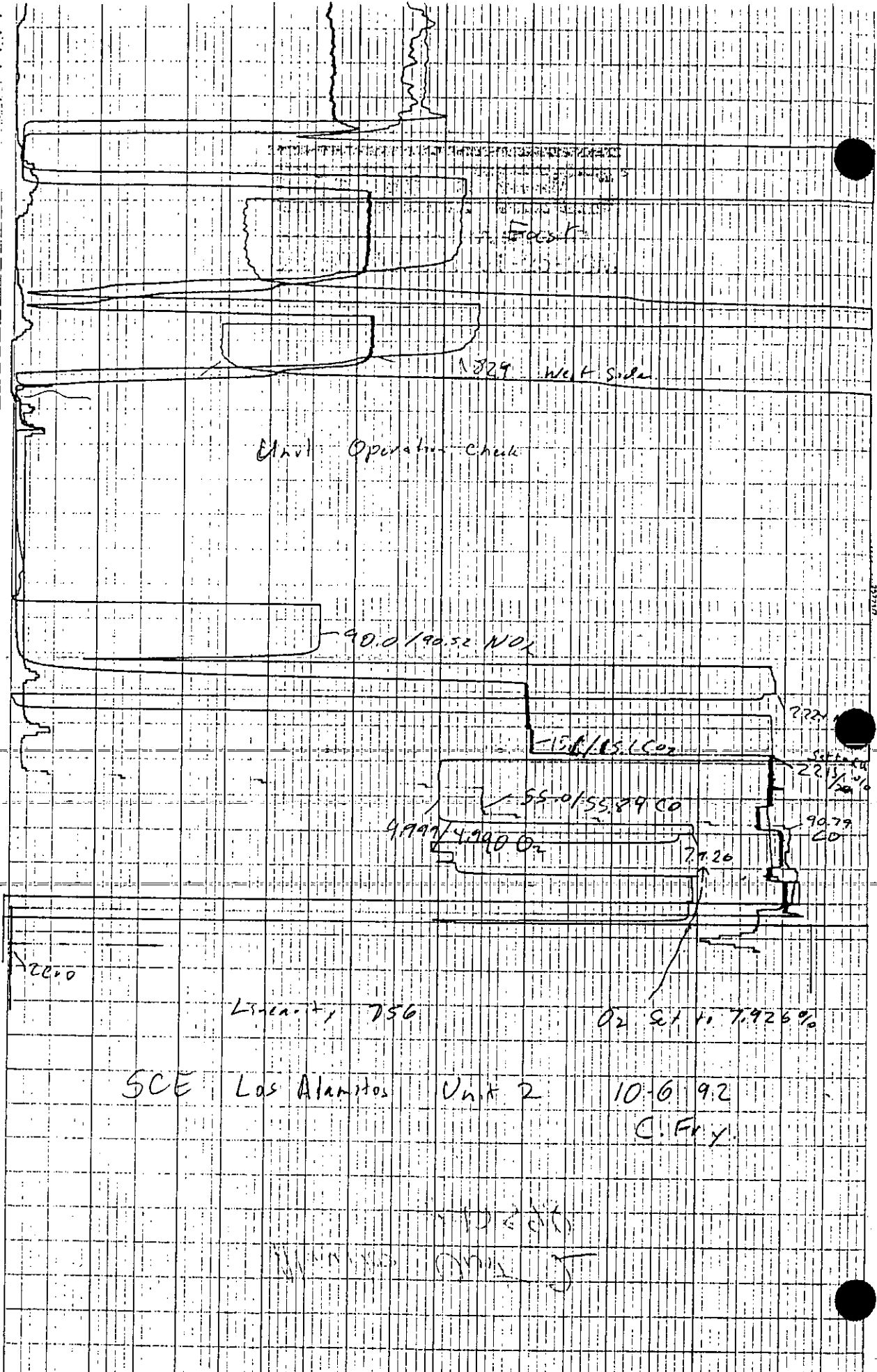
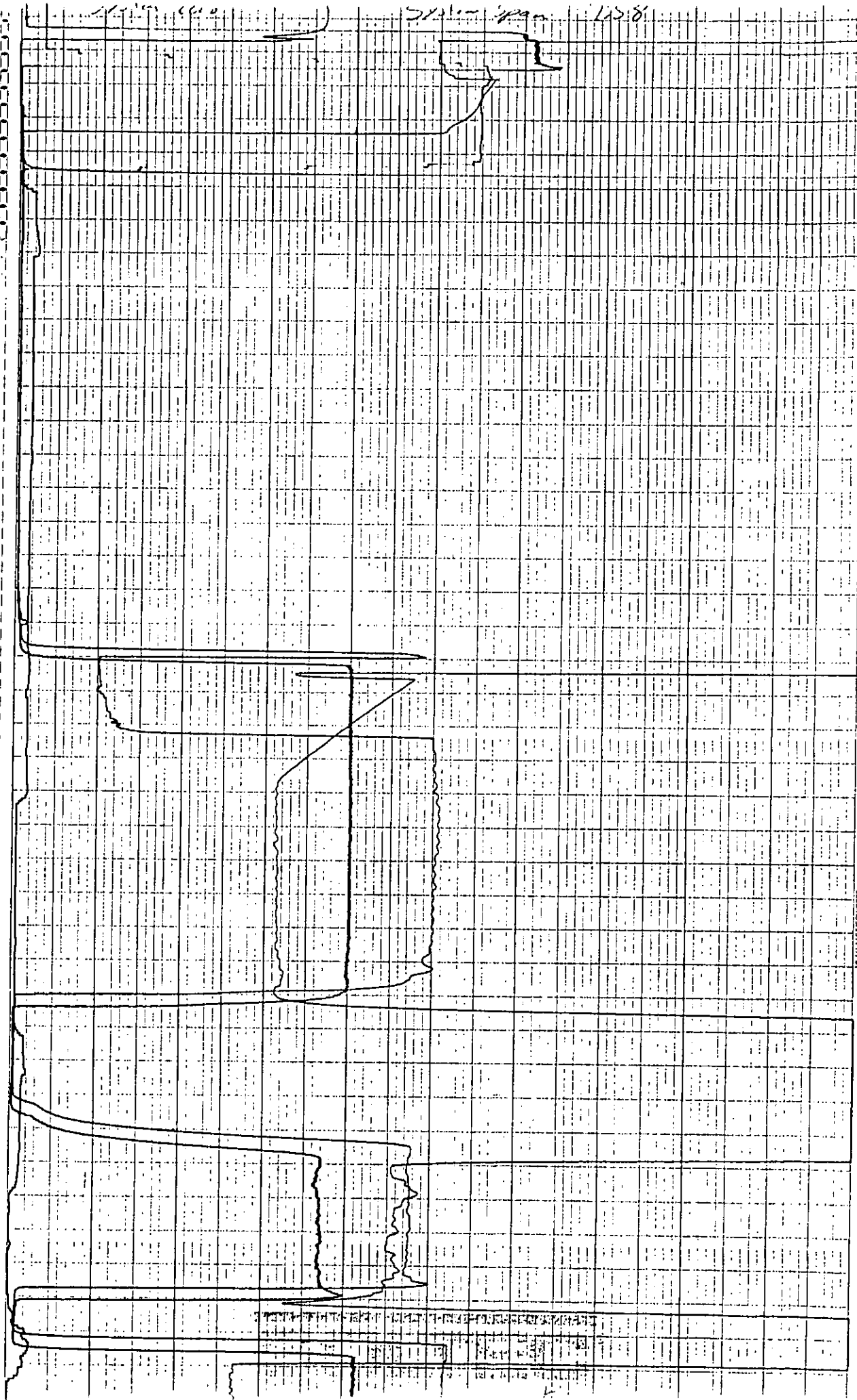


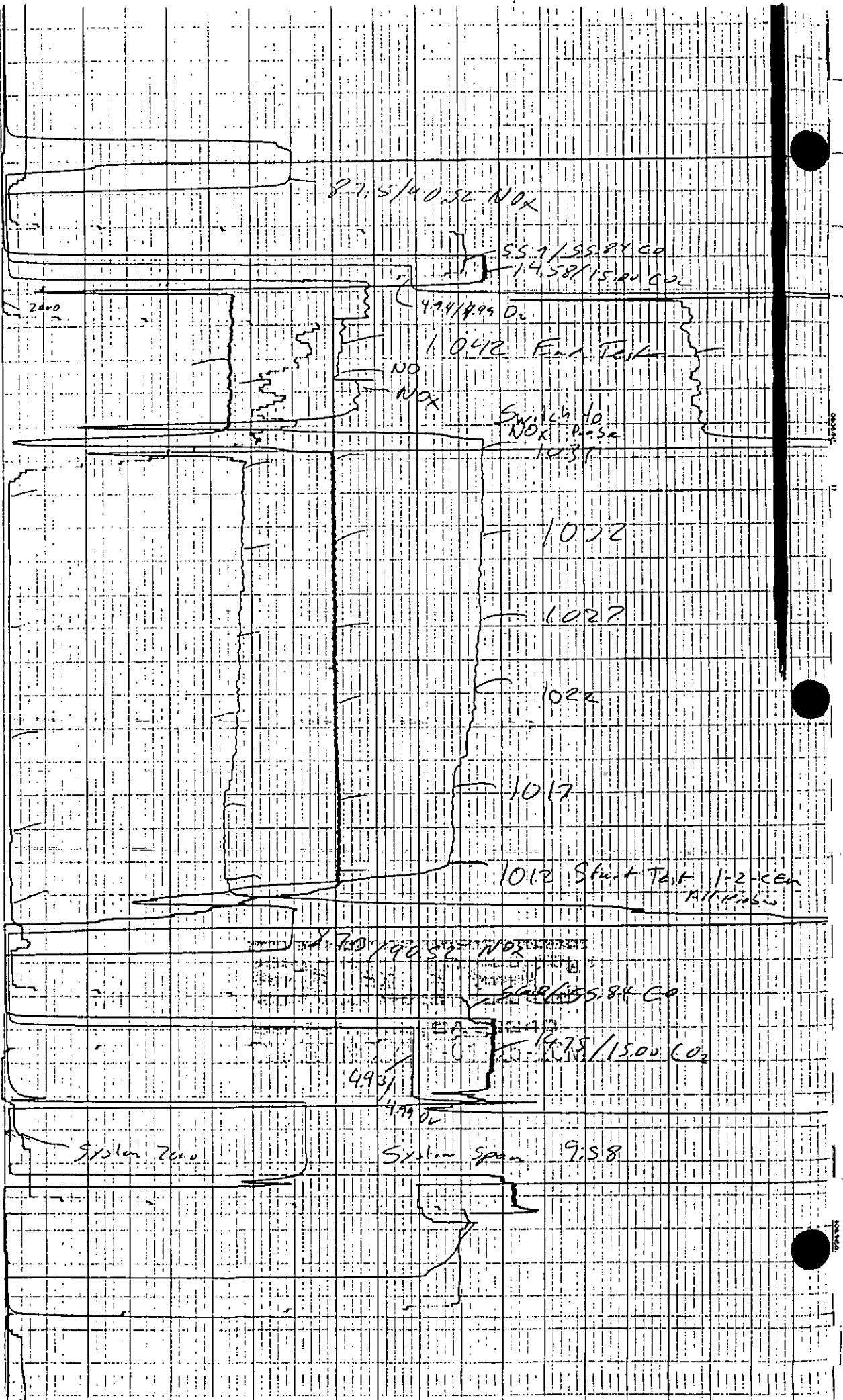
CHART NO. ZD1-01-25-20M

SCITEC CHART NO. ZD1-01-25-20M



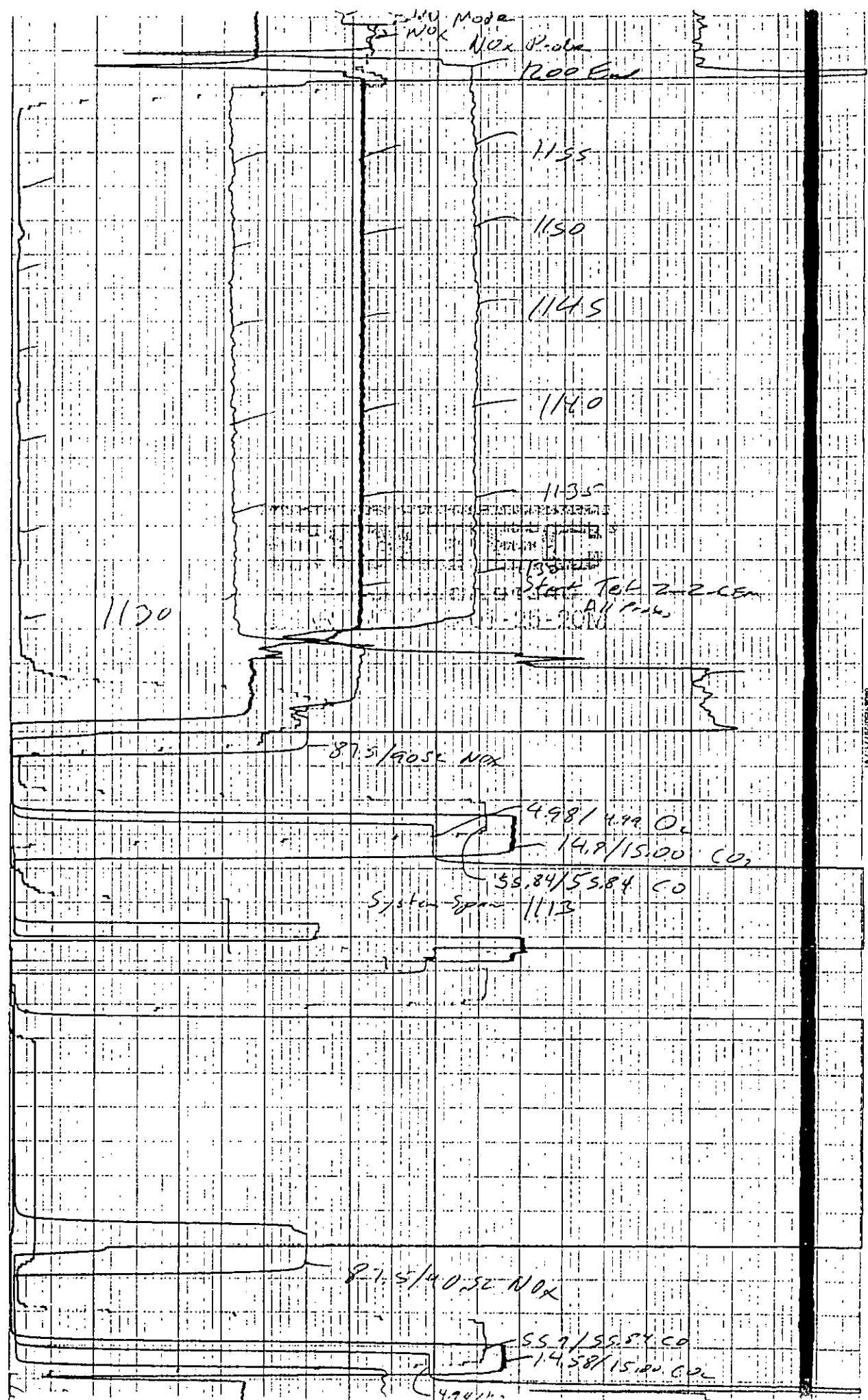
SOLTEC CHART NO. Z01-01-25-20M

SOLTEC CHART NO. Z01-01-25-20M



SOLEC CHART 110 ZOI-01-25-20M

SOLEC



SOURCE CHART NO. ZD1-01-25-2011

SOLETEC CHART NO. ZD1-01-25-20M

10-11-1964
 10-12-1964
 10-13-1964
 10-14-1964
 10-15-1964
 10-16-1964
 10-17-1964
 10-18-1964
 10-19-1964
 10-20-1964
 10-21-1964
 10-22-1964
 10-23-1964
 10-24-1964
 10-25-1964
 10-26-1964
 10-27-1964
 10-28-1964
 10-29-1964
 10-30-1964
 10-31-1964
 11-1-1964
 11-2-1964
 11-3-1964
 11-4-1964
 11-5-1964
 11-6-1964
 11-7-1964
 11-8-1964
 11-9-1964
 11-10-1964
 11-11-1964
 11-12-1964
 11-13-1964
 11-14-1964
 11-15-1964
 11-16-1964
 11-17-1964
 11-18-1964
 11-19-1964
 11-20-1964
 11-21-1964
 11-22-1964
 11-23-1964
 11-24-1964
 11-25-1964
 11-26-1964
 11-27-1964
 11-28-1964
 11-29-1964
 11-30-1964
 12-1-1964
 12-2-1964
 12-3-1964
 12-4-1964
 12-5-1964
 12-6-1964
 12-7-1964
 12-8-1964
 12-9-1964
 12-10-1964
 12-11-1964
 12-12-1964
 12-13-1964
 12-14-1964
 12-15-1964
 12-16-1964
 12-17-1964
 12-18-1964
 12-19-1964
 12-20-1964
 12-21-1964
 12-22-1964
 12-23-1964
 12-24-1964
 12-25-1964
 12-26-1964
 12-27-1964
 12-28-1964
 12-29-1964
 12-30-1964
 12-31-1964
 1-1-1965
 1-2-1965
 1-3-1965
 1-4-1965
 1-5-1965
 1-6-1965
 1-7-1965
 1-8-1965
 1-9-1965
 1-10-1965
 1-11-1965
 1-12-1965
 1-13-1965
 1-14-1965
 1-15-1965
 1-16-1965
 1-17-1965
 1-18-1965
 1-19-1965
 1-20-1965
 1-21-1965
 1-22-1965
 1-23-1965
 1-24-1965
 1-25-1965
 1-26-1965
 1-27-1965
 1-28-1965
 1-29-1965
 1-30-1965
 1-31-1965
 2-1-1965
 2-2-1965
 2-3-1965
 2-4-1965
 2-5-1965
 2-6-1965
 2-7-1965
 2-8-1965
 2-9-1965
 2-10-1965
 2-11-1965
 2-12-1965
 2-13-1965
 2-14-1965
 2-15-1965
 2-16-1965
 2-17-1965
 2-18-1965
 2-19-1965
 2-20-1965
 2-21-1965
 2-22-1965
 2-23-1965
 2-24-1965
 2-25-1965
 2-26-1965
 2-27-1965
 2-28-1965
 2-29-1965
 2-30-1965
 3-1-1965
 3-2-1965
 3-3-1965
 3-4-1965
 3-5-1965
 3-6-1965
 3-7-1965
 3-8-1965
 3-9-1965
 3-10-1965
 3-11-1965
 3-12-1965
 3-13-1965
 3-14-1965
 3-15-1965
 3-16-1965
 3-17-1965
 3-18-1965
 3-19-1965
 3-20-1965
 3-21-1965
 3-22-1965
 3-23-1965
 3-24-1965
 3-25-1965
 3-26-1965
 3-27-1965
 3-28-1965
 3-29-1965
 3-30-1965
 3-31-1965
 4-1-1965
 4-2-1965
 4-3-1965
 4-4-1965
 4-5-1965
 4-6-1965
 4-7-1965
 4-8-1965
 4-9-1965
 4-10-1965
 4-11-1965
 4-12-1965
 4-13-1965
 4-14-1965
 4-15-1965
 4-16-1965
 4-17-1965
 4-18-1965
 4-19-1965
 4-20-1965
 4-21-1965
 4-22-1965
 4-23-1965
 4-24-1965
 4-25-1965
 4-26-1965
 4-27-1965
 4-28-1965
 4-29-1965
 4-30-1965
 5-1-1965
 5-2-1965
 5-3-1965
 5-4-1965
 5-5-1965
 5-6-1965
 5-7-1965
 5-8-1965
 5-9-1965
 5-10-1965
 5-11-1965
 5-12-1965
 5-13-1965
 5-14-1965
 5-15-1965
 5-16-1965
 5-17-1965
 5-18-1965
 5-19-1965
 5-20-1965
 5-21-1965
 5-22-1965
 5-23-1965
 5-24-1965
 5-25-1965
 5-26-1965
 5-27-1965
 5-28-1965
 5-29-1965
 5-30-1965
 5-31-1965
 6-1-1965
 6-2-1965
 6-3-1965
 6-4-1965
 6-5-1965
 6-6-1965
 6-7-1965
 6-8-1965
 6-9-1965
 6-10-1965
 6-11-1965
 6-12-1965
 6-13-1965
 6-14-1965
 6-15-1965
 6-16-1965
 6-17-1965
 6-18-1965
 6-19-1965
 6-20-1965
 6-21-1965
 6-22-1965
 6-23-1965
 6-24-1965
 6-25-1965
 6-26-1965
 6-27-1965
 6-28-1965
 6-29-1965
 6-30-1965
 7-1-1965
 7-2-1965
 7-3-1965
 7-4-1965
 7-5-1965
 7-6-1965
 7-7-1965
 7-8-1965
 7-9-1965
 7-10-1965
 7-11-1965
 7-12-1965
 7-13-1965
 7-14-1965
 7-15-1965
 7-16-1965
 7-17-1965
 7-18-1965
 7-19-1965
 7-20-1965
 7-21-1965
 7-22-1965
 7-23-1965
 7-24-1965
 7-25-1965
 7-26-1965
 7-27-1965
 7-

90.0/90.52/NOX

55.74/55.84 Co

2168

$$\frac{7.80}{7.720}$$

System 1281
744

-55.84/55.84 CO

14.8 / 15.00 CVL

4.96 / 4.950

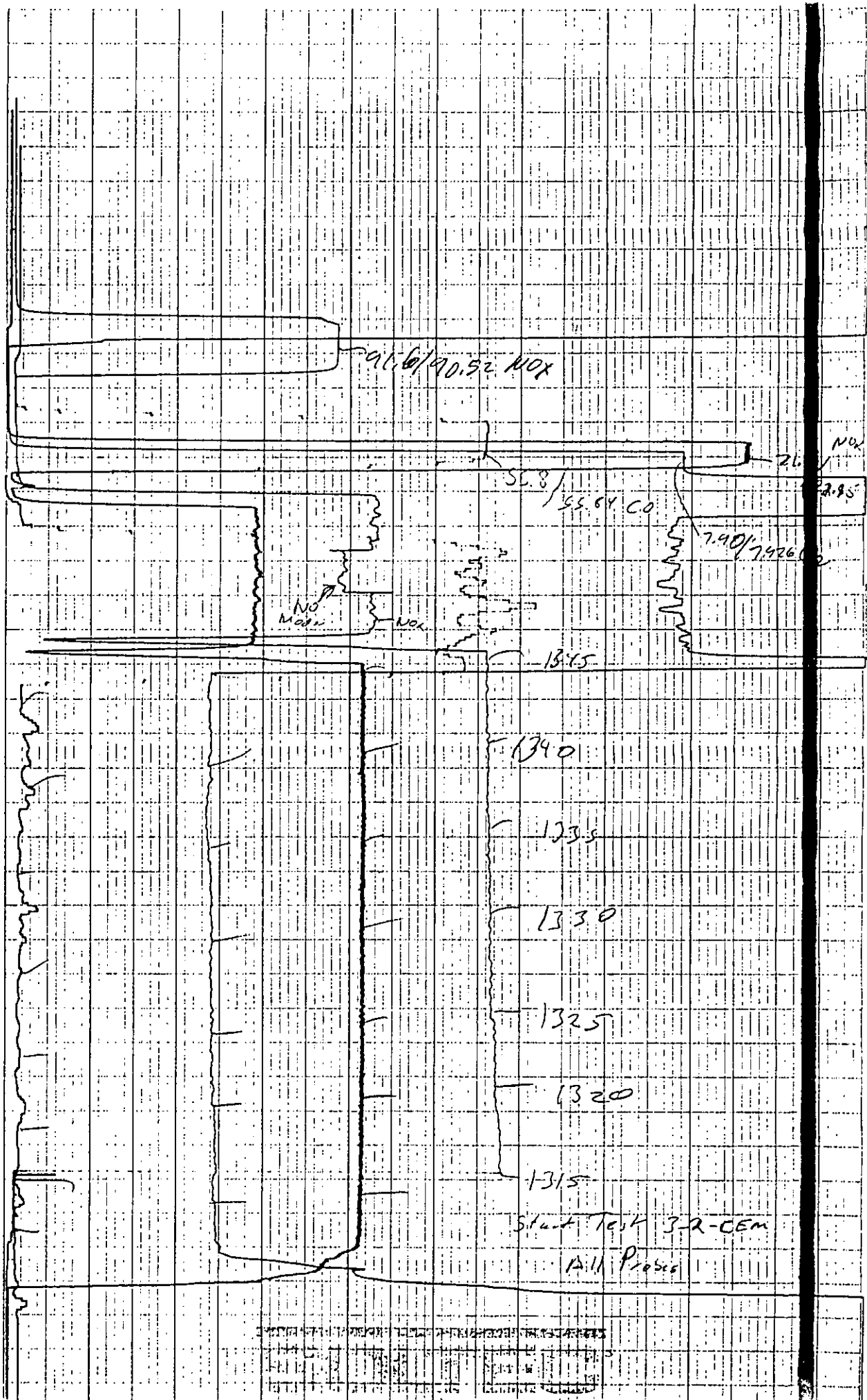
Mode
Nex Plate
Pro En

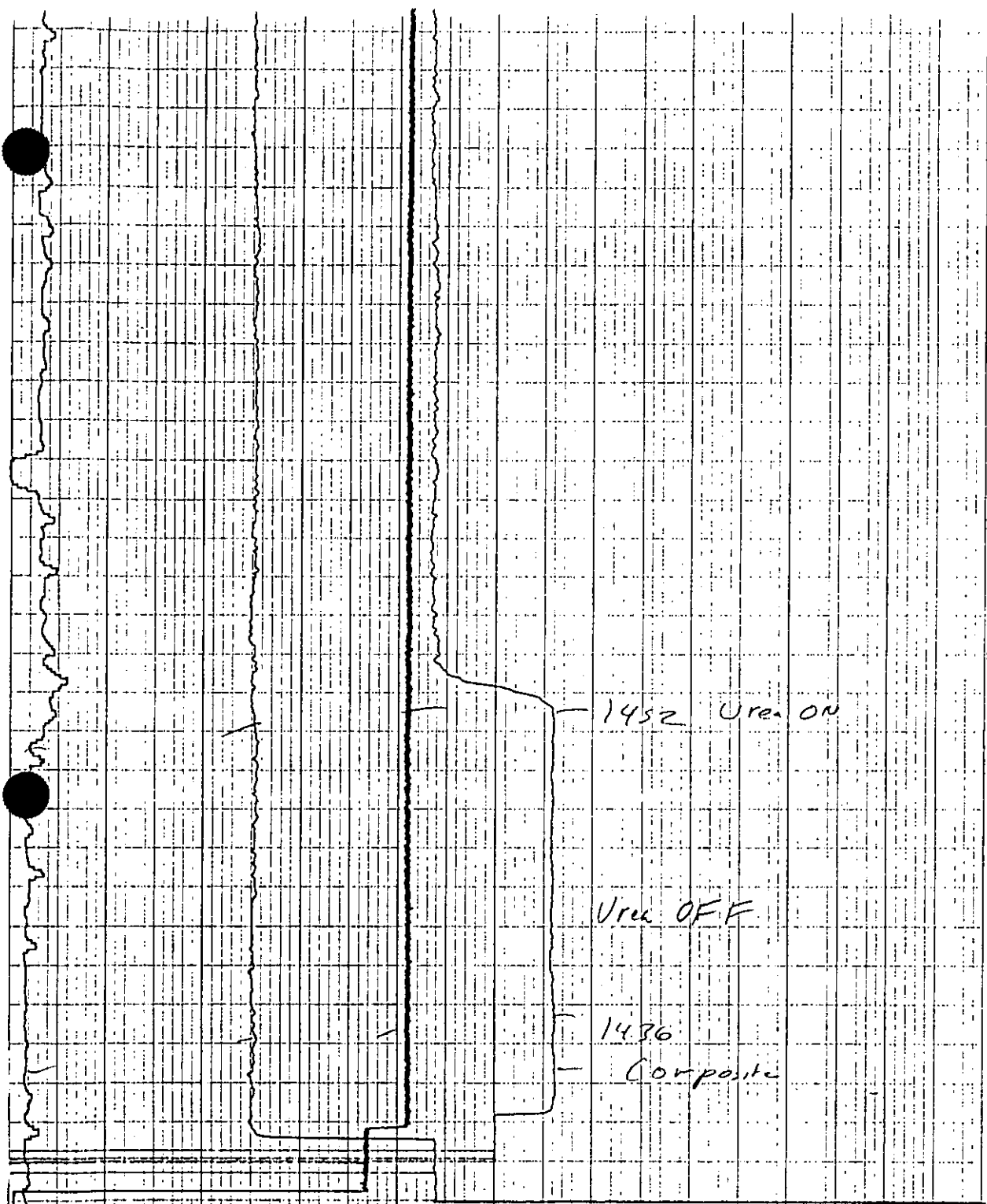
7155

1150

SOURCE CHART NO. ZOI-01-25-20M

SOURCE CHART NO.





0520-10003717/8

SCE / UREA 10-6-72 CHF

Unit 2

DATE	TIME	UNIT	STATUS	REMARKS
10-6-72	1436	Unit 2	Urea OFF	Composite
10-6-72	1452	Unit 2	Urea ON	

0604-10023

060300Z071717.81

1635

1630

1625

1620

1615 Start Test 4.2-CEK
All P. 0.5
Vice ON

56.0/55.8460

Zero

System Span 1605

27.9/27.15

7.85/7.9260

RECEIVED
FBI
JAN 17 1981
CHART NO. 10-25-10N

060300Z071717.81

RESEARCH THERMAL ANALYSIS
THERMAL ANALYSIS
THERMAL ANALYSIS

87.5/90.52 NOX

55.84/55.8400

System Span 17.00

CO₂
21.97%

7.8/7.73 O₂

NO mode

NOX mode

1645

1640

1635

1630

1625

06/03/2017 11:41

06/03/2017 11:41

System Span 1847

55.84/55.84 CO

2158 Co

1845

770/770 W L

1840

1835

1830

1825

1820

1815

Start Test S2-CEM

89.5/10.3 = NOX

55.7/55.84 CO

0.785

770 Co

System Span 1905

1900

SCOTT'S CRISTIAN 7/21/01

7010 / Span
SCE Atlanta Unit 2

151 / 19.98 CO.
5.02 / 4.9-7.3 O₂
7.511
7.926 O₂
22.15
Sel. L₀

New O₂ Cylinder Linearity
10-7-92

NO_x mode
1835 NO_x / NO_x mode

90.75 / 90.52 NO_x

System Span 1.847
55.84 / 55.84 CO₂
719.5 CO₂

1845

710.772 O₂

1846

THE NIST YEAR 2000
1846
1847
1848
1849
1850
1851
1852
1853
1854
1855
1856
1857
1858
1859
1860
1861
1862
1863
1864
1865
1866
1867
1868
1869
1870
1871
1872
1873
1874
1875
1876
1877
1878
1879
1880
1881
1882
1883
1884
1885
1886
1887
1888
1889
1890
1891
1892
1893
1894
1895
1896
1897
1898
1899
1900

38.05/10.57 NOx

49.75/9.75 CO

55.84/35.84 CO

14.75/14.77 CO₂

System Span 900

849 East side

846 West side

RECEIVED
FEDERAL BUREAU OF INVESTIGATION
U.S. DEPARTMENT OF JUSTICE
WASHINGTON, D.C. 20535
NOV 14 1974
CHNR NO 14-15-401

70.0 / Span

SCE Atlanta Unit 2

NO Mole
955 NOx Max

88.25/90.2 NOx

55.84/55.84 CO

14.75/14.75 CO₂

14.75/14.75 O₂

970 CALORIMETER

925

930

925

920

915

910 Start Test G-2 CEM
All Probes

88.25/90.52 NOx

55.84/55.84 CO

14.75/14.75 CO₂

8.14/8.14 SP

114 Poles

88.0 hours Nov

55.8588 CO
4.75 / 14.78 CO2
S. 1.0 S. 1.0

49.24 / 4.97 O2

0000000121/17.81

0000000121/17.81

NO
NO_x

NO_x P-20 12.23

8.75 / 19.52

System Span

55.84 / 55.84 CO

14.70 / 14.70 CO₂

49.1 / 49.7 CO

1200

1155

1130

1115

1100

1035

1130 Start Test 7-2-CEN
NH Probes

88.0 / 10.5 NO_x

55.84 / 55.84 CO

14.75 / 14.75 CO₂
System Span

49.2 / 49.2 CO

Signature Date: 1/3/15

VEA ON 1300

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

NO
NO

NO
1/2

89.25/90.52 NO

SS.84/SS.84 CO

14.7 / 14.98 CO

System Span 1432

1430

4.87 / 14.975 O₂

1425

1420

1415

1410

1405

1400 Start 8-2CEM

Air Probes

Via ON 1410 IN

89.25/90.51 NO

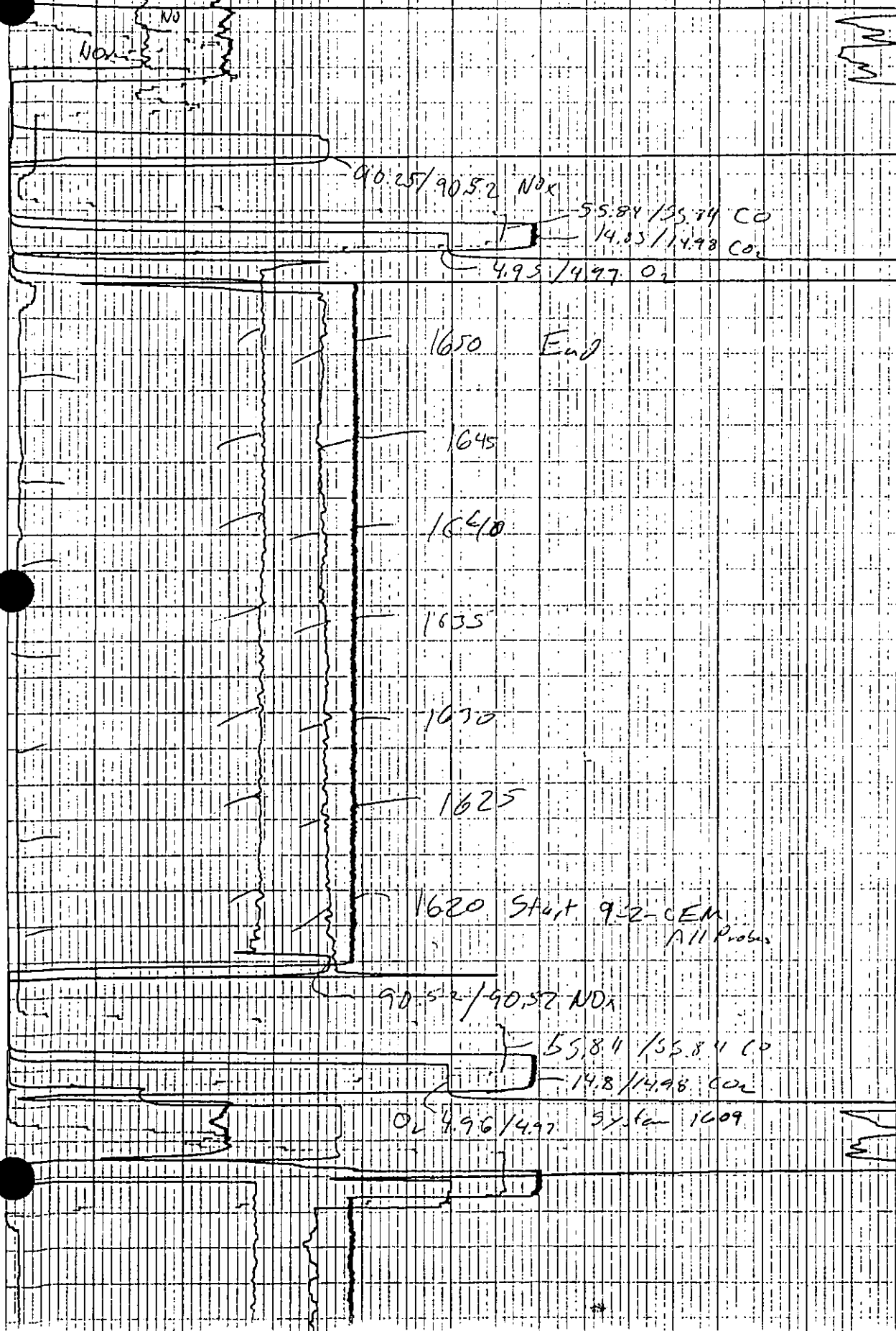
SS.84/SS.84 CO

14.75 / 14.98 CO

System Span 1345

1428 / 1467

10-8-92 SCE Alamitos CHF
CHART NO. 22 10-25-104



40 kW Vrea ON

NO_x 0-100 ppm

Linearity

50.4 / 49.86 ppm

Set 90.520V

10-18-92 SEE A limits

CHK

CHART NO. Z01-01-25-20M

NO_x

W

NOx 0.750 μ m Range

Modu

NO
NOx

12/16

49.5 / 49.96 NOx

55.84 / 55.84 CO

14.7 / 14.96 CO₂

5.00 / 4.97 O₂

1145

1140

1135

Atmospheric

1400

1355

1350

1345 Start

12.2 CFM

87.00/87.90.52 NO_x

Range
NO_x 0-250 ppm

55.84/55.84 CO

14.81/14.98 CO₂

1335

4.99/4.97 O₂

System Span

CHART

UREA

0.6

4.97/4.97 O₂
System Span
1514

03040251717.11

moderate

8545/90.52 NDK

55.7/55.91 CO
14.8/14.98 CO₂

4.97/4.97 O₂

System Cal 1470

1415

1410

1405

1400

1355

12

moderate

03040251717.11

NO Mode

NOx

O₂ 0-25%

87.5 / 90.52 NOx

55.84 / 55.84 CO

14.7 / 14.98 CO₂

5.00 / 4.97 O₂

1550

1545

1540

1535

1530

1525 Start

13-2-CEM

86.5 / 90.52 NOx

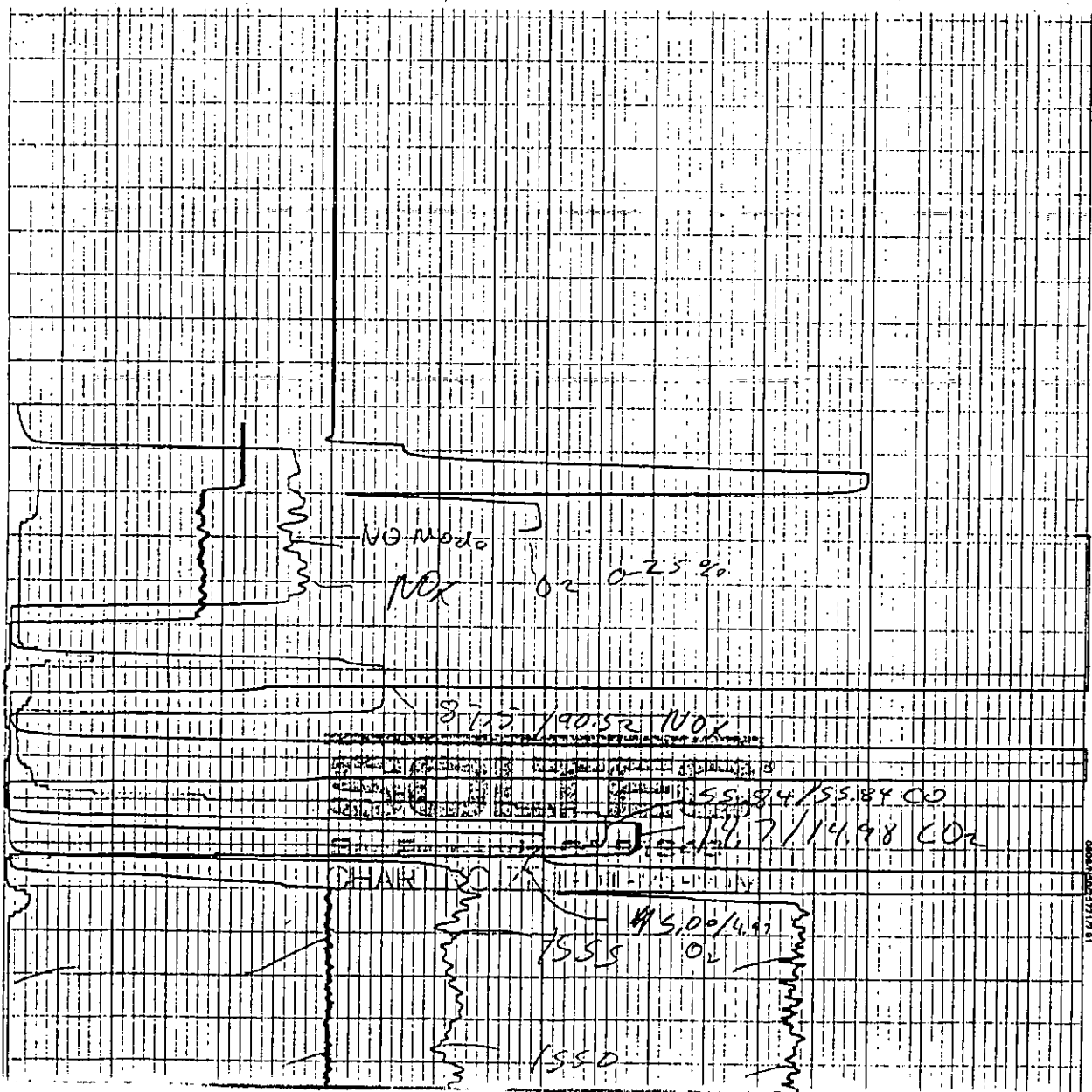
55.84 / 55.84 CO

14.75 / 14.98 CO₂

4.97 / 4.97 O₂

System Span

1514



APPENDIX G
CHAIN OF CUSTODY

CHAIN OF CUSTODY

PROJECT # 10550 OUTSIDE LAB REQUIRED (Y/N) NO SAMPLE DATE 10-18-12
CLIENT/LOCATION GE Energy - 2 PROJECT MANAGER ---
SAMPLE LOCATION CORVUS METHOD(S) 10-100-5.3 TECHNICIAN C.F.
COMPLIANCE TEST (Y/N) NO DATE DUE 11/1/12

[illegible]

CHAIN OF CUSTODY

PROJECT # 12598 OUTSIDE LAB REQUIRED (Y/N) NO SAMPLE DATE 10/16/19
CLIENT/LOCATION SE/Alamosa #2 PROJECT MANAGER EP
SAMPLE LOCATION CSAPH METHOD(S) SEE COMMENTS TECHNICIAN CF
COMPLIANCE TEST (Y/N) Yes DATE DUE ASAP

DATE	TIME	TEST #	SAMPLE DESCRIPTION	CONTAINERS	SAMPLER	COMMENTS
✓ 10/6	:	1-2-PM	Front 1/2	1		SCAMUD 513
✓ 10/8	:	1-2-PM	Back 1/2	1		
✓ 10/16	:	1-2-PM	Ø 5mm filter 45-167	1		
10/11	:	1-2-PM	Front 1/2	1		

DATE	TIME	TEST #	SAMPLE DESCRIPTION	CONTAINERS	SAMPLER	COMMENTS
10/16	:	1-2-PM	Front 1/2	1		SCAGMD 5.3
10/15	:	1-2-PM	Back 1/2	1		
10/16	:	1-2-PM	Back 1/2	1		

PROJECT # 12578
 CLIENT/LOCATION SCE/Highways #2
 SAMPLE LOCATION CSAPH
 COMPLIANCE TEST (Y/N) Yes
 OUTSIDE LAB REQUIRED (Y/N) NO
 SAMPLE DATE 10/16/92
 PROJECT MANAGER EF
 TECHNICIAN CF
 DATE DUE 11/92

CHAIN OF CUSTODY

1	:	4-2-11C	↓	1		
1	:	5-2-11C		1		
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					

TRANSFER OF SAMPLES FROM FIELD SAMPLE CUSTODIAN (FSC):

RELEASED BY (FSC)	DATE AND TIME	RECEIVED BY	DATE AND TIME
[Signature]	10/16/92	Kelly B. [Signature]	10/17/92 05:00
	1/1/92		1/1/92
	1/1/92		1/1/92

ANALYSIS REQUIRED:

Analyze for CH₄ & TMMHC By SCAGMD
 Method 25.2. Report in PPM

CERTIFICATION OF SAMPLE RECEIPT

PROJECT # 12598 OUTSIDE LAB# ATM AA SAMPLE DATE 10/6/92
 SAMPLE LOCATION CSAPH METHOD(S) SCRAMD 25.2 PROJECT MANAGER EF
 COMPLIANCE TEST (Y/N) YES TECHNICIAN CF/RM DATE DUE _____

TEST #	COMPLETE DESCRIPTION
1-2-HC	Tied in bag. Analyze for CH ₄ and TNMHC by SCRAMD 25.2. Report in ppm
2-2-HC	
3-2-HC	
4-2-HC	
5-2-HC	
	Please return ^{these} samples to Carnot. Thank you.
	PO#9018

CHAIN OF CUSTODY PRIOR TO SHIPMENT:

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
<i>Kelly Borkenhagen</i>	10/7/92	10:00		1/1	:
	1/1	:		1/1	:
	1/1	:		1/1	:

OUTSIDE LAB INFORMATION

SAMPLES SHIPPED TO ATM AA
21354 NOROFF STREET, Suite 113
CHASWORTH, CA 91311
 PHONE: (818) 718-6070

CARNOT SHIPPER Rite-O-Way
 DATE 10/7/92
 CARRIER # 457 5009
 AIR BILL # NA

RECIPIENT *Kenneth P. Peter*
 COMPANY ATM AA
 DATE 10/7/92

CHAIN OF CUSTODY

PROJECT # 12598 OUTSIDE LAB REQUIRED (Y/N) Yes SAMPLE DATE 10/17/92
 CLIENT/LOCATION SE/Alameda PROJECT MANAGER EF
 SAMPLE LOCATION CSAPM METHOD(S) SC96MD 25.2 TECHNICIAN CF
 COMPLIANCE TEST (Y/N) Yes DATE DUE _____

DATE	TIME	TEST #	SAMPLE DESCRIPTION	CONTAINERS	SAMPLER	COMMENTS
10/17	:	6-27K	Trucker Bay	1		
1	:	7-27K		1		
1	:	8-27K		1		
1	:	9-27K		1		
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					
1	:					

TRANSFER OF SAMPLES FROM FIELD SAMPLE CUSTODIAN (FSC):

RELEASED BY (FSC)	DATE AND TIME	RECEIVED BY	DATE AND TIME
<u>[Signature]</u>	<u>10/17/92</u>	<u>[Signature]</u>	<u>10/18/92</u>
	<u>1 1</u>		<u>1 1</u>
	<u>1 1</u>		<u>1 1</u>

ANALYSIS REQUIRED:

Analyze for CH₄ & TNNMHC
using 25.2 Report in PPM

CERTIFICATION OF SAMPLE RECEIPT

PROJECT # 12598 OUTSIDE LAB: Atm AA SAMPLE DATE 10, 7, 92
 SAMPLE LOCATION CSAPM METHOD(S) SCAQM 25.1 PROJECT MANAGER EF
 COMPLIANCE TEST (Y/N) YES TECHNICIAN CF DATE DUE 10/10/92

TEST #	COMPLETE DESCRIPTION
822-1 6-2-HC	Jedder bag for CH ₄ + TNMHC analysis by SCAQM 25.1
-2 7-2-HC	↓
-3 8-2-HC	↓
-4 9-2-HC	↓
	Please report in ppm.
	Please return these samples to Carnot.
	PO# 9022

CHAIN OF CUSTODY PRIOR TO SHIPMENT:

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
<i>Kelly Buchanan</i>	10/8/92	6:00a		/ /	:
	/ /	:		/ /	:
	/ /	:		/ /	:

OUTSIDE LAB INFORMATION

SAMPLES SHIPPED TO Atm AA CARNOT SHIPPER KB
21354 Nordhoff Street; Suite 113 DATE 10/8/92
Chatsworth, CA 91311 CARRIER # Rite-O-Way
 PHONE: (818) 718-6070 AIR BILL # ACT# 5009
 RECIPIENT James P. Riteo
 COMPANY Atm AA, Inc.
 DATE 10/8/92

CHAIN OF CUSTODY

PROJECT # 1018 OUTSIDE LAB REQUIRED (Y/N) YES SAMPLE DATE 10/18/11
 CLIENT/LOCATION SEA / HAWAII #2 PROJECT MANAGER E.P.
 SAMPLE LOCATION CLAP METHOD(S) PS 2 TECHNICIAN CE
 COMPLIANCE TEST (Y/N) YES DATE DUE _____

DATE	TIME	TEST #	SAMPLE DESCRIPTION	CONTAINERS	SAMPLER	COMMENTS
10/18	:	1024	Beaker 120	1		
10/18	:	1025	1			
10/18	:	1026				
10/18	:	1027	V			
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					

TRANSFER OF SAMPLES FROM FIELD SAMPLE CUSTODIAN (FSC):

RELEASED BY (FSC)	DATE AND TIME	RECEIVED BY	DATE AND TIME
<i>[Signature]</i>	10/19/11 X	<i>Kelly H. [Signature]</i>	10/19/11 X
	/ / :		/ / :
	/ / :		/ / :

ANALYSIS REQUIRED: _____

15991 Red Hill Ave., Suite 110, Tustin, California 92680-7388 (714) 259-9520 • FAX (714) 259-0372

CERTIFICATION OF SAMPLE RECEIPT

PROJECT # 1259.9 OUTSIDE LAB: Atm. AA SAMPLE DATE 10/8/92
SAMPLE LOCATION _____ METHOD(S) SCARM 25.1 PROJECT MANAGER EF
COMPLIANCE TEST (Y/N) YES for DRY 1 IN/100 TECHNICIAN CF
DATE DUE 10/10/92

TEST #	COMPLETE DESCRIPTION
10-2-HC	Tedder bug for CHA + TMHC by SCARD 25.1. Please report in Apr.
11-2-HC	
12-2-HC	
13-2-HC	
	PD# 9023 Please return these samples to Carnot

CHAIN OF CUSTODY PRIOR TO SHIPMENT:

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
Kelly B. ...	10/19/92	8:00	DW. ...	10/19/92	9:30
DW. ...	10/19/92	9:30		1 1	:
	1 1	:		1 1	:

OUTSIDE LAB INFORMATION

SAMPLES SHIPPED TO John ARA
21354 Nardoff; Suite 113
Ontario, CA 91311
PHONE: (909 718 - 6070

CARNOT SHIPPER 1
DATE 10 19 1972
CARRIER # RITE-O-WAY
AIR BILL # ACCT # 5009

RECIPIENT Xerox Data
COMPANY AtMAA, Inc.
DATE 10/9/92

CARNOT

CHAIN OF CUSTODY

PROJECT # 12598 OUTSIDE LAB REQUIRED (Y/N) NO SAMPLE DATE 10/17/10
 CLIENT/LOCATION SCE/Alamitos PROJECT MANAGER EF
 SAMPLE LOCATION CSAPV1 METHOD(S) Draft 207.1 TECHNICIAN LF
 COMPLIANCE TEST (Y/N) Yes DATE DUE ASAP

DATE	TIME	TEST #	SAMPLE DESCRIPTION	CONTAINERS	SAMPLER	COMMENTS
10/17	:	824	Probe → IMPV	1		
10/17	:	924	Probe → IMPV	1		
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					

TRANSFER OF SAMPLES FROM FIELD SAMPLE CUSTODIAN (FSC):

RELEASED BY (FSC)	DATE AND TIME	RECEIVED BY	DATE AND TIME
<u>[Signature]</u>	<u>10/17/10</u>	<u>Andy K. House</u>	<u>10/18/10 29:00</u>
	/ / :		/ / :
	/ / :		/ / :

ANALYSIS REQUIRED: Analyse for NH₃ using Draft SCAMD 207.1
(report total volume and NH₃ in ppm)

CHAIN OF CUSTODY

PROJECT # 12598 OUTSIDE LAB REQUIRED (Y/N) NO SAMPLE DATE 10/18/92
 CLIENT/LOCATION SCE / Alameda #2 PROJECT MANAGER EF
 SAMPLE LOCATION _____ METHOD(S) SAGMD DRAFT 207 TECHNICIAN CF
 COMPLIANCE TEST (Y/N) YES DATE DUE 10/6/92

DATE	TIME	TEST #	SAMPLE DESCRIPTION	CONTAINERS	SAMPLER	COMMENTS
10/8	:	10-2-14	Probe → IMPROVE	1		
10/8	:	11-2-10 ₂₃	↓	1		
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					
/	:					

TRANSFER OF SAMPLES FROM FIELD SAMPLE CUSTODIAN (FSC):

RELEASED BY (FSC)	DATE AND TIME	RECEIVED BY	DATE AND TIME
<u>[Signature]</u>	<u>10/18/92</u>	<u>Jody R. Hone</u>	<u>10/18/92 13:10</u>
	1 1 :		1 1 :
	1 1 :		1 1 :

ANALYSIS REQUIRED: Analysis for NH₃ using Nessler reagents.
Report in P.P.M.