Background Report Reference

AP-42 Section Number: 1.4

Background Chapter: 2

Reference Number: 12

Title: Source Test Report for Urea Permit Compliance Testing Redondo Beach Generating Stating Units 5 and 6

Sierra Environmental Engineering, Inc.

Sierra Environmental Engineering, Inc.

October 1992

AP-42 # 12
Section 1.4
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(18)

SIERRA ENVIRONMENTAL ENGINEERING, INC.
Combustion and Environmental Engineers

SOURCE TEST REPORT
FOR
UREA PERMIT COMPLIANCE TESTING
REDONDO BEACH GENERATING STATION
UNITS 5 AND 6
SEPTEMBER 21 - OCTOBER 02, 1992
APPLICATION NUMBERS R-236483 AND R-236484

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SIERRA 92364-100

DECEMBER 17, 1992

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SECTION 1.0

PROJECT OVERVIEW

1.1 INTRODUCTION

Sierra Environmental Engineering, Inc. (Sierra) was retained by Southern California Edison (SCE) to perform gaseous emission testing on Units 5 and 6 at the SCE Redondo Beach Generating Station in Redondo Beach, California. The objective of the test program is to quantify the effect of urea injection on various stack emissions. These tests were to fulfill the requirements of Sections 11B and 11C(b) of the South Coast Air Quality Management District (SCAQMD) Permit to Construct Application Number R-236483 for Unit 5 and R-236484 for Unit 6. These permits are located in Appendix A.1.

1.2 TEST SUMMARY

Each unit was tested at three load points:

(1) Unit 5 was tested at 40 MW, 140 MW and 167 MW.
(2) Unit 6 was tested at 42 MW, 140 MW and 172 MW.

At each load, each unit was tested with and without urea injection. Gaseous emissions of oxides of nitrogen (NO_x), carbon monoxide (CO), and oxygen (O_2) were measured at the Air Preheater (APH) Inlet. Ammonia (NH_3) and reactive organic gases (ROG), were measured in the flue gas duct downstream of the APH just prior to the stack. Duplicate tests were conducted at each load point and each condition. All testing was performed between September 21 through October 2, 1992, while the boiler was burning natural gas fuel. Table 1.1 summarizes the tests and procedures. The source test results for Units 5 and 6 have been summarized in Tables 1.2 and 1.3.

1.3 DOCUMENT OUTLINE

Section 2.0 presents test result for both Units 5 and 6. Section 3.0 describes the site and the test methods performed at the site. Section 4.0 addresses the Quality Assurance/Quality Control program maintained by Sierra for their project.

TABLE 1.1

SCE REDONDO BEACH

SUMMARY OF TEST METHODS

PARAMETER	METHOD	COMMENTS
Oxides of Nitrogen (NO_x)	SCAQMD 100.1	Duplicate 30 minute tests at three load points and two conditions at the APH Inlet using the Sierra Test Trailer continuous electronic analyzers
Oxygen (O_2)	SCAQMD 100.1	Concurrent with NO_x testing.
Carbon Monoxide (CO)	SCAQMD 100.1	Concurrent with NO_x testing.
Ammonia (NH_3)	SCAQMD DRAFT	Duplicate 30 minute tests at three load points during urea injection at the APH Outlet; Analysis by Nessler Colorimetry Spectrophotometry
Reactive Organic Gases (ROG)	SCAQMD 25.2	Duplicate tedlar bag samples at three load points during urea conditions at the APH Outlet; Analysis by TCA/FID

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TABLE 1.2
SOURCE TEST RESULTS
SCE REDONDO BEACH GENERATING STATION - UNIT 5
NATURAL GAS FUEL

	NET LOAD 167 MW		NET LOAD 140 MW		NET LOAD 40 MW	
	UREA OFF	UREA ON	UREA OFF	UREA ON	UREA OFF	UREA ON
UREA FLOW (gpm)	0	2.20	0	1.32	0	0.48
TEST TRAILER READINGS (1)						
NO_x (ppm)	166	108	82	62	27	16
NO_x (ppm @ 3% of O_2)	160 34%	105	83 25%	63	43 42%	25
CO (ppm)	218	246	91	100	25	31
CO (ppm @ 3% of O_2)	209 13%	237	92 10%	101	39 23%	48
O_2 (%)	2.2	2.4	3.2	3.2	9.6	9.4
ROG (TEDLAR BAG ANALYSIS)						
METHANE (ppm)	ND @ 1	ND @ 1	ND @ 1	ND @ 1	ND @ 1	1.16
METHANE (ppm @ 3% O_2)	ND @1.4	ND @1.4	ND @1.4	ND @1.4	ND @2.4	2.6
TGNMO (ppm)	20.1	16.8	9.51	16.0	10.8	10.5
TGNMO (ppm @ 3% O_2)	27.4 15%	23.2	13.5 65%	22.3	25.4 9%	23.1
OXYGEN (%)	7.82	7.93	8.25	8.11	13.3	12.8%
AMMONIA SLIP (2)						
NH_3 (ppm)	--	9.8	--	9.3	--	8.1
NH_3 (ppm @ 3%O_2	--	12.8	--	12.9	--	16.4

NOTE: (1) Measured at APH inlet
(2) Measured at flue gas duct prior to stack
ND means non-detectable
Entries were based on one hour average
Appendix A.2 - Sample Calculations

TABLE 1.3
SOURCE TEST RESULTS
SCE REDONDO BEACH GENERATING STATION - UNIT 6
NATURAL GAS FUEL

	NET LOAD 172 MW		NET LOAD 140 MW		NET LOAD 41 MW	
	UREA OFF	UREA ON	UREA OFF	UREA ON	UREA OFF	UREA ON
UREA FLOW (gpm)	0	2.4	0	1.4	0	0.44
TEST TRAILER READINGS						
NO_x (ppm)	139	98	74	57	40	25
NO_x (ppm @ 3% of O_2)	143	100	82	63	64	39
CO (ppm)	199	225	179	168	29	35
CO (ppm @ 3% of O_2)	203	231	199	187	47	55
OXYGEN (%)	3.4	3.5	4.7	4.8	9.8	9.6
ROG (TEDLAR BAG ANALYSIS)						
METHANE (ppm)	7.40	7.49	4.09	4.22	7.22	8.32
METHANE (ppm @ 3% O_2)	10.6	10.7	6.30	6.50	19.0	21.1
TGNMO (ppm)	12.8	10.6	13.1	13.4	11.8	10.9
TGNMO (ppm @ 3% O_2)	18.3	15.1	20.1	20.3	31.1	27.6
O_2 (%)	8.39	8.37	9.23	9.06	14.1	13.85
AMMONNIA SLIP (2)						
NH_3 (ppm)	--	13.5	--	12.5	--	8.9
NH_3 (ppm @ 3% O_2)	--	18.5	--	18.3	--	17.8
O_2 (%)						

NOTE: (1) Measured at APH inlet.
(2) Measured at flue gas duct prior to stack.
ND means non-detect
Entries were based on one hour average
Appendix A.2 - Sample calculations

SECTION 2.0

TEST RESULTS

This section expands the test results presented in Table 1.2 and 1.3 in more detail. Tables 2.1 through 2.3 present test results for Unit 5 at 167 NMW, 140 NMW and 40 NMW. Tables 2.4 through 2.6 present test results for Unit 6 at 172 NMW, 140 NMW and 41 NMW.

TABLE 2.1
REDONDO #5 TEST RESULTS
OCTOBER 1, 1992

UREA OFF - 167 NMW

PARAMETER	UNIT	TEST #3	TEST #4	AVERAGE
NOx	ppmv	165	167	166
NOx @ 3% O2	ppmv	159	160	160
CO	ppmv	215	220	218
CO @ 3% O2	ppmv	207	210	209
OXYGEN	%	2.30	2.17	2.23
CH4	ppmv	ND@1.0	ND@1.0	ND@1.0
CH4 @ 3% O2*	ppmv	ND@1.4	ND@1.4	ND@1.4
TGNMO	ppmv	18.7	21.4	20.1
TGNMO @ 3%O2*	ppmv	25.7	29.1	27.4

UREA ON - 167 NMW
(total flow =2.2 GPM)

PARAMETER	UNIT	TEST #1	TEST #2	AVERAGE
NOx	ppmv	107	110	108
NOx @ 3% O2	ppmv	104	106	105
CO	ppmv	295	197	246
CO @ 3% O2	ppmv	284	190	237
OXYGEN	%	2.33	2.47	2.40
CH4	ppmv	ND@1.0	ND@1.0	ND@1.0
CH4 @ 3% O2*	ppmv	ND@1.4	ND@1.4	ND@1.4
TGNMO	ppmv	15.7	17.8	16.8
TGNMO @ 3%O2*	ppmv	21.5	24.8	23.2
NH3	ppmv	10.4	9.2	9.8
NH3 @ 3% O2**	ppmv	13.4	12.2	12.8

*Calculations based on O2 analysis from sample bags.
**Calculations based on O2 readings at NH3 sampling location.

. TABLE 2.2
REDONDO #5 TEST RESULTS
OCTOBER 2, 1992

UREA OFF - 140 NMW

PARAMETER	UNIT	TEST #3	TEST #4	AVERAGE
NOx	ppmv	83	81	82
NOx @ 3% O2	ppmv	84	82	82
CO	ppmv	70	112	91
CO @ 3% O2	ppmv	71	113	92
OXYGEN	%	3.23	3.23	3.23
CH4	ppmv	ND@1.0	ND@1.0	ND@1.0
CH4 @ 3% O2*	ppmv	ND@1.4	ND@1.4	ND@1.4
TGNMO	ppmv	9.5	9.52	9.51
TGNMO @ 3%O2*	ppmv	13.2	13.7	13.5

UREA ON - 140 NMW
(total flow =1.32 GPM)

PARAMETER	UNIT	TEST #1	TEST #2	AVERAGE
NOx	ppmv	62	62	62
NOx @ 3% O2	ppmv	63	63	63
CO	ppmv	110	90	100
CO @ 3% O2	ppmv	111	91	101
OXYGEN	%	3.2	3.2	3.2
CH4	ppmv	ND@1.0	ND@1.0	ND@1.0
CH4 @ 3% O2*	ppmv	ND@1.4	ND@1.4	ND@1.4
TGNMO	ppmv	16.7	15.2	16
TGNMO @ 3%O2*	ppmv	23.2	21.4	22.3
NH3	ppmv	11.7	6.9	9.3
NH3 @ 3% O2**	ppmv	16.1	9.6	12.9

*Calculations based on O2 analysis from sample bags.
**Calculations based on O2 readings at NH3 sampling location.

TABLE 2.3
REDONDO #5 TEST RESULTS
SEPTEMBER 29, 1992

UREA OFF - 40 NMW

PARAMETER	UNIT	TEST #3	TEST #4	AVERAGE
NOx	ppmv	27	27	27
NOx @ 3% O2	ppmv	43	42	43
CO	ppmv	25	25	25
CO @ 3% O2	ppmv	39	39	39
OXYGEN	%	9.6	9.6	9.6
CH4	ppmv	ND@1.0	ND@1.0	ND@1.0
CH4 @ 3% O2*	ppmv	ND@2.4	ND@2.3	ND@2.4
TGNMO	ppmv	11.2	10.4	10.8
TGNMO @ 3%O2*	ppmv	26.7	24.2	25.4

UREA ON - 40 NMW
(total flow = 0.48 GPM)

PARAMETER	UNIT	TEST #1	TEST #2	AVERAGE
NOx	ppmv	16	16	16
NOx @ 3% O2	ppmv	25	25	25
CO	ppmv	30	32	31
CO @ 3% O2	ppmv	46	50	48
OXYGEN	%	9.3	9.5	9.4
CH4	ppmv	1.19	1.13	1.16
CH4 @ 3% O2*	ppmv	2.7	2.4	2.6
TGNMO	ppmv	9.85	11.1	10.5
TGNMO @ 3%O2*	ppmv	22.3	23.9	23.1
NH3	ppmv	7.9	8.2	8.1
NH3 @ 3% O2**	ppmv	15.9	16.8	16.4

*Calculations based on O2 analysis from sample bags.
**Calculations based on O2 readings at NH3 sampling location.

TABLE 2.4
REDONDO #6 TEST RESULTS
SEPTEMBER 21, 1992

UREA OFF - 172 NMW

PARAMETER	UNIT	TEST #1	TEST #2	AVERAGE
NOx	ppmv	141	138	139
NOx @ 3% O2	ppmv	145	140	143
CO	ppmv	188	210	199
CO @ 3% O2	ppmv	192	214	203
OXYGEN	%	3.43	3.33	3.38
CH4	ppmv	7.3	7.49	7.4
CH4 @ 3% O2*	ppmv	10.2	10.9	10.6
TGNMO	ppmv	14.0	11.6	12.8
TGNMO @ 3%O2*	ppmv	19.7	16.9	18.3

UREA ON -172 NMW
(total flow =2.4 GPM)

PARAMETER	UNIT	TEST #3	TEST #4	AVERAGE
NOx	ppmv	94	101	98
NOx @ 3% O2	ppmv	96	104	100
CO	ppmv	250	200	225
CO @ 3% O2	ppmv	255	206	231
OXYGEN	%	3.37	3.53	3.45
CH4	ppmv	8.12	6.85	7.49
CH4 @ 3% O2*	ppmv	11.4	10.0	10.7
TGNMO	ppmv	10.2	11.0	10.6
TGNMO @ 3%O2*	ppmv	14.3	16.0	15.0
NH3	ppmv	14.3	12.7	13.5
NH3 @ 3% O2**	ppmv	19.4	17.5	18.5

*Calculations based on O2 analysis from sample bags.
**Calculations based on O2 readings at NH3 sampling location.

TABLE 2.5
REDONDO #6 TEST RESULTS
SEPTEMBER 22, 1992

UREA OFF - 140 NMW

PARAMETER	UNIT	TEST #1	TEST #2	AVERAGE
NOx	ppmv	73	74	74
NOx @ 3% O2	ppmv	81	82	82
CO	ppmv	187	172	179
CO @ 3% O2	ppmv	206	191	199
OXYGEN	%	4.67	4.8	4.74
CH4	ppmv	3.87	4.3	4.09
CH4 @ 3% O2*	ppmv	5.9	6.6	6.3
TGNMO	ppmv	12.4	13.8	13.1
TGNMO @ 3%O2*	ppmv	18.9	21.3	20.1

UREA ON -140 NMW
(total flow =1.4 GPM)

PARAMETER	UNIT	TEST #3	TEST #4	AVERAGE
NOx	ppmv	57	56	57
NOx @ 3% O2	ppmv	63	63	63
CO	ppmv	175	160	168
CO @ 3% O2	ppmv	195	178	187
OXYGEN	%	4.83	4.83	4.8
CH4	ppmv	4.1	4.43	4.22
CH4 @ 3% O2*	ppmv	6.2	6.7	6.5
TGNMO	ppmv	12.9	13.9	13.4
TGNMO @ 3%O2*	ppmv	19.4	21.1	20.3
NH3	ppmv	13.0	12	12.5
NH3 @ 3% O2**	ppmv	19.1	17.5	18.3

*Calculations based on O2 analysis from sample bags.
**Calculations based on O2 readings at NH3 sampling location.

TABLE 2.6
REDONDO #6 TEST RESULTS
SEPTEMBER 24, 1992

UREA OFF - 41 NMW

PARAMETER	UNIT	TEST #3	TEST #4	AVERAGE
NOx	ppmv	40	39	40
NOx @ 3% O2	ppmv	65	63	64
CO	ppmv	28	30	29
CO @ 3% O2	ppmv	45	48	47
OXYGEN	%	9.8	9.87	9.84
CH4	ppmv	8.51	5.92	7.22
CH4 @ 3% O2*	ppmv	22.7	15.4	19.0
TGNMO	ppmv	12.3	11.3	11.8
TGNMO @ 3%O2*	ppmv	32.9	29.3	31.1

UREA ON - 41 NMW
(total flow = 0.44 GPM)

PARAMETER	UNIT	TEST #1	TEST #2	AVERAGE
NOx	ppmv	24	25	25
NOx @ 3% O2	ppmv	38	40	39
CO	ppmv	35	35	35
CO @ 3% O2	ppmv	56	55	55
OXYGEN	%	9.73	9.5	9.62
CH4	ppmv	8.84	7.8	8.32
CH4 @ 3% O2*	ppmv	22.0	20.2	21.1
TGNMO	ppmv	11.0	10.7	10.9
TGNMO @ 3%O2*	ppmv	27.3	27.8	27.6
NH3	ppmv	9	8.7	8.9
NH3 @ 3% O2**	ppmv	18	17.6	17.8

*Calculations based on O2 analysis from sample bags.
**Calculations based on O2 readings at NH3 sampling location.

SECTION 3.0

SCE REDONDO BEACH UNITS 5 AND 6

SITE DESCRIPTION AND TEST METHODS

3.1 BOILER DESCRIPTION

SCE Redondo Beach Units 5 and 6 are gas or oil-fired steam-electric units with a nameplate rating of 175MW. They have a steam capacity of 1,140,000 LB/HR at design conditions of 1990 PSIG, 1000 ^{O}F superheat, and 1000 ^{O}F reheat steam temperature.

The furnaces are fired with 16 combination gas/oil B&W burners arranged in a four-by-four matrix on the front wall. Gas is introduced radially inward through a single ring located adjacent to each burner throat. Oil is injected through a mechanically atomized gun positioned in the center of each burner. During gas fuel operation, the oil guns are retracted to the back of the windbox. Combustion air enters each burner through adjustable vane-type air registers. The register vanes are slightly curved to impart swirl to the air; swirl can be increased by throttling the registers. The draft system comprises forced and induced draft fans and the furnace is operated with slightly negative pressure.

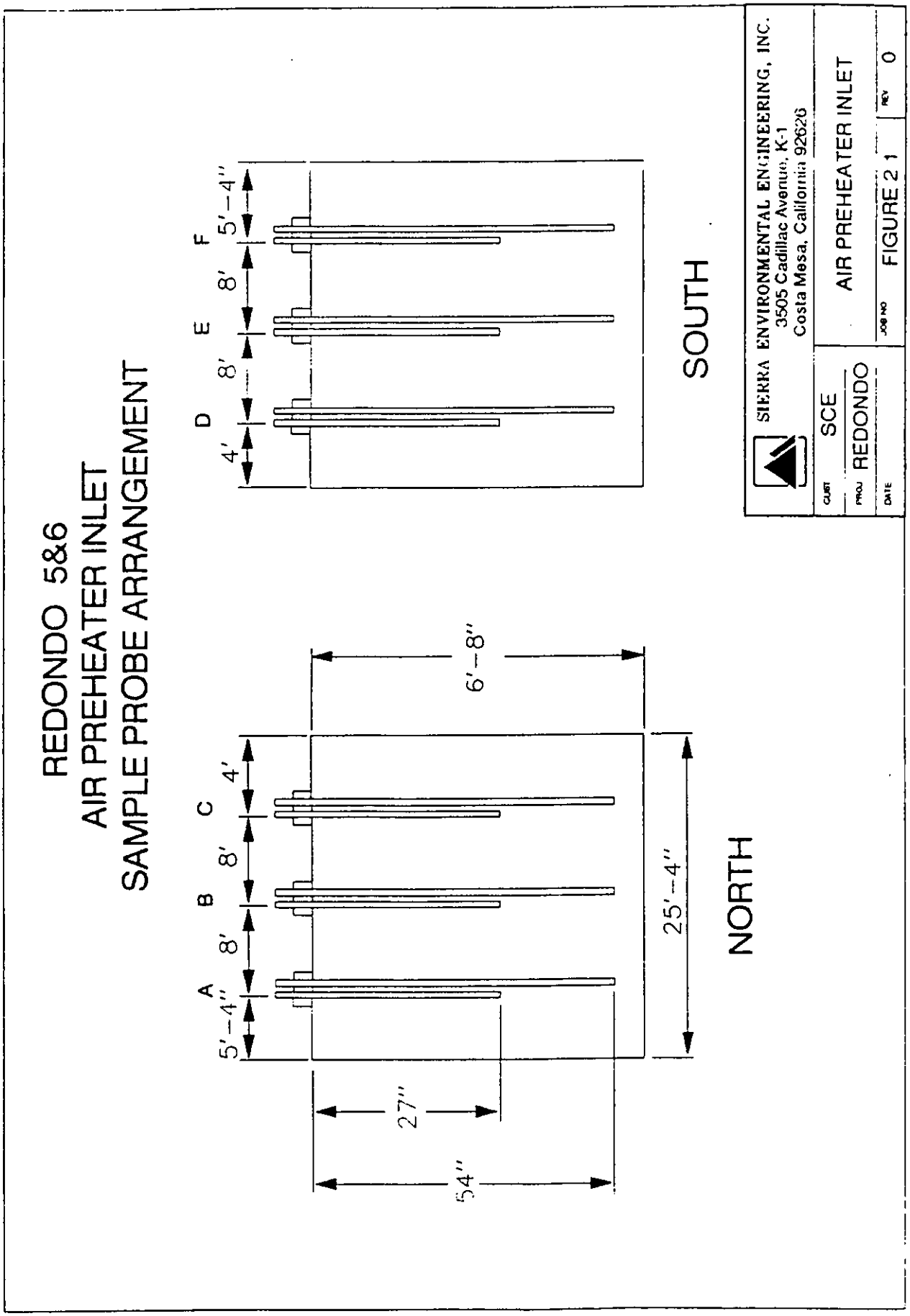
The boilers are equipped with flue gas recirculation (FGR) to the furnace hopper which is intended for steam temperature control. The flue gas is extracted from the boiler exhaust upstream of both air preheaters. The flue gas is introduced into the furnace through slots between the waterwall tubes located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

3.2 SAMPLING LOCATIONS

Figure 3.1 illustrates the Air Preheater (APH) Inlet sampling locations. Gaseous emissions of NO_x, CO and O_2 were sampled at the APH Inlet. At this location there are two flue gas ducts each with 3 sampling ports. Two probes were installed in each port for a total of 12 sampling probes. Each probe in the sampling analysis was connected by a sample line to a manifold in the Sierra Test Trailer where they were composited into a single line, which was connected to the continuous electronic analyzers.

FIGURE 3.1

SCE REDONDO # 5 and # 6 AIR PREHEATER INLET SAMPLE PROBE ARRANGEMENT



Ammonia and ROG were sampled from the flue gas duct just prior to the stack through a single port (Figure 3.2). A 3 point traverse of the duct was performed to obtain a representative sample.

3.3 CONTINUOUS EMISSION MONITORING: NO_x, CO, O_2 - SCAQMD METHOD 100.1

Gaseous emissions of NO_x, CO, and O_2 were measured continuously over two 30 minute test periods using a sampling manifold and electronic instrumentation following CARB Method 100 and SCAQMD Method 100.1 procedures. A description of the continuous analyzers used in the Sierra Test Trailer are presented in Table 3.1. Figure 3.3 is a schematic of the sampling manifold and continuous monitoring system.

Flue gas was extracted from a twelve point array of probes located on APH Inlet ducts as shown in Figure 3.1. Lines from each of the individual sample probes were manifolded together in the Sierra Test Trailer. The flow from each line is controlled by a series of valves and rotameters to ensure a composite sample is taken. The composited gas sample was drawn by a Teflon-lined diaphragm pump through a Hankison 2 pass dryer/condenser system. The clean, dry sample gas (~35 ^{o}F) was then transported to the continuous analyzer system through an unheated 3/8" Teflon line and a Finite Filter (S-E series, grade 2, 99.9999%, 0.1 micron). A series of flowmeters, valves, and regulators maintain constant flow and pressure through the system.

Point by point leak-checks were performed at the beginning and end of the test program on the entire gaseous sampling system by disconnecting the sample line from each probe and plugging the end of the line. A leak-check was successful only if pressure at the analyzer system and flow through the rotameters to the individual analyzers all drop to zero.

Initial analyzer calibrations were performed at the start of the test period by introducing zero and span gases to each analyzer and making the necessary adjustments. A calibration check was also completed at the end of the test and adjustments (if necessary) to the analyzers were made in preparation for another test.

Calibrations of the continuous analyzers were performed using EPA Protocol 1 calibration gases ($\pm$1 percent) for criteria pollutant analysis (i.e., NO_x and CO) and certified calibration gases ($\pm$1 percent) for fixed gas analysis (i.e., O_2). All pertinent data (date, time, test locations, analyzer range, calibration gas value) was recorded on both the field data sheets and continuous Western Graphtec 3665 strip charts in the field.

PERMIT TO CONSTRUCT

9150 FLAIR DRIVE, EL MONTE, CALIFORNIA 91731

This Permit to Construct shall serve as a temporary Permit to Operate provided the Executive Officer is given prior notice of such intent to operate.

This Permit to Construct will become invalid if the Permit to Operate is denied or if this application is cancelled. THIS PERMIT TO CONSTRUCT SHALL EXPIRE ONE YEAR FROM THE DATE OF ISSUANCE unless an extension is granted by the Executive Officer.

By: _____
RAQUEL M. PUERTA
Principal Office Assistant

RP/mb

B) FUEL OIL ADDITIVE SYSTEM

a. IF THE FUEL OIL ADDITIVE SYSTEM FAILS TO MAINTAIN THE SPECIFIED FEED RATE RANGE, REPAIRS SHALL BE MADE AS EXPEDITIOUSLY AS POSSIBLE, INCLUDING SCHEDULING WORK ON WEEKENDS AND HOLIDAYS.

b. IF REPAIRS ARE NOT COMPLETED WITHIN 48 HOURS, THE AFFECTED UNIT WILL BE SWITCHED TO NATURAL GAS FUEL PROVIDED IT IS AVAILABLE.

20. RECORDS SHALL BE MAINTAINED TO PROVE COMPLIANCE WITH THE ABOVE LISTED CONDITIONS IN A FORMAT APPROVED IN WRITING BY THE DIRECTOR OF ENFORCEMENT OF THE DISTRICT. THE RECORDS SHALL BE KEPT ON FILE FOR AT LEAST TWO YEARS AND MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.

THIS PERMIT TO CONSTRUCT R-236484 SUPERSEDES PERMIT TO CONSTRUCT 236484 ISSUED NOVEMBER 27, 1990.

Approval or denial of this application for permit to operate the above equipment will be made after an inspection to determine if the equipment has been constructed in accordance with the approved plans and specifications and if the equipment can be operated in compliance with all Rules of the South Coast Air Quality Management District.

Please notify D. W. STROUD at 818/572-6232 when construction of equipment is complete.

This Authority to Construct is based on the plans, specifications, and data submitted as it pertains to the release of air contaminants and control measures or reduce air contaminants. No approval or opinion concerning safety and other factors in design, construction or operation of the equipment is expressed or implied.

9. THE FLOW RATE OF THE UREA/WATER SOLUTION SHALL BE REGULATED ACCORDING TO THE LOAD OF THE BOILER VIA A FULLY MODULATED AUTOMATIC CONTROL SYSTEM.

11. ONCE THE INSTALLATION AND TESTING OF THE UREA INJECTION SYSTEM HAS BEEN COMPLETED, SOUTHERN CALIFORNIA EDISON (SCE) SHALL SUBMIT TO THE DISTRICT BY JANUARY 17, 1992, A FINAL REPORT CONSISTING OF THE FOLLOWING INFORMATION:

A) A DESCRIPTION OF HOW THE UREA SOLUTION FLOW IS CONTROLLED AND REGULATED FOR VARIOUS BOILER LOADS.

B) A QUANTITATIVE ANALYSIS OF THE EFFECT OF UREA INJECTION ON THE EMISSIONS OF CO, NO_x, NH_3, ROG, AND PARTICULATES AT VARIOUS BOILER LOADS AND UREA INJECTION CONDITIONS.

C) A QUANTITATIVE ANALYSIS OF NO_x AND CO EMISSIONS WHILE FIRING NATURAL GAS AND FIRING FUEL OIL, IF AVAILABLE, AFTER THE INSTALLATION OF THE UREA INJECTION SYSTEM. SUCH AN ANALYSIS SHALL CONTAIN DATA ARRANGED IN THE FOLLOWING FORMAT:

a) NO_x EMISSION DATA, IN PPM, OVER A ONE HOUR BASIS AND DRY, CORRECTED TO 3 PERCENT OXYGEN, FOR ANY SEVEN (7) DAYS OF OPERATION. EACH DAY OF OPERATION SHALL BE FOR A TWENTY-FOUR (24) HOUR PERIOD. THE AVERAGE UTILITY BOILER LOAD SHALL ACCOMPANY EACH NO_x DATA POINT. THE DATA SHALL BE SUBMITTED IN TABULAR FORM CONTAINED ON A 3.5" FLOPPY DISC THAT IS FORMATTED FOR LOTUS 123.

b) FOR COMPARING CO EMISSIONS, SOURCE TESTS SHALL BE CONDUCTED TO ESTABLISH A REPRESENTATIVE CO EMISSION LEVEL AFTER THE MODIFICATION. THE SOURCE TEST PROTOCOL SHALL BE SUBMITTED FOR DISTRICT APPROVAL BEFORE MARCH 1, 1991.

12. TO COMPLY WITH THE REQUIREMENTS OF 1135 (g), (ADOPTED AUGUST 4, 1989), SCE SHALL PROVIDE THE FOLLOWING TWO PLANS TO DEMONSTRATE THAT THE LOWEST EMISSION RATES POSSIBLE HAVE BEEN AND WILL BE ACHIEVED DURING DAYS OF MANAGED OIL BURNING AND GAS CURTAILMENT:

A) BEFORE FEBRUARY 15, 1991, A PLAN TO SHOW COMPLIANCE WITH 1135 (g) FOR THE UTILITY BOILER BEFORE THE UTILIZATION OF UREA INJECTION SYSTEM.

B) NINETY (90) DAYS AFTER THE INSTALLATION OF THE UREA INJECTION SYSTEM BUT NO LATER THAN AUGUST 16, 1991, A PLAN TO SHOW COMPLIANCE WITH 1135 (g) BY UTILIZING UREA INJECTION AS SPECIFIED BY THIS PERMIT.

Conditions

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA, DRAWINGS, AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION FOR REDONDO BEACH UNIT 5 UNLESS OTHERWISE NOTED BELOW.

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.

3. THE MAXIMUM CONCENTRATION OF OXIDES OF NITROGEN (NO_x) EMISSIONS, AS CALCULATED AS NO_2, AT THE EXHAUST STACK, AVERAGED OVER ONE HOUR, SHALL NOT EXCEED 240 PPM WHEN FIRING NATURAL GAS AND 320 PPM WHEN FIRING FUEL OIL, DRY AND CORRECTED TO 3% OXYGEN (O_2).

   THESE NO_x LIMITS ARE VALID THROUGH THE ENTIRE PERMIT TO CONSTRUCT PHASE. SUBSEQUENT CONCENTRATION NO_x LIMITS WILL BE DETERMINED AT THE PERMIT TO OPERATE PHASE.

4. THE MAXIMUM CONCENTRATION OF CARBON MONOXIDE (CO) EMISSIONS, AT T EXHAUST STACK, AVERAGED OVER ONE-HOUR, SHALL NOT EXCEED 500 PPM WHEN FIRING NATURAL GAS AND 500 PPM WHEN FIRING FUEL OIL, DRY AND CORRECTED TO 3% OXYGEN (O_2).

   THESE CO LIMITS ARE VALID THROUGH THE ENTIRE PERMIT TO CONSTRUCT PHASE. SUBSEQUENTLY CONCENTRATION CO LIMITS WILL BE DETERMINED AT THE PERMIT TO OPERATE PHASE.

5. THE MAXIMUM CONCENTRATION OF AMMONIA (NH_3) SLIP DURING UREA INJECTION, AT THE EXHAUST STACK, SHALL NOT EXCEED 20 PPM FOR BOTH NATURAL GAS AND FUEL OIL FIRING, CORRECTED TO 3% DRY OXYGEN (O_2) AND AVERAGED OVER ONE HOUR.

   THESE NH_3 LIMITS ARE VALID THROUGH THE ENTIRE PERMIT TO CONSTRUCT PHASE. SUBSEQUENT CONCENTRATION CO LIMITS WILL BE DETERMINED AT THE PERMIT TO OPERATE PHASE.

6. THE CONCENTRATION OF UREA IN THE UREA/WATER SOLUTION INJECTED INTO THIS UTILITY BOILER SHALL CONTAIN NO MORE THAN FIFTY (50) PERCENT UREA BY WEIGHT.

7. THE UREA/WATER SOLUTION RATE OF INJECTION INTO THIS BOILER SHALL NOT EXCEED THIRTY (30) GALLONS PER MINUTE (GPM) FOR EACH INJECTION NOZZLE.

8. THE OPERATOR OF THIS UTILITY BOILER SHALL MAINTAIN RECORDS OF THE CONCENTRATION OF UREA IN THE UREA/WATER SOLUTION FOR THE VARIOUS BOILER LOADS.

PERMIT TO CONSTRUCT

9150 FLAIR DRIVE, EL MONTE, CALIFORNIA 91731

Application N
R-23648
Page 1

REDONDO #6

Granted as of December 24, 1990

Legal Owner or Operator: ID 014052

SOUTHERN CALIFORNIA EDISON COMPANY
POST OFFICE BOX 800
2244 WALNUT GROVE AVENUE
ROSEMEAD, CALIFORNIA 91770
ATTN: PETER R. WELSING

Equipment Location: 1100 HARBOR DRIVE, REDONDO BEACH, CALIFORNIA

The equipment described below and as shown on the approved plans and specifications are subject to the special condition, or conditions listed.

Equipment Description

ALTERATION TO AN EXISTING UTILITY BOILER NO. 6 PERMIT NO. D17754, BY THE ADDITION OF AN UREA INJECTION SYSTEM CONSISTING OF:

1) 15 HP UREA TRANSFER PUMP (P-101).

2) UREA DAY STORAGE TANK (TK 102), 1,000 GALLONS CAPACITY, WITH A 5 H.P. UREA SUPPLY PUMP (P-102).

3) 15 H.P. WATER INJECTION PUMP (P-103).

4) A THREE LEVEL UREA/WATER/AIR NOZZLE SYSTEM CONSISTING OF:

A.) LOOP 1;
NOZZLES A AND B LOCATED AT AN ELEVATION OF APPROXIMATELY 78'-0".

B.) LOOP 2;
NOZZLES A, B, C, AND D LOCATED AT AN ELEVATION OF APPROXIMATELY 112'-0".

C.) LOOP 3;
a.) NOZZLES A AND F LOCATED AT AN ELEVATION OF APPROXIMATELY 122'-0".

b.) NOZZLES B, C, D, AND E LOCATED AT AN ELEVATION OF APPROXIMATELY 126'-0".

This Permit to Construct shall serve as a temporary Permit to Operate provided the Executive Officer is given prior notice of such intent to operate.

This Permit to Construct will become invalid if the Permit to Operate is denied or if this application is cancelled. THIS PERMIT TO CONSTRUCT SHALL EXPIRE ONE YEAR FROM THE DATE OF ISSUANCE unless an extension is granted by the Executive Officer.

By
RAQUEL M. PUERTA
Principal Office Assistant

RP/mb

d. IF A BREAKDOWN OCCURS ON NON-LANCE RELATED EQUIPMENT WHICH AFFECTS NORMAL OPERATING CONDITION, ONE LANCE CYCLE MAY BE OMITTED, DEPENDING ON THE NATURE OF THE BREAKDOWN CONDITION.

B) FUEL OIL ADDITIVE SYSTEM

a. IF THE FUEL OIL ADDITIVE SYSTEM FAILS TO MAINTAIN THE SPECIFIED FEED RATE RANGE, REPAIRS SHALL BE MADE AS EXPEDITIOUSLY AS POSSIBLE, INCLUDING SCHEDULING WORK ON WEEKENDS AND HOLIDAYS.

b. IF REPAIRS ARE NOT COMPLETED WITHIN 48 HOURS, THE AFFECTED UNIT WILL BE SWITCHED TO NATURAL GAS FUEL PROVIDED IT IS AVAILABLE.

20. RECORDS SHALL BE MAINTAINED TO PROVE COMPLIANCE WITH THE ABOVE LISTED CONDITIONS IN A FORMAT APPROVED IN WRITING BY THE DIRECTOR OF ENFORCEMENT OF THE DISTRICT. THE RECORDS SHALL BE KEPT ON FILE FOR AT LEAST TWO YEARS AND MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.

THIS PERMIT TO CONSTURCT R-236483 SUPERSEDES PERMIT TO CONSTURCT 236483 ISSUED NOVEMBER 27, 1990.

Approval or denial of this application for permit to operate the above equipment will be made after an inspection to determine if the equipment has been constructed in accordance with the approved plans and specifications and if the equipment can be operated in compliance with all Rules of the South Coast Air Quality Management District.

Please notify D. W. STROUD at 818/572-6232 when construction of equipment is complete.

This Authority to Construct is based on the plans, specifications, and data submitted as it pertains to the release of air contaminants and control measures or reduce air contaminants. No approval or opinion concerning safety and other factors in design, construction or operation of the equipment is expressed or implied.

17. INDUCT FALLOUT MONITOR (IFM)

A) THE 1983 DISTRICT-APPROVED IFM SHALL BE USED TO COLLECT SAMPLES EVERY 24 HOURS BEGINNING FROM ALL START-UPS. IF THREE 24 HOUR IFM SAMPLES TAKEN AFTER NATURAL GAS FIRING SHOW NO ABNORMAL COLLECTIONS, THE SAMPLES CAN BE TAKEN ONCE A WEEK.

B) THE IFM SAMPLES SHALL BE ANALYZED FOR ACIDITY, WEIGHT, AND VOLUME. THE RESULTS OF THE ANALYSIS SHALL BE USED TO DETERMINE THE NECESSARY OPERATIONAL CHANGES TO MINIMIZE THE FALLOUT. SUCH OPERATIONAL CHANGES INCLUDE, BUT ARE NOT LIMITED TO, THE INCREASING OF FUEL OIL ADDITIVE INJECTION RATE AND LANCING FREQUENCY.

C) THE RESULTS OF IFM SAMPLE ANALYSIS SHALL BE KEPT AT LEAST FOR 2 YEARS AND THE RESIDUAL SAMPLES FOR 3 MONTHS AND MADE AVAILABLE UPON REQUEST OF THE DISTRICT.

18. BOILER LANCING (SOOT BLOWING)

A) BOILER AND AIR PREHEATER LANCING SHALL BE CONDUCTED ONCE PER 8 HOUR SHIFT PROVIDED THE UNIT IS OPERATING ABOVE 50 MW WHILE BURNING FUEL OIL AND WILL COMMENCE AS SOON AS OIL FIRING HAS STABILIZED.

B) DURING PERIODS OF NATURAL GAS FUEL BURNING, BOILER AND AIR PREHEATER LANCES SHOULD BE EXERCISED ONCE DAILY.

19. BREAKDOWN CONDITIONS

A) LANCE AND LANCE SYSTEM

a. IF AN INDIVIDUAL LANCE FAILS TO OPERATE AND THE UNIT IS BURNING FUEL OIL, REPAIRS SHALL BE MADE AS EXPEDITIOUSLY AS POSSIBLE. IF A LANCE SYSTEM FAILS TO OPERATE AND THE UNIT IS BURNING FUEL OIL, REPAIRS WILL BE MADE AS EXPEDITIOUSLY AS POSSIBLE, INCLUDING SCHEDULING WORK ON WEEKENDS OR HOLIDAYS.

b. IF THE LANCE SYSTEM FAILS AND REPAIRS ARE NOT COMPLETED IN THREE DAYS, THE AFFECTED UNIT SHALL BE SWITCHED TO GAS FUEL PROVIDED IT IS AVAILABLE.

c. A LANCE SYSTEM FAILURE IS DEEMED TO OCCUR WHEN MORE THAN ONE THIRD OF THE INDIVIDUAL LANCES ARE INOPERABLE.

B) NINETY (90) DAYS AFTER THE INSTALLATION OF THE UREA INJECTION SYSTEM BUT NO LATER THAN AUGUST 16, 1991, A PLAN TO SHOW COMPLIANCE WITH 1135 (g) BY UTILIZING UREA INJECTION AS SPECIFIED BY THIS PERMIT.

13. AIR PREHEATER ELEMENTS

AIR PREHEATER BASKETS SHALL BE 409 STAINLESS STEEL OR OTHER EQUIVALENT MATERIAL APPROVED BY THE SCAQMD DIRECTOR OF ENGINEERING.

14. OFF-LINE CLEANING

AFTER EACH SHUT DOWN IN WHICH THE FURNACE TEMPERATURE IS REDUCED TO AMBIENT CONDITION, THE BOILER SHALL BE INSPECTED FOR CLEANLINESS AND ITS CONDITION DOCUMENTED. BASED ON THE INSPECTION AND THE IN DUCT MONITORING (IFM) INFORMATION, THE BOILER, THE AIR PREHEATER, AND STACK WILL BE CLEANED IN AN APPROPRIATE MANNER PRIOR TO START-UP TO REMOVE ANY DEPOSITS THAT COULD CAUSE A FALLOUT INCIDENT. A FOLLOW UP INSPECTION WILL BE MADE AND DOCUMENTED TO VERIFY THE CLEANLINESS. IF THE BOILER HAS NOT BEEN PLACED INTO SERVICE WITHIN SEVEN (7) DAYS, A REINSPECTION WILL BE MADE, AND IF NECESSARY A RECLEANING WILL BE PERFORMED.

15. STACK WASHING

A) THE BOILER STACK SHALL HAVE A PERMANENT STACK WASHING SYSTEM MAINTAINED IN OPERABLE CONDITION.

B) EACH TIME THE BOILER IS SHUTDOWN FOR 48 HOURS OR MORE AFTER EXTENDED OIL-FIRING, (20 DAYS), THE STACK SHALL BE WASHED PRIOR TO START-UP.

16. FUEL OIL ADDITIVES

A) AS SOON AS OIL FIRING HAS STABILIZED, DISTRICT-APPROVED ADDITIVES SHALL BE INJECTED AT A RATE OF 2 GALLONS PER HOUR $\pm$ 0.5 GALLONS PER HOUR WHENEVER FUEL OIL IS BURNED.

B) EDISON MAY CHANGE THE FUEL ADDITIVE TYPES AND CORRESPONDING FEED RATES SUBJECT TO APPROVAL OF THE DISTRICT'S DIRECTOR OF ENGINEERING.

C) THE ADDITIVE SYSTEM WILL BE CHECKED FOR FLOW ONCE PER SHIFT AND THE TANK DROP LEVELS WILL BE RECORDED DAILY.

9. THE OPERATOR OF THIS UTILITY BOILER SHALL MAINTAIN RECORDS OF THE CONCENTRATION OF UREA IN THE UREA/WATER SOLUTION FOR THE VARIOUS BOILER LOADS.

10. THE FLOW RATE OF THE UREA/WATER SOLUTION SHALL BE REGULATED ACCORDING TO THE LOAD OF THE BOILER VIA A FULLY MODULATED AUTOMATIC CONTROL SYSTEM.

11. ONCE THE INSTALLATION AND TESTING OF THE UREA INJECTION SYSTEM HAS BEEN COMPLETED, SOUTHERN CALIFORNIA EDISON (SCE) SHALL SUBMIT TO THE DISTRICT BY JANUARY 17, 1992, A FINAL REPORT CONSISTING OF THE FOLLOWING INFORMATION:

A) A DESCRIPTION OF HOW THE UREA SOLUTION FLOW IS CONTROLLED AND REGULATED FOR VARIOUS BOILER LOADS.

B) A QUANTITATIVE ANALYSIS OF THE EFFECT OF UREA INJECTION ON THE EMISSIONS OF CO, NO_x, NH_3, ROG, AND PARTICULATES AT VARIOUS BOILER LOADS AND UREA INJECTION CONDITIONS.

C) A QUANTITATIVE ANALYSIS OF NO_x AND CO EMISSIONS WHILE FIRING NATURAL GAS AND FIRING FUEL OIL, IF AVAILABLE, AFTER THE INSTALLATION OF THE UREA INJECTION SYSTEM. SUCH AN ANALYSIS SHALL CONTAIN DATA ARRANGED IN THE FOLLOWING FORMAT:

a) NO_x EMISSION DATA, IN PPM, OVER A ONE HOUR BASIS AND DRY, CORRECTED TO 3 PERCENT OXYGEN, FOR ANY SEVEN (7) DAYS OF OPERATION. EACH DAY OF OPERATION SHALL BE FOR A TWENTY-FOUR (24) HOUR PERIOD. THE AVERAGE UTILITY BOILER LOAD SHALL ACCOMPANY EACH NO_x DATA POINT. THE DATA SHALL BE SUBMITTED IN TABULAR FORM CONTAINED ON A 3.5" FLOPPY DISC THAT IS FORMATTED FOR LOTUS 123.

b) FOR COMPARING CO EMISSIONS, SOURCE TESTS SHALL BE CONDUCTED TO ESTABLISH A REPRESENTATIVE CO EMISSION LEVEL AFTER THE MODIFICATION. THE SOURCE TEST PROTOCOL SHALL BE SUBMITTED FOR DISTRICT APPROVAL BEFORE MARCH 1, 1991.

12. TO COMPLY WITH THE REQUIREMENTS OF 1135 (g), (ADOPTED AUGUST 4, 1989), SCE SHALL PROVIDE THE FOLLOWING TWO PLANS TO DEMONSTRATE THAT THE LOWEST EMISSION RATES POSSIBLE HAVE BEEN AND WILL BE ACHIEVED DURING DAYS OF MANAGED OIL BURNING AND GAS CURTAILMENT:

A) BEFORE FEBRUARY 15, 1991, A PLAN TO SHOW COMPLIANCE WITH 1135 (g) FOR THE UTILITY BOILER BEFORE THE UTILIZATION OF UREA INJECTION SYSTEM.

Conditions

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA, DRAWINGS, AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION FOR REDONDO BEACH UNIT 5 UNLESS OTHERWISE NOTED BELOW.

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.

3. THE MAXIMUM CONCENTRATION OF OXIDES OF NITROGEN (NO_x) EMISSIONS, AS CALCULATED AS NO_2, AT THE EXHAUST STACK, AVERAGED OVER ONE HOUR, SHALL NOT EXCEED 240 PPM WHEN FIRING NATURAL GAS AND 320 PPM WHEN FIRING FUEL OIL, DRY AND CORRECTED TO 3% OXYGEN (O_2).

   THESE NO_x LIMITS ARE VALID THROUGH THE ENTIRE PERMIT TO CONSTRUCT PHASE. SUBSEQUENT CONCENTRATION NO_x LIMITS WILL BE DETERMINED AT THE PERMIT TO OPERATE PHASE.

4. THE MAXIMUM CONCENTRATION OF CARBON MONOXIDE (CO) EMISSIONS, AT THE EXHAUST STACK, AVERAGED OVER ONE HOUR, SHALL NOT EXCEED 500 PPM WHE FIRING NATURAL GAS AND 500 PPM WHEN FIRING FUEL OIL, DRY AND CORRECTE TO 3% OXYGEN (O_2).

   THESE CO LIMITS ARE VALID THROUGH THE ENTIRE PERMIT TO CONSTRUCT PHASE. SUBSEQUENTLY CONCENTRATION CO LIMITS WILL BE DETERMINED AT THE PERMIT TO OPERATE PHASE.

5. THE MAXIMUM CONCENTRATION OF AMMONIA (NH_3) SLIP DURING UREA INJECTION, AT THE EXHAUST STACK, SHALL NOT EXCEED 20 PPM FOR BOTH NATURAL GAS AND FUEL OIL FIRING, CORRECTED TO 3% DRY OXYGEN (O_2) AND AVERAGED OVER ONE HOUR.

   THESE NH_3 LIMITS ARE VALID THROUGH THE ENTIRE PERMIT TO CONSTRUCT PHASE. SUBSEQUENT CONCENTRATION CO LIMITS WILL BE DETERMINED AT THE PERMIT TO OPERATE PHASE.

6. THE CONCENTRATION OF UREA IN THE UREA/WATER SOLUTION INJECTED INTO THIS UTILITY BOILER SHALL CONTAIN NO MORE THAN FIFTY (50) PERCENT UREA BY WEIGHT.

7. THE UREA/WATER SOLUTION RATE OF INJECTION INTO THIS BOILER SHALL NOT EXCEED THIRTY (30) GALLONS PER MINUTE (GPM) FOR EACH INJECTION NOZZLE.

8. THE OPERATOR OF THIS UTILITY BOILER SHALL INSTALL FLOW METERS THAT MEASURE THE UREA/WATER SOLUTION FLOW RATE IN GALLONS PER MINUTE.

PERMIT TO CONSTRUCT

9150 FLAIR DRIVE, EL MONTE, CALIFORNIA 91731

Application No. R-236483
Page 1

REDONDO #5

Granted as of December 24, 1990

Legal Owner or Operator: ID 014052

SOUTHERN CALIFORNIA EDISON COMPANY
POST OFFICE BOX 800
2244 WALNUT GROVE AVENUE
ROSEMEAD, CALIFORNIA 91770
ATTN: PETER R. WELSING

Equipment Location: 1100 HARBOR DRIVE, REDONDO BEACH, CALIFORNIA

The equipment described below and as shown on the approved plans and specifications are subject to the special condition, or conditions listed.

Equipment Description

BOILER No.5

ALTERATION TO AN EXISTING UTILITY [redacted] PERMIT NO. D17747, BY THE ADDITION OF AN UREA-INJECTION SYSTEM CONSISTING OF:

1) 15 HP UREA TRANSFER PUMP (P-101).

2) UREA DAY STORAGE TANK (TK 102), 1,000 GALLONS CAPACITY, WITH A 5 H.P. UREA SUPPLY PUMP (P-102).

3) 15 H.P. WATER INJECTION PUMP (P-103).

4) A THREE LEVEL UREA/WATER/AIR NOZZLE SYSTEM CONSISTING OF:

   A.) LOOP 1;
   NOZZLES A AND B LOCATED AT AN ELEVATION OF APPROXIMATELY 78'-0".

   B.) LOOP 2;
   NOZZLES A, B, C, AND D LOCATED AT AN ELEVATION OF APPROXIMATELY 112'-0".

   C.) LOOP 3;
   a.) NOZZLES A AND F LOCATED AT AN ELEVATION OF APPROXIMATELY 122'-0".

   b.) NOZZLES B, C, D, AND E LOCATED AT AN ELEVATION OF APPROXIMATELY 126'-0".

ORIGINAL

SECTION 4.0

QUALITY ASSURANCE/QUALITY CONTROL

4.1 EQUIPMENT CALIBRATIONS AND CARB CERTIFICATION

All equipment used is in calibration prior to testing. The span gases used are certified. Criteria gases are EPA Protocol 1. Non-criteria gases are NBS traceable to ±1%. Sierra is State Certified by the California Air Resources Board to perform emission source testing as an independent source tester. Sierra's CARB Certification is located in Appendix A.2.

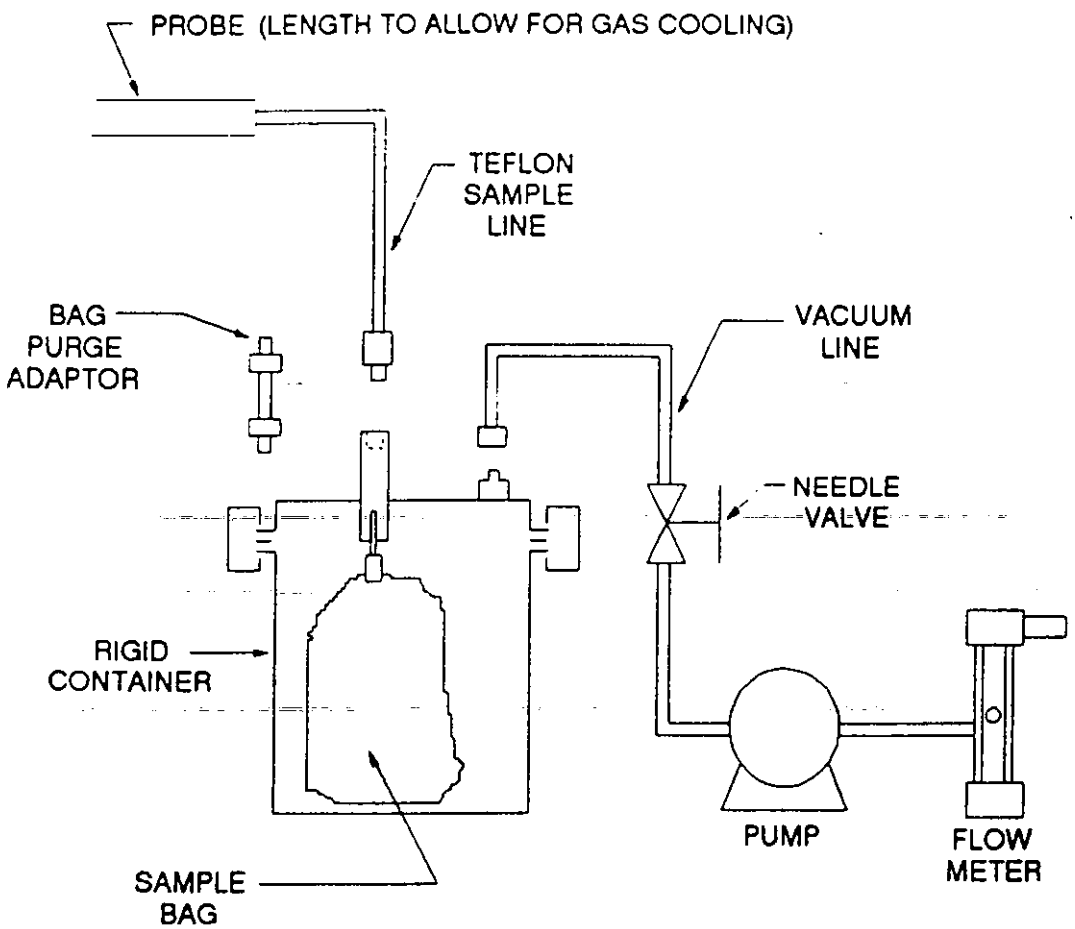
4.2 QUALITY ASSURANCE MEASURES

Sierra has a rigorous on-going QA program to ensure that high quality data is obtained and to ensure full documentation of test details. Sierra participates in EPA audits for Methods 3, 5, and 6. Our results are statistically compared to all other participants to determine if the results are satisfactory. Unsatisfactory performance for EPA's audit samples is immediately addressed to determine the cause for unsatisfactory results (outliers).

Sierra follows the QA/QC protocols found in "Air Monitoring Quality Assurance Vol. VI: Standard Operating Procedures for stationary Source Emission Monitoring and Testing" CARB, January 1979, and the Quality Assurance Guidelines as published in "Quality Assurance Handbooks for Air Pollution Measurement Systems," Volume III, US EPA-600/4-77-0276. Detailed QA/QC information is presented in Appendix A.3.

FIGURE 3.4

SCAQMD METHOD 25.2
LUNG SAMPLER



SIERRA ENVIRONMENTAL ENGINEERING, INC.
3505 Cadillac Avenue, K-1
Costa Mesa, California 92626

PROJ	SCAQMD 25.2
CUST	
DATE	JOB NO

Emission data was collected by recording averages from the strip chart recordings on to the field data sheets. Data collected over the actual test period was averaged and recorded. Data was reported in the as-found stack condition, on a dry basis and on a corrected to 3.0% O_2 dilution basis.

3.4 AMMONIA (NH_3) - SCAQMD/EPA DRAFT METHOD

Ammonia sampling was performed using SCAQMD/EPA Draft Method. Flue gas was drawn through a set of four impingers. The first two impingers each contained 100 ml of 0.1N Hydrochloric Acid to absorb the ammonia from the sample gas. The third impinger was dry and the fourth contained a desiccant. After sampling, the contents of the first three impingers were recovered and the samples were analyzed using Nessler Colorimetry Spectrophotometry with ultraviolet (UV) detection.

3.5 REACTIVE ORGANIC GAS (ROG) - SCAQMD 25.2

ROG samples were collected in twelve liter Tedlar bags using a probe connected to a "lung" type sampler as illustrated in Figure 3.4. The lung sampling system consisted of a rigid evacuation container and a Nutech Model 218 pump. New Tedlar bags were inerted with GC grade Nitrogen and leak checked prior to sampling.

The nitrogen inerted bags were evacuated with the Nutech 218 pump just prior to sampling, and then attached to the inlet of the lung sampler system. As the lung sampler container was evacuated, the empty Tedlar bags were filled with sample gas. Duplicate ROG samples were collected over a sampling time of 30 minutes.

After sampling, the twelve liter bags were sealed and enclosed in an opaque bag to prevent sunlight from initiating photo sensitive reactions with the captured species within the bag. The bags were immediately transferred to the analytical lab for analysis. ROG compounds were measured by Flame Ionization Detection/Total Combustion Analysis (FID/TCA). A field blank sample was also analyzed.

SAMPLING MANIFOLD AND CONTINUOUS EMISSIONS MONITORING SYSTEM

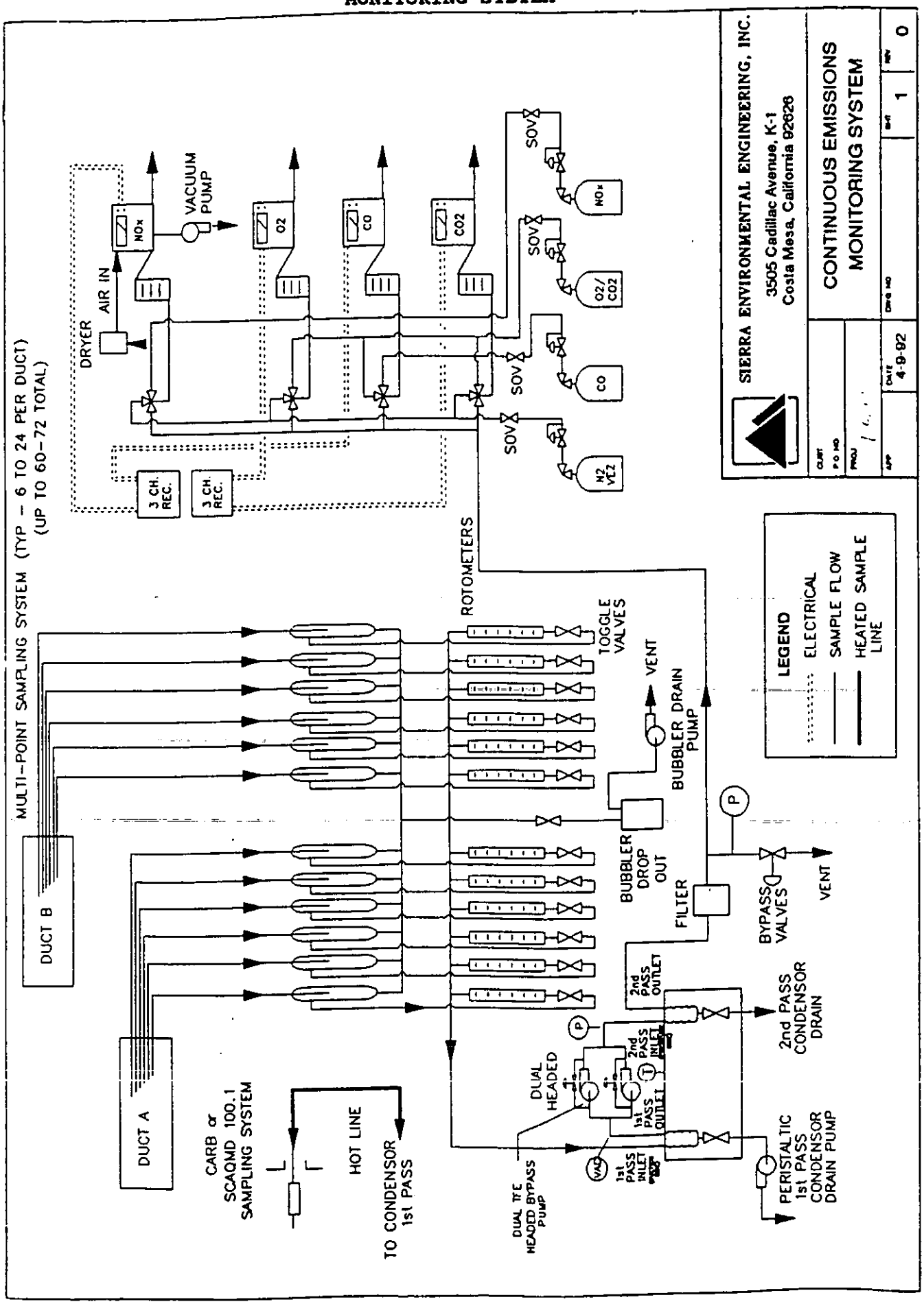


TABLE 3.1

SIERRA TEST TRAILER SPECIFICATIONS OF MONITORING ANALYZERS

NO_x CHEMILUMINESCENT ANALYZER -- THERMO ELECTRON MODEL 10AR

Response Time (0-90%)	1.5 sec -- NO mode 1.7 sec -- NOx mode
Zero Drift	Negligible after 1/2 hour warmup
Linearity	±1% of full scale
Accuracy	Derived from the NO or NO2 calibration gas, ±1% of full scale
Converter	Stainless steel or molychrome (avail.)
Remote converter	Available for EPA Method 20 tests
Ranges	0-2.5, 10, 25, 100, 250, 1000, 2500, 10,000 ppmv

O_2 ANALYZER, ELECTROCHEMICAL TYPE -- TELEDYNE MODEL 326RA

Response Time (0-90%)	60 seconds
Accuracy	±1% of scale at constant temperatures; ±1% of scale of ±5% of reading, whichever is greater, over the operating temperature range
Ranges	0-5%, 0-10%, 0-25%

CO INFRARED ANALYZER -- HORIBA MODEL PIR 2000

Response time (0-90%)	1.2 seconds
Zero Drift	±1% / 24 hr full scale
Span Drift	±1% / 24 hr full scale
Linearity	1%
Repeatability	±0.5% of full scale
Ranges	0-500, 0-1500, 0-2500 ppmv

STRIP CHARGE RECORDERS (2) - (3 PEN) -- GRAPHTEC MODEL 3665

Pen Response	20 inches/second
Span -- full scale	1 mV through 10 V
Zero Set	Electronically adjustable full scale with 1 full scale of zero suppression. Total limit or error of ±0.5%

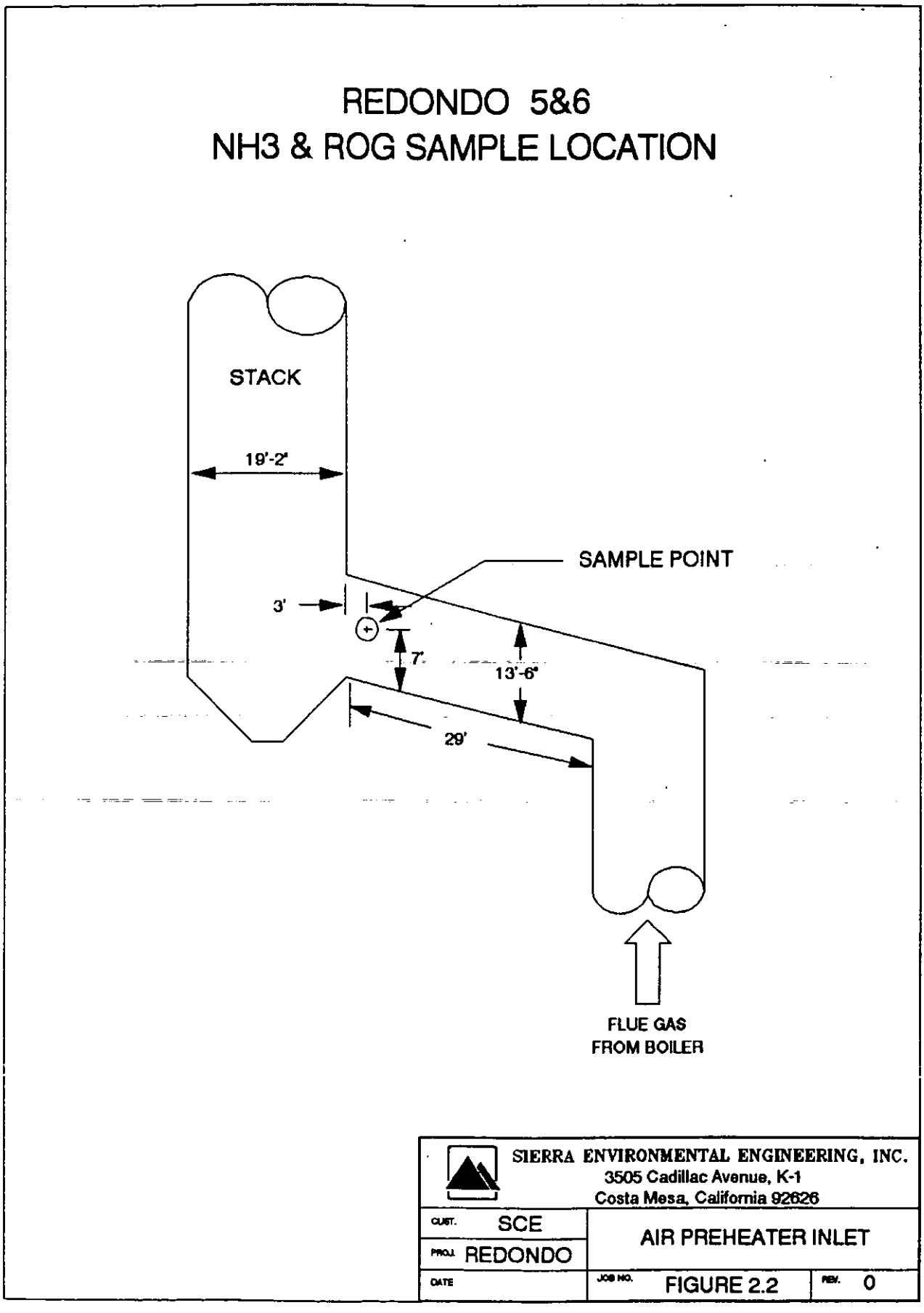
SCOTSMAN TRAILER -- CONTROLLED ENVIRONMENT FOR INSTRUMENTATION

Fully Insulated
Air conditioned and heated
8-ft x 16-ft x 11-ft

FIGURE 3.3

FIGURE 3.2

REDONDO # 5 AND #6
NH_3 AND ROG SAMPLE LOCATION



CONTINUOUS EMISSIONS MEASUREMENTS

Client: SCE Redondo
Date: 09-21-92
Test Location: APH Inlet - Unit 6
Test Condition: 172 MW
Ambient Temp: DB 72
WB 68
RH% 82

Page 1 of 1
Test No: As listed
Project No: 92364
Fuel: Natural Gas
Barometric Pressure: 30.21 in. Hg
Operator: J. Adamiak
Lotus File: CEM1

Test #	Start 24hr	Stop 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						Corrected At 3 % O2	
				O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
1	1010	1020	Comp	3.5	10.0	180	-	-	142.5	185	147
1	1020	1030	Comp	3.4	9.9	190	-	-	140.0	194	143
1	1030	1040	Comp	3.4	9.8	193	-	-	141.3	197	145
2	1100	1110	Comp	3.3	10.0	240	-	-	135.0	244	137
2	1110	1120	Comp	3.4	9.8	185	-	-	140.0	189	143
2	1120	1130	Comp	3.3	9.9	205	-	-	137.5	208	140
3	1245	1255	Comp	3.4	9.5	260	-	-	95.0	266	97
3	1255	1305	Comp	3.3	9.0	260	-	-	92.5	264	94
3	1305	1315	Comp	3.4	9.2	230	-	-	95.0	235	97
	1333	1343	*	7.7	-	-	-	-	-	-	-
4	1525	1535	Comp	3.5	10.7	220	-	-	100.0	226	103
4	1535	1545	Comp	3.6	10.4	180	-	-	102.5	186	106
4	1545	1555	Comp	3.5	10.6	200	-	-	100.0	206	103
	1612	1624	*	7.9	-	-	-	-	-	-	-

COMMENTS:

1) Test 1 & 2 - Without Urea Injection
2) * O2 At Ammonia Sampling Port With Urea On - Three Points Traverse

SIERRA ENVIRONMENTAL ENGINEERING, INC.

CONTINUOUS EMISSIONS MEASUREMENTS

Client: SCE Redondo
Date: 09-22-92
Test Location: APH Inlet - Unit 6
Test Condition: 140 MW
Ambient Temp: DB 72
WB 68
RH% 82

Page 1 of 1
Test No: As listed
Project No: 92364
Fuel: Natural Gas
Barometric Pressure: 30.28 in. Hg
Operator: J. Adamiak
Lotus File: CEM2

Test #	Start 24hr	Stop 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						Corrected At 3 % O2	
				O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
1	0910	0920	Comp	4.7	9.3	180	-	-	75.0	199	83
1	0920	0930	Comp	4.7	9.3	180	-	-	72.5	199	80
1	0930	0940	Comp	4.6	4.6	200	-	-	72.5	220	80
2	1000	1010	Comp	4.8	8.7	180	-	-	74.0	200	82
2	1010	1020	Comp	4.8	8.6	160	-	-	75.0	178	83
2	1020	1030	Comp	4.8	8.7	175	-	-	74.0	195	82
	1115	1119	*	9.1	-	-	-	-	-	-	-
	1119	1127	*	8.7	-	-	-	-	-	-	-
	1127	1133	*	8.3	-	-	-	-	-	-	-
3	1142	1152	Comp	4.8	9.5	170	-	-	57.0	189	63
3	1152	1202	Comp	4.9	9.6	175	-	-	57.0	196	64
3	1202	1212	Comp	4.8	9.6	180	-	-	57.0	200	63
4	1308	1318	Comp	4.8	8.6	160	-	-	57.0	178	63
4	1318	1328	Comp	4.9	8.6	160	-	-	56.0	179	63
4	1328	1338	Comp	4.8	8.6	160	-	-	56.0	178	62
	1414	1418	**	9.0	-	-	-	-	-	-	-
	1418	1422	**	8.6	-	-	-	-	-	-	-
	1422	1426	**	8.2	-	-	-	-	-	-	-

COMMENTS:

1) Test 1 & 2 - Without Urea Injection
2) * O2 At Ammonia Sampling Port With Urea Off- Three Points Traverse
** O2 At Ammonia Sampling Port With Urea On- Three Points Traverse

SIERRA ENVIRONMENTAL ENGINEERING, INC.

CONTINUOUS EMISSIONS MEASUREMENTS

Client: SCE Redondo
Date: 09-24-92
Test Location: APH Inlet - Unit 6
Test Condition: 41 MW
Ambient Temp: DB 73
WB 67
RH% 83

Page 1 of 1
Test No: As listed
Project No: 92364
Fuel: Natural Gas
Barometric Pressure: 30.18 in. Hg
Operator: J. Adamiak
Lotus File: CEM3

Test #	Start 24hr	Stop 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						Corrected At 3 % O2	
				O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
1	0415	0425	Comp	9.8	5.6	35	-	-	24.0	56	39
1	0425	0435	Comp	9.6	5.5	35	-	-	23.0	55	36
1	0435	0445	Comp	9.8	5.6	35	-	-	24.0	56	39
	0505	0510	*	11.8	-	-	-	-	-	-	-
	0510	0515	*	12.0	-	-	-	-	-	-	-
	0515	0520	*	12.5	-	-	-	-	-	-	-
2	0614	0624	Comp	9.5	6.3	35	-	-	25.0	55	39
2	0624	0634	Comp	9.5	6.2	35	-	-	25.0	55	39
2	0634	0644	Comp	9.5	6.2	35	-	-	26.0	55	41
	0700	0705	**	11.8	-	-	-	-	-	-	-
	0705	0710	**	12.0	-	-	-	-	-	-	-
	0710	0715	**	12.5	-	-	-	-	-	-	-
3	0840	0850	Comp	9.8	5.7	28	-	-	40.0	45	65
3	0850	0900	Comp	9.8	5.6	28	-	-	41.0	45	66
3	0900	0910	Comp	9.8	5.6	28	-	-	40.0	45	65
4	0927	0937	Comp	9.8	6.2	30	-	-	38.0	48	61
4	0937	0947	Comp	9.8	6.2	30	-	-	38.0	48	61
4	0947	0957	Comp	10.0	6.2	30	-	-	40.0	49	66

COMMENTS:

1) Test 3 & 4 - Without Urea Injection
2) * O2 At Ammonia Sampling Port With Urea On - Three Points Traverse
** O2 At Ammonia Sampling Port With Urea Off - Three Points Traverse

CONTINUOUS EMISSIONS MEASUREMENTS

Client: SCE Redondo
Date: 10-01-92
Test Location: APH Inlet - Unit 5
Test Condition: 167 MW
Ambient Temp: DB 74
WB 78
RH% 82

Page 1 of 1
Test No: As listed
Project No: 92364
Fuel: Natural Gas
Barometric Pressure: 30.25 in. Hg
Operator: J. Adamiak
Lotus File: CEM5

Test #	Start 24hr	Stop 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						Corrected At 3 % O2	
				O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
1	1044	1054	Comp	2.4	9.9	300	-	-	108.0	290	104
1	1054	1104	Comp	2.3	9.8	285	-	-	108.0	274	104
1	1104	1114	Comp	2.3	9.9	300	-	-	105.0	289	101
	1125	1130	*	7.6	-	-	-	-	-	-	-
	1130	1135	*	6.8	-	-	-	-	-	-	-
	1135	1140	*	6.5	-	-	-	-	-	-	-
2	1238	1248	Comp	2.3	10.4	255	-	-	105.0	245	101
2	1248	1258	Comp	2.4	10.1	215	-	-	108.0	208	104
2	1258	1308	Comp	2.7	10.0	120	-	-	116.0	118	114
	1319	1323	**	8.1	-	-	-	-	-	-	-
	1323	1331	**	7.3	-	-	-	-	-	-	-
	1331	1335	**	6.9	-	-	-	-	-	-	-
3	1450	1500	Comp	2.4	10.3	210	-	-	168.0	203	163
3	1500	1510	Comp	2.3	10.4	225	-	-	163.0	217	157
3	1510	1520	Comp	2.2	10.4	210	-	-	165.0	201	158
4	1535	1545	Comp	2.1	10.7	220	-	-	165.0	209	157
4	1545	1555	Comp	2.2	10.8	220	-	-	168.0	211	161
4	1555	1605	Comp	2.2	10.7	220	-	-	168.0	211	161

COMMENTS:

1) Test 3 & 4 - Without Urea Injection

2) * O2 At Ammonia Sampling Port With Urea On - Three Points Traverse
** O2 At Ammonia Sampling Port With Urea Off - Three Points Traverse

SIERRA ENVIRONMENTAL ENGINEERING, INC.

CONTINUOUS EMISSIONS MEASUREMENTS

Client: SCE Redondo
Date: 10-02-92
Test Location: APH Inlet - Unit 5
Test Condition: 140 MW
Ambient Temp: DB 74
WB 78
RH% 82

Page 1 of 1
Test No: As listed
Project No: 92364
Fuel: Natural Gas
Barometric Pressure: 30.27 in. Hg
Operator: J. Adamiak
Lotus File: CEM6

Test #	Start 24hr	Stop 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						Corrected At 3 % O2	
				O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
1	1006	1016	Comp	3.2	9.6	110	-	-	61.0	111	62
1	1016	1026	Comp	3.2	9.6	105	-	-	62.0	106	63
1	1026	1036	Comp	3.2	9.8	115	-	-	62.0	116	63
	1052	1056	*	8.9	-	-	-	-	-	-	-
	1056	1100	*	8.0	-	-	-	-	-	-	-
	1100	1104	*	6.9	-	-	-	-	-	-	-
2	1135	1145	Comp	3.2	9.9	90	-	-	63.0	91	64
2	1145	1155	Comp	3.2	9.9	90	-	-	62.0	91	63
2	1155	1205	Comp	3.2	9.9	90	-	-	62.0	91	63
	1217	1220	**	9.0	-	-	-	-	-	-	-
	1220	1225	**	8.0	-	-	-	-	-	-	-
	1225	1229	**	6.9	-	-	-	-	-	-	-
3	1415	1425	Comp	3.3	10.0	70	-	-	83.0	71	84
3	1425	1435	Comp	3.2	10.0	70	-	-	84.0	71	85
3	1435	1445	Comp	3.2	9.9	70	-	-	83.0	71	84
4	1508	1518	Comp	3.3	10.1	115	-	-	81.0	117	82
4	1518	1528	Comp	3.2	10.1	110	-	-	81.0	111	82
4	1528	1538	Comp	3.2	10.0	110	-	-	81.0	111	82

COMMENTS:

1) Test 3 & 4 - Without Urea Injection
2) * O2 At Ammonia Sampling Port With Urea On - Three Points Traverse
** O2 At Ammonia Sampling Port With Urea Off - Three Points Traverse

SIERRA ENVIRONMENTAL ENGINEERING, INC.

CONTINUOUS EMISSIONS MEASUREMENTS

Client: SCE Redondo
Date: 09-29-92
Test Location: APH Inlet - Unit 5
Test Condition: 40 MW
Ambient Temp: DB 74
WB 78
RH% 82

Page 1 of 1
Test No: As listed
Project No: 92364
Fuel: Natural Gas
Barometric Pressure: 30.24 in. Hg
Operator: J. Adamiak
Lotus File: CEM4

Test #	Start 24hr	Stop 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						Corrected At 3 % O2	
				O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
1	0317	0327	Comp	9.3	6.5	30	-	-	16.0	46	25
1	0327	0337	Comp	9.3	6.5	30	-	-	16.0	46	25
1	0337	0347	Comp	9.3	6.4	30	-	-	16.0	46	25
	0402	0407	*	12.5	-	-	-	-	-	-	-
	0407	0412	*	12.0	-	-	-	-	-	-	-
	0412	0417	*	11.5	-	-	-	-	-	-	-
2	0500	0510	Comp	9.5	6.4	30	-	-	16.0	47	25
2	0510	0520	Comp	9.5	6.6	33	-	-	16.0	52	25
2	0520	0532	Comp	9.5	6.4	33	-	-	16.0	52	25
	0542	0546	**	13.0	-	-	-	-	-	-	-
	0546	0550	**	12.0	-	-	-	-	-	-	-
	0550	0554	**	11.5	-	-	-	-	-	-	-
3	0900	0910	Comp	9.8	6.1	25	-	-	27.0	40	44
3	0910	0920	Comp	9.5	6.3	25	-	-	27.0	39	42
3	0920	0930	Comp	9.5	6.3	25	-	-	28.0	39	44
4	0942	0952	Comp	9.8	6.3	25	-	-	27.0	40	44
4	0952	1002	Comp	9.5	6.3	25	-	-	27.0	39	42
4	1002	1012	Comp	9.5	6.2	25	-	-	26.0	39	41

COMMENTS:

1) Test 3 & 4 - Without Urea Injection

2) * O2 At Ammonia Sampling Port With Urea On - Three Points Traverse
** O2 At Ammonia Sampling Port With Urea Off - Three Points Traverse

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 10-01-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 167 MW With Urea Injection

Test #: 1
Fuel: Natural Gas
Unit: 5
Lotus File: OCT01T1

Standard Conditions: 68 °F
29.92 *In. Hg*

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	452.923
Final Reading	Cu. Feet	469.463
Avg. Meter Temp.	°F	102.0
Y Factor	N.D.	1.0383
Delta H	iwg	1.0
Bar. Pressure	Inch Hg	30.25
Net Cond. H2O	g	53.20
Spectrophotometer		
Concentration	mg/L	1.41
Sample Volume	mL	482
Aliquot Factor	mL/mL	5.00
PARAMETER	**UNITS**	**DATA OUTPUT**
Total NH3 Catch	mg	3.4
Meter Volume	ACF	16.54
Sample Gas Vol.	DSCF	16.34
Moisture Content:		
Vol H2O Vapor	SCF	2.51
Flue Gas Moist.	%	13.32
Oxygen Conc.	%	7.0
Ammonia Slip	PPM Vol.	10.4
At 3% O2	PPM Vol.	13.4

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 10-01-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 167 MW With Urea Injection

Test #: 2
Fuel: Natural Gas
Unit: 5
Lotus File: OCT01T2

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	470.000
Final Reading	Cu. Feet	486.810
Avg. Meter Temp.	°F	104.3
Y Factor	N.D.	1.0383
Delta H	iwg	1.1
Bar. Pressure	Inch Hg	30.25
Net Cond. H2O	g	55.00
Spectrophotometer		
Concentration	mg/L	1.15
Sample Volume	mL	530
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	mg	3.0
Meter Volume	ACF	16.81
Sample Gas Vol.	DSCF	16.54
Moisture Content:		
Vol H2O Vapor	SCF	2.60
Flue Gas Moist.	%	13.56
Oxygen Conc.	%	7.4
Ammonia Slip	PPM Vol.	9.2
At 3% O2	PPM Vol.	12.2

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 10-02-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: *140 MW With Urea Injection*

Page 1 of 1
Test #: 1
Fuel: Natural Gas
Unit: 5
Lotus File: OCT02T1

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	487.409
Final Reading	Cu. Feet	504.661
Avg. Meter Temp.	°F	100.7
Y Factor	N.D.	1.0383
Delta H	iwg	1.0
Bar. Pressure	Inch Hg	30.26
Net Cond. H2O	g	54.30
Spectrophotometer		
Concentration	mg/L	1.48
Sample Volume	mL	540
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	*mg*	4.0
Meter Volume	ACF	17.25
Sample Gas Vol.	DSCF	17.09
Moisture Content:		
Vol H2O Vapor	SCF	2.56
Flue Gas Moist.	%	13.04
Oxygen Conc.	%	7.9
Ammonia Slip	PPM Vol.	11.7
At 3% O2	PPM Vol.	16.1

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 10-02-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 140 MW With Urea Injection

Test #: 2
Fuel: Natural Gas
Unit: 5
Lotus File: OCT02T2

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	505.135
Final Reading	Cu. Feet	522.393
Avg. Meter Temp.	°F	110.2
Y Factor	N.D.	1.0383
Delta H	iwg	1.0
Bar. Pressure	Inch Hg	30.26
Net Cond. H2O	g	46.50
Spectrophotometer		
Concentration	mg/L	0.91
Sample Volume	mL	510
Aliquot Factor	mL/mL	5.00
PARAMETER	**UNITS**	**DATA OUTPUT**
Total NH3 Catch	mg	2.3
Meter Volume	ACF	17.26
Sample Gas Vol.	DSCF	16.81
Moisture Content:		
Vol H2O Vapor	SCF	2.19
Flue Gas Moist.	%	11.55
Oxygen Conc.	%	8.0
Ammonia Slip	PPM Vol.	6.9
At 3% O2	PPM Vol.	9.6

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 09-29-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 40 MW With Urea Injection

Test #: 1
Fuel: Natural Gas
Unit: 5
Lotus File: SEP29T1

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	400.474
Final Reading	Cu. Feet	417.312
Avg. Meter Temp.	°F	89.0
Y Factor	N.D.	1.0383
Delta H	iwg	1.1
Bar. Pressure	Inch Hg	30.25
Net Cond. H2O	g	44.40
Spectrophotometer		
Concentration	mg/L	1.10
Sample Volume	mL	490
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	mg	2.7
Meter Volume	ACF	16.84
Sample Gas Vol.	DSCF	17.03
Moisture Content:		
Vol H2O Vapor	SCF	2.10
Flue Gas Moist.	%	10.96
Oxygen Conc.	%	12.0
Ammonia Slip	PPM Vol.	7.9
At 3% O2	PPM Vol.	15.9

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 09-29-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 40 MW With Urea Injection

Test #: 2
Fuel: Natural Gas
Unit: 5
Lotus File: SEP29T2

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	417.716
Final Reading	Cu. Feet	434.791
Avg. Meter Temp.	°F	92.5
Y Factor	N.D.	1.0383
Delta H	iwg	1.1
Bar. Pressure	Inch Hg	30.25
Net Cond. H2O	g	52.10
Spectrophotometer		
Concentration	mg/L	1.07
Sample Volume	mL	525
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	mg	2.8
Meter Volume	ACF	17.07
Sample Gas Vol.	DSCF	17.16
Moisture Content:		
Vol H2O Vapor	SCF	2.46
Flue Gas Moist.	%	12.53
Oxygen Conc.	%	12.2
Ammonia Slip	PPM Vol.	8.2
At 3% O2	PPM Vol.	16.8

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 09-21-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 172 MW With Urea Injection

Test #: 3
Fuel: Natural Gas
Unit: 6
Lotus File: SEP21T1

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	412.940
Final Reading	Cu. Feet	428.517
Avg. Meter Temp.	°F	92.1
Y Factor	N.D.	1.0380
Delta H	iwg	0.92
Bar. Pressure	Inch Hg	30.20
Net Cond. H2O	g	60.80
Spectrophotometer		
Concentration	mg/L	1.69
Sample Volume	mL	531
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	mg	4.5
Meter Volume	ACF	15.58
Sample Gas Vol.	DSCF	15.63
Moisture Content:		
Vol H2O Vapor	SCF	2.87
Flue Gas Moist.	%	15.51
Oxygen Conc.	%	7.70
Ammonia Slip	PPM Vol.	14.3
At 3% O2	PPM Vol.	19.4

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 09-21-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 172 MW With Urea Injection

Test #: 4
Fuel: Natural Gas
Unit: 6
Lotus File: SEP21T2

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	438.461
Final Reading	Cu. Feet	455.030
Avg. Meter Temp.	°F	92.5
Y Factor	N.D.	1.0380
Delta H	iwg	1.00
Bar. Pressure	Inch Hg	30.20
Net Cond. H2O	g	56.00
Spectrophotometer		
Concentration	mg/L	1.77
Sample Volume	mL	478
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	mg	4.2
Meter Volume	ACF	16.57
Sample Gas Vol.	DSCF	16.62
Moisture Content:		
Vol H2O Vapor	SCF	2.64
Flue Gas Moist.	%	13.72
Oxygen Conc.	%	7.9
Ammonia Slip	PPM Vol.	12.7
At 3% O2	PPM Vol.	17.5

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 09-22-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 140 MW With Urea Injection

Test #: 3
Fuel: Natural Gas
Unit: 6
Lotus File: SEP22T1

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	456.664
Final Reading	Cu. Feet	473.220
Avg. Meter Temp.	°F	91.5
Y Factor	N.D.	1.0380
Delta H	iwg	1.03
Bar. Pressure	Inch Hg	30.28
Net Cond. H2O	g	53.80
Spectrophotometer		
Concentration	mg/L	1.72
Sample Volume	mL	505
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	mg	4.3
Meter Volume	ACF	16.56
Sample Gas Vol.	DSCF	16.68
Moisture Content:		
Vol H2O Vapor	SCF	2.54
Flue Gas Moist.	%	13.21
Oxygen Conc.	%	8.7
Ammonia Slip	PPM Vol.	13.0
At 3% O2	PPM Vol.	19.1

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 09-22-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 140 MW With Urea Injection

Test #: 4
Fuel: Natural Gas
Unit: 6
Lotus File: SEP22T2

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	473.835
Final Reading	Cu. Feet	489.734
Avg. Meter Temp.	°F	93.8
Y Factor	N.D.	1.0380
Delta H	iwg	0.92
Bar. Pressure	Inch Hg	30.29
Net Cond. H2O	g	50.80
Spectrophotometer		
Concentration	mg/L	1.44
Sample Volume	mL	534
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	mg	3.8
Meter Volume	ACF	15.90
Sample Gas Vol.	DSCF	15.95
Moisture Content:		
Vol H2O Vapor	SCF	2.40
Flue Gas Moist.	%	13.07
Oxygen Conc.	%	8.6
Ammonia Slip	PPM Vol.	12.0
At 3% O2	PPM Vol.	17.5

SIERRA ENVIRONMENTAL ENGINEERING, INC.

AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 09-24-92
Test Location: *Flue Gas Duct Prior To Stack*
Test Condition: 41 MW With Urea Injection

Page 1 of 1
Test #: 1
Fuel: Natural Gas
Unit: 6
Lotus File: SEP24T1

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	559.830
Final Reading	Cu. Feet	576.643
Avg. Meter Temp.	°F	84.7
Y Factor	N.D.	1.0380
Delta H	iwg	1.0
Bar. Pressure	Inch Hg	30.15
Net Cond. H2O	g	39.40
Spectrophotometer		
Concentration	mg/L	1.13
Sample Volume	mL	542
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	mg	3.1
Meter Volume	ACF	16.81
Sample Gas Vol.	DSCF	17.08
Moisture Content:		
Vol H2O Vapor	SCF	1.86
Flue Gas Moist.	%	9.82
Oxygen Conc.	%	12.0
Ammonia Slip	PPM Vol.	9.0
At 3% O2	PPM Vol.	18.0

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AMMONIA SLIP CALCULATION

Client: SCE-Redondo
Project #: 92364
Test Date: 09-24-92
Test Location: Flue Gas Duct Prior To Stack
Test Condition: 41 MW With Urea Injection

Test #: 2
Fuel: Natural Gas
Unit: 6
Lotus File: SEP24T2

Standard Conditions: 68 °F
29.92 In. Hg

PARAMETER	UNITS	DATA INPUT
Meter Condition		
Initial Reading	Cu. Feet	577.200
Final Reading	Cu. Feet	593.543
Avg. Meter Temp.	°F	86.7
Y Factor	N.D.	1.0380
Delta H	iwg	1.0
Bar. Pressure	Inch Hg	30.18
Net Cond. H2O	g	43.00
Spectrophotometer		
Concentration	mg/L	0.87
Sample Volume	mL	661
Aliquot Factor	mL/mL	5.00

PARAMETER	UNITS	DATA OUTPUT
Total NH3 Catch	mg	2.9
Meter Volume	ACF	16.34
Sample Gas Vol.	DSCF	16.55
Moisture Content:		
Vol H2O Vapor	SCF	2.03
Flue Gas Moist.	%	10.92
Oxygen Conc.	%	12:1
Ammonia Slip	PPM Vol.	8.7
At 3% O2	PPM Vol.	17.6

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laboratory services

LABORATORY ANALYSIS REPORT

Oxygen, Methane, & Total Gaseous Non-Methane Organics Analysis in Tedlar Bag Samples

Report Date:	October 9, 1992
Client:	Sierra Environmental
P.O. No.:	2793
Project No.:	92364
Site:	SCE, Redondo
Date Received:	October 2, 1992
Date Analyzed:	October 2, 1992

ANALYSIS DESCRIPTION

Oxygen was analyzed by thermal conductivity detection/gas chromatography (TCD/GC). Methane and total gaseous non-methane organics were measured by flame ionization detection/total combustion analysis portion (FID/TCA).

AtmAA Lab No.:	92762-11	92762-12	92762-13	92762-14
Sample I.D.:	920231	920232	920233	920234
Components:	(Concentration in %, v/v)			
Oxygen	7.82	8.04	7.90	7.74
	(Concentration in ppm, v/v)			
Methane	< 1	< 1	< 1	< 1
TGNMO	15.7	17.8	18.7	21.4

The reported oxygen concentration includes any argon present in the sample, calibration is based on a standard atmosphere containing 20.95% oxygen and 0.93% argon.

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.: 92364
Site: SCE, Redondo

Component:	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in %, v/v)			
Oxygen	920231	7.87	7.78	7.82	0.57
		(Concentration in ppm, v/v)			
Methane	920231	< 1	< 1	---	---
	920234	< 1	< 1	---	---
TGNMO	920231	15.5	15.9	15.7	1.3
	920234	21.1	21.8	21.4	1.6

A set of 4 Tedlar bag samples laboratory numbers, 92762-(11-14) was analyzed for oxygen, 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 3 repeat measurements from the sample set of 4 Tedlar bag samples is 1.2%.

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CHAIN OF CUSTODY DOCUMENT

TEST DATE 10-01-92 PAGE 1 OF 1

CLIENT SCE - REDONDO LOCATION VOTT #5

PROJECT # 9236A

SAMPLED BY:	RECOVERED BY:		DATE	TIME
			10-01-92	1433
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
		TRANSPORTATION **	10.2.92	850
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
		analysis	10-2-92	10:45

ANALYSIS REQUESTED

SAMPLE ID	SAMPLE DESCRIPTION	TEST NO.	DATE/TIME SAMPLED	SCAQMD 25.3	O2							SAMPLE COND.
920231	167 HW W/ UREA	1	9-30-92 - 1252	✓	✓							
920232	167 HW W/ UREA	2	1252	✓	✓							
920233	167 HW W/O UREA	3	1445	✓	✓							
920234	167 HW W/O UREA	4	1542	✓	✓							

COMMENTS:

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LABORATORY ANALYSIS REPORT

Oxygen, Methane, & Total Gaseous Non-Methane Organics Analysis in Tedlar Bag Samples

Report Date:	October 9, 1992
Client:	Sierra Environmental
P.O. No.:	2793
Project No.:	92364
Site:	SCE, Redondo
Date Received:	October 3, 1992
Date Analyzed:	October 3, 1992

ANALYSIS DESCRIPTION

Oxygen was analyzed by thermal conductivity detection/gas chromatography (TCD/GC). Methane and total gaseous non-methane organics were measured by flame ionization detection/total combustion analysis portion (FID/TCA).

AtmAA Lab No.:	92772-1	92772-2	92772-3	92772-4	92772-5
Sample I.D.:	920239	920240	920220	920221	920222
Components:	(Concentration in %, v/v)				
Oxygen	8.01	8.20	8.03	8.46	0.15
	(Concentration in ppm, v/v)				
Methane	< 1	< 1	< 1	< 1	< 1
TGNMO	16.7	15.2	9.50	9.52	4.60

The reported oxygen concentration includes any argon present in the sample, calibration is based on a standard atmosphere containing 20.95% oxygen and 0.93% argon.

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.: 92364
Site: SCE, Redondo

Component:	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in %, v/v)			
Oxygen	920221	8.53	8.38	8.46	0.89
		(Concentration in ppm, v/v)			
Methane	920240	< 1	< 1	---	---
	920222	< 1	< 1	---	---
TGNMO	920240	15.8	14.6	15.2	3.9
	920222	4.62	4.58	4.60	0.43

A set of 5 Tedlar bag samples laboratory numbers, 92772-(1-5) was analyzed for oxygen, 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 3 repeat measurements from the sample set of 5 Tedlar bag samples is 1.7%.

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TEST DATE 10-02-92 PAGE 1 OF 1

CLIENT SCE - REDONDO LOCATION UNIT # 5 STACK

PROJECT # 92364

SAMPLED BY:	RECOVERED BY:		DATE	TIME
			10-02-92	
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
		TRANSPORTATION	10-02-92	
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
			10-3 92	
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME

ANALYSIS REQUESTED

SAMPLE ID	SAMPLE DESCRIPTION	TEST NO.	DATE/TIME SAMPLED	SO2	O2							SAMPLE COND.
920239	140 MW W/UREA	1	10-02-92/1150	✓	✓							
920240	140 MW W/UREA	2	1150	✓	✓							
920220	140 MW W/O UREA	3	1416	✓	✓							
920221	140 MW W/O UREA	↑	↓ 1506	✓	✓							
920222	FIELD BLANK	—	10-02-92/1410	✓	✓							

COMMENTS:

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LABORATORY ANALYSIS REPORT

Oxygen, Methane, & Total Gaseous Non-Methane Organics
Analysis in Tedlar Bag Samples

Report Date:	October 1, 1992
Client:	Sierra Environmental
P.O. No.:	2793
Site:	SCE, Redondo
Project No.:	92364
Date Received:	September 29, 1992
Date Analyzed:	September 30, 1992

ANALYSIS DESCRIPTION

Oxygen was analyzed by thermal conductivity detection/gas chromatography (TCD/GC). Methane and total gaseous non-methane organics were measured by flame ionization detection/total combustion analysis portion (FID/TCA).

AtmAA Lab No.:	92732-12	92732-13	92732-14	92732-15
Sample I.D.:	920223	920224	920225	920227
Components:	(Concentration in %, v/v)			
Oxygen	13.0	12.6	13.4	13.2
	(Concentration in ppm, v/v)			
Methane	1.19	1.13	< 1	< 1
TGNMO	9.85	11.1	11.2	10.4

The reported oxygen concentration includes any argon present in the sample, calibration is based on a standard atmosphere containing 20.95% oxygen and 0.93% argon.

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.: 92364
Site: SCE, Redondo

Component:	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in %, v/v)			
Oxygen	920225	13.2	13.5	13.4	1.1
		(Concentration in ppm, v/v)			
Methane	920223	1.20	1.18	1.19	0.84
TGNMO	920223	10.0	9.70	9.85	1.5

A set of 4 Tedlar bag samples laboratory numbers, 92732-(12-15) was analyzed for oxygen, 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 3 repeat measurements from the sample set of 4 Tedlar bag samples is 1.1%.

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TEST DATE 09-29-92 PAGE 1 OF 1

CLIENT SCE - REDONDO LOCATION UNIT #5

PROJECT # 92364

SAMPLED BY:	RECOVERED BY:		DATE	TIME
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
[signature]	[signature]	TRANSPORTATION **	9-29-92	1359
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
[signature]	[signature]	analysis	9-29-92	5:15 PM

ANALYSIS REQUESTED

SAMPLE ID	SAMPLE DESCRIPTION	TEST NO.	DATE/TIME SAMPLED	AQMD 25.2	O2							SAMPLE COND.
920223	40 W/ UREA	1	9-29-92/0525	✓	✓							
920224	40 W/ UREA	2	9-29-92/0525	✓	✓							
920225	40 W/O UREA	3	9-29-92/0911	✓	✓							
920227	40 W/O UREA	4	9-29-92/0911	✓	✓							

COMMENTS:

** RIGHT-O-WAY DELIVERY SERVICE

Unit #6

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LABORATORY ANALYSIS REPORT

Oxygen, Methane, & Total Gaseous Non-Methane Organics Analysis in Tedlar Bag Samples

Report Date: September 24, 1992
Client: Sierra Environmental
P.O. No.: 2793
Project No.: 92364
Date Received: September 22, 1992
Date Analyzed: September 22, & 23, 1992

ANALYSIS DESCRIPTION

Oxygen was analyzed by thermal conductivity detection/gas chromatography (TCD/GC). Methane and total gaseous non-methane organics were measured by flame ionization dectection/total combustion analysis portion (FID/TCA).

AtmAA Lab No.:	92662-9	92662-10	92662-11	92662-12
Sample I.D.:	920158	920159	920160	920518
Components:	(Concentration in %, v/v)			
Oxygen	8.15	8.62	8.12	8.62
	(Concentration in ppm, v/v)			
Methane	7.30	7.49	8.12	6.85
TGNMO	14.0	11.6	10.2	11.0

The reported oxygen concentration includes any argon present in the sample, calibration is based on a standard atmosphere containing 20.95% oxygen and 0.93% argon.

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.: 92364

Component:	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in %, v/v)			
Oxygen	920159	8.53	8.72	8.62	1.1
		(Concentration in ppm, v/v)			
Methane	920158	7.37	7.23	7.30	0.96
TGNMO	920158	14.1	13.8	14.0	1.1

A set of 4 Tedlar bag samples laboratory numbers, 92662-(9-12) was analyzed for oxygen, methane, and TGNMO. Agreement between repeat analyses is a measure of precision and is shown above the column "% Difference from Mean." Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 3 repeat measurements from the sample set of 4 Tedlar bag samples is 1.0%.

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CHAIN OF CUSTODY DOCUMENT

TEST DATE 9-21-92 PAGE 1 OF 1

CLIENT SCE - REDONDO LOCATION UNIT #6 STACK P.T. OUTLET

PROJECT # 92364

SAMPLED BY:	RECOVERED BY:		DATE	TIME
Raymond G Pionessa	N/A		9-21-92	
RELINQUISHED BY:	**RECEIVED BY:**	**FOR**	**DATE**	**TIME**
	Vince Carter *	TRANSPORTATION	9-22-92	1227
RELINQUISHED BY:	**RECEIVED BY:**	**FOR**	**DATE**	**TIME**
Vince Carter		ANALYSIS		
RELINQUISHED BY:	**RECEIVED BY:**	**FOR**	**DATE**	**TIME**

ANALYSIS REQUESTED

SAMPLE ID	SAMPLE DESCRIPTION	TEST NO.	DATE/TIME SAMPLED	SCAQMD 25.2	O2							SAMPLE COND.
920156	175 MW - NO UREA	1	1013 - 9/21/92	X	X			Tedlar	-	9		
920159	175 MW - NO UREA	2	1110 - 9/21/92	X	X				-	10		
920160	175 MW - W/UREA	3	1312 - 9/21/92	X	X				-	11		
920518	175 MW - W/UREA	4	1546 - 9/21/92	X	X				-	12		

COMMENTS:

MUST BE ANALYZED IN 72 HRS!!!

P.O. No. 2793

PLEASE SUBMIT REPORT TO SON H. NGUYEN

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LABORATORY ANALYSIS REPORT

Oxygen, Methane, & Total Gaseous Non-Methane Organics
Analysis in Tedlar Bag Samples

Report Date:	September 24, 1992
Client:	Sierra Environmental
P.O. No.:	2793
Project No.:	92364
Date Received:	September 24, 1992
Date Analyzed:	September 24, 1992

ANALYSIS DESCRIPTION

Oxygen was analyzed by thermal conductivity detection/gas chromatography (TCD/GC). Methane and total gaseous non-methane organics were measured by flame ionization dectection/total combustion analysis portion (FID/TCA).

AtmAA Lab No.:	92682-1	92682-2	92682-3	92682-4
Sample I.D.:	920548	920550	920551	920552
Components:	(Concentration in %, v/v)			
Oxygen	9.14	9.31	9.00	9.11
	(Concentration in ppm, v/v)			
Methane	3.87	4.30	4.10	4.43
TGNMO	12.4	13.8	12.9	13.9

The reported oxygen concentration includes any argon present in the sample, calibration is based on a standard atmosphere containing 20.95% oxygen and 0.93% argon.

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.: 92364

Component:	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in %, v/v)			
Oxygen	920550	9.20	9.09	9.14	0.60
		(Concentration in ppm, v/v)			
Methane	920548	3.90	3.85	3.87	0.64
TGNMO	920548	11.2	13.7	12.4	10

A set of 4 Tedlar bag samples laboratory numbers, 92682-(1-4) was analyzed for oxygen, methane, and TGNMO. Agreement between repeat analyses is a measure of precision and is shown above the column "% Difference from Mean." Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 3 repeat measurements from the sample set of 4 Tedlar bag samples is 3.7%.

SIERRA ENVIRONMENTAL ENGINEERING, INC.
CHAIN OF CUSTODY DOCUMENT

TEST DATE 9-22-92 PAGE 1 OF 1

CLIENT SCE - REDONDO LOCATION APH OUT UNIT #6

PROJECT # 92364

SAMPLED BY:	RECOVERED BY:		DATE	TIME
R.G. Pioneer Jr.	JOE MONTIAL		9-22-92	1445
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
	Dan Glenn	TRANSPORTATION **	9-23-92	
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
Dan Glenn	Kim Porter	ANALYSIS	9/24/92	8:30
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME

ANALYSIS REQUESTED

	SAMPLE ID	SAMPLE DESCRIPTION	TEST NO.	DATE/TIME SAMPLED	WAQMD 25	O2								SAMPLE COND.
2682-1	920546	140 MW W/O UREA	1	0921 / 9-22-92	X	X								
-2	920550	140 MW W/O UREA	2	1010 / "	X	X								
-3	920551	140 MW W/ UREA	3	1156 / "	X	X								
-4	920552	140 MW W/ UREA	4	1320 / "	X	X								

COMMENTS:

* MUST BE ANALYZED WITHIN 72 HRS!!!

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LABORATORY ANALYSIS REPORT

Oxygen, Methane, & Total Gaseous Non-Methane Organics
Analysis in Tedlar Bag Samples

Report Date:	September 29, 1992
Client:	Sierra Environmental
P.O. No.:	2793
Project No.:	92364
Date Received:	September 25, 1992
Date Analyzed:	September 25, 1992

ANALYSIS DESCRIPTION

Oxygen was analyzed by thermal conductivity detection/gas chromatography (TCD/GC). Methane and total gaseous non-methane organics were measured by flame ionization dectection/total combustion analysis portion (FID/TCA).

AtmAA Lab No.:	92692-1	92692-2	92692-3	92692-4	92692-5
Sample I.D.:	920163	920164	920165	920166	920248
Components:	(Concentration in %, v/v)				
Oxygen	13.7	14.0	14.2	14.0	0.13
	(Concentration in ppm, v/v)				
Methane	8.84	7.80	8.51	5.92	< 1
TGNMO	11.0	10.7	12.3	11.3	4.51

The reported oxygen concentration includes any argon present in the sample, calibration is based on a standard atmosphere containing 20.95% oxygen and 0.93% argon.

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.: 92364

Component:	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in %, v/v)			
Oxygen	920164	14.0	14.1	14.0	0.35
		(Concentration in ppm, v/v)			
Methane	920163	8.88	8.80	8.84	0.45
	920166	5.88	5.96	5.92	0.68
TGNMO	920163	10.5	11.4	10.9	4.1
	920166	10.8	11.8	11.3	4.4

A set of 5 Tedlar bag samples laboratory numbers, 92692-(1-5) was analyzed for oxygen, methane, and TGNMO. Agreement between repeat analyses is a measure of precision and is shown above the column "% Difference from Mean." Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 5 repeat measurements from the sample set of 5 Tedlar bag samples is 2.0%.

SIERRA ENVIRONMENTAL ENGINEERING, INC.
CHAIN OF CUSTODY DOCUMENT

TEST DATE 9-24-92 PAGE 1 OF 1

CLIENT SCE REDONDO LOCATION UNIT #6

PROJECT # 92364

SAMPLED BY:	RECOVERED BY:		DATE	TIME
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
	[signature]	UA	9-24-92	1920
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
[signature]	[signature]	TRANSPORTATION	9-24-92	
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
[signature]				

ANALYSIS REQUESTED

	SAMPLE ID	SAMPLE DESCRIPTION	TEST NO.	DATE/TIME SAMPLED	SCAQMD 25.2	O2							SAMPLE COND.
92-1	920163	40 - W/ UREA	1	9-24-92 / 0642	✓	✓							
-2	920164	40 - W/ UREA	2	0642	✓	✓							
-3	920165	40 - W/O UREA	3	0900	✓	✓							
-4	920166	40 - W/O UREA	4	0900	✓	✓							
-5	920248	FIELD BLANK	N/A	0900	✓	✓							

Fim AA Lab #

COMMENTS:

RIGHT - O - WAY DELIVERY SERVICE

SPECTROPHOTOMETER ANALYSIS
STANDARD CALIBRATION

CLIENT SCE - Redondo ANALYTE NH_3

PROJECT NO. 92364 WAVE LENGTH 440 nm

COMMENTS: Primary Stock: 0.314g NH_4Cl/1L 0.1N HCL

(0.314g/L) x1000 (0.31838) = 99.97132 ug NH_3/mL or ≅ 10

Stock A: (100 ug NH_3/ml)(10ml) = Conc. A (100ml)

Conc. A = 10ug NH_3/ml

STOCK CONC ug/mL	ALIQUOT Vol. mL	FINAL Vol. mL	CONCENTRATION ug	CONCENTRATION ug/mL	ABSORBANCE
10	0	25	0	0	.055
	0.7		7	0.28	.068
	1.0		10	0.40	.119
	2.0		20	0.80	.325
	3.0		30	1.20	.633
	4.0		40	1.60	.916
	6.0		60	2.40	1.282
	8.0		80	3.20	1.783
	10.0		100	4.00	2.182
↓ ChK Std	4.0	↓	40	1.60	.760

CORRELATION COEFFICIENT 0.997

ANALYST BD

METHOD SCAQMD DRAFT

DATE 9-22-92

SPECTROPHOTOMETER ANALYSIS

CLIENT SCE - Redondo

ANALYTE NH_3

PROJECT NO. 92364

METHOD SCAQMD DRAFT

TEST DATE 9-22-92

WAVE LENGTH 440

SAMPLE IDENTIFICATION	DESORP. VOLUME DV (mL)	ALIQUOT VOLUME AV (mL)	TOTAL VOLUME V (mL)	ABSORBANCE	CONC. FROM CALIB. CURVE C (ug/mL)	TOTAL CONC. TC (mg)
920162	25	5	531	.885	1.69	4.5
920519	↓	↓	478	.935	1.77	4.2
* 920162-MS	↓	↓	531	1.315	2.43	6.5
920520	↓	↓	505	.902	1.72	4.3
920521	↓	↓	534	.741	1.44	3.8

* Spiked with 2mL - 10ug/ml Stock

$TC = C \times (DV / AV) \times (V / 1000)$

ANALYST BD

DATE 9-22-92

SPECTROPHOTOMETER ANALYSIS
STANDARD CALIBRATION

CLIENT SCE - Redondo ANALYTE NH_3

PROJECT NO. 92364 WAVE LENGTH 440 nm

COMMENTS: Primary Stock: 0.314g NH_4Cl/1L 0.1N HCL

(0.314g/L) x1000 (0.31838) = 99.97132 ug NH_3/mL or ≡ 10

Stock A: (100 ug NH_3/ml)(10mL) = Conc. A (100mL)

Conc. A = 10ug NH_3/mL

STOCK CONC ug/mL	ALIQUOT Vol. mL	FINAL Vol. mL	CONCENTRATION ug	CONCENTRATION ug/mL	ABSORBANCE
10	0	25	0	0	0.067
	0.7		7	0.28	0.093
	1.0		10	0.40	0.124
	2.0		20	0.80	0.364
	3.0		30	1.20	0.612
	4.0		40	1.60	0.820
	6.0		60	2.40	1.283
	8.0		80	3.20	1.797
	10.0		100	4.00	2.315
↓ Chk Std	4.0	↓	40	1.60	0.853

CORRELATION COEFFICIENT 0.9991

ANALYST RD

METHOD SCAQMD DRAFT

DATE 9-24-92

SPECTROPHOTOMETER ANALYSIS
STANDARD CALIBRATION

CLIENT SCE - Redondo ANALYTE NH_3

PROJECT NO. 92364 WAVE LENGTH 440 NM

COMMENTS: Primary Stock: 0.314g NH_4Cl/1L 0.1 N HCL

(0.314g/L) x1000 (0.31838) = 99.97132 ug NH_3/ml or ≅ 10

Stock A: (100 ug NH_3/ml)(10ml) = Conc. A (100ml)

Conc. A = 10ug NH_3/ml

STOCK CONC ug/mL	ALIQUOT Vol. mL	FINAL Vol. mL	CONCENTRATION ug	CONCENTRATION ug/mL	ABSORBANCE
10	0	25	0	0	.070
	0.7		7	0.28	.034
	1.0		10	0.40	.087
	2.0		20	0.80	.349
	3.0		30	1.20	.583
	4.0		40	1.60	.810
	6.0		60	2.40	1.306
	8.0		80	3.20	1.697
	10.0		100	4.00	2.208
Chk Std	4.0		40	1.60	.867

CORRELATION COEFFICIENT .9992

ANALYST RD

METHOD SCAQMD DRAFT

DATE 9-29-92

SPECTROPHOTOMETER ANALYSIS

CLIENT SCE - Redondo

ANALYTE NH_3

PROJECT NO. 92364

METHOD SCAQMD DRAFT

TEST DATE 9-24-92

WAVE LENGTH 440

SAMPLE IDENTIFICATION	DESORP. VOLUME DV (mL)	ALIQUOT VOLUME AV (mL)	TOTAL VOLUME V (mL)	ABSORBANCE	CONC. FROM CALIB. CURVE C (ug/mL)	TOTAL CONC. TC (mg)	
920178	25	5	542	.554	1.13	3.1	8.94
* 920178-MS	25	5	542	1.077	2.00	5.4	
920179/170	25	5	661	.397	.87	2.9	8.6
920179/170-MS	25	5	661	.852	1.62	5.4	

* 2.0mL Spike 10ug/mL Stock

TC = C x (DV / AV) x (V / 1000)

ANALYST BD

DATE 9-24-92

STEIGER ENVIRONMENTAL ENGINEERING, INC.

CHAIN OF CUSTODY DOCUMENT

TEST DATE SEP 21-24, 1992 PAGE 1 OF 2

CLIENT SCE REDONDO LOCATION FLUE GAS DUCT PRIOR TO STACK

PROJECT # 92364

RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
Ray Pioneer Jr	Brian Dunlap	ANALYSIS	9-21-92 9-24-92	
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME

ANALYSIS REQUESTED

SAMPLE ID	SAMPLE DESCRIPTION	TEST NO.	DATE/TIME SAMPLED	UM3 SCAQMD DRAFT								SAMPLE COND.
920162	IMP CATCH	1	9-21-92/1215	✓								GOOD
920519	"	2	9-21-92/1525	✓								"
920520	"	1	9-22-92/1142	✓								"
920521	"	2	9-22-92/1307	✓								"
920178	"	1	9-24-92/0915	✓								"
920170/171	↓	2	9-24-92/0613	✓								↓

COMMENTS:

UNIT #6

CUSTODY

SPECTROPHOTOMETER ANALYSIS

CLIENT SCE - Redondo

ANALYTE NH_3

PROJECT NO. 92364

METHOD SCAQMD DRAFT

TEST DATE 9-29-92

WAVE LENGTH 440

SAMPLE IDENTIFICATION	DESORP. VOLUME DV (mL)	ALIQUOT VOLUME AV (mL)	TOTAL VOLUME V (mL)	ABSORBANCE	CONC. FROM CALIB. CURVE C (ug/mL)	TOTAL CONC. TC (mg)	
920168	25	5	490	.513	1.10	2.7	7.89
920168*	25	5	490	.963	1.87	4.6	8.96
920226	25	5	525	.500	1.07	2.8	8.16
920226*	25	5	525	.929	1.81	4.8	9.32

*Spiked 2mL 10ug/mL

TC = C x (DV / AV) x (V / 1000)

ANALYST BD

DATE 9-29-92

SPECTROPHOTOMETER ANALYSIS
STANDARD CALIBRATION

CLIENT SCE - Redondo

ANALYTE NH_3

PROJECT NO. 92364

WAVE LENGTH 440 nm

COMMENTS: Primary Stock: 0.314g NH_4Cl/1L 0.1 N HCL

(0.314g/L) x1000 (0.31838) = 99.97132 ug NH_3/mL or ≡ 100

Stock A : (100 ug NH_3/ml)(10mL) = Conc. A (100mL)

Conc. A = 10ug NH_3/mL

STOCK CONC ug/mL	ALIQUOT Vol. mL	FINAL Vol. mL	CONCENTRATION ug	CONCENTRATION ug/mL	ABSORBANCE
10	0	25	0	0	
	0.7		7	0.28	
	1.0		10	0.40	0.193
	2.0		20	0.80	0.273
	3.0		30	1.20	0.570
	4.0		40	1.60	0.798
	6.0		60	2.40	1.403
	8.0		80	3.20	1.866
	10.0		100	4.00	2.326
CHK STD				1.2	0.619

CORRELATION COEFFICIENT

0.27

ANALYST RD

METHOD SCAQMD DRAFT

DATE 10-01-92

SPECTROPHOTOMETER ANALYSIS

CLIENT SCE - REDONDO

ANALYTE AMMONIA

PROJECT NO. _____

METHOD SCAQMD DRAFT

TEST DATE 09-30-92

WAVE LENGTH 440 NM

SAMPLE IDENTIFICATION	DESORP. VOLUME DV (mL)	ALIQUOT VOLUME AV (mL)	TOTAL VOLUME V (mL)	ABSORBANCE	CONC. FROM CALIB. CURVE C (ug/mL)	TOTAL CONC. TC (mg)
920229	25	5	482	0.896 -0.049	1.41	3.4
920229 S (5mL)	25	5	482	1.627 -0.049	2.69	107%
920230	25	5	530	0.570	1.15	3.05
920230 S (5mL)	25	5	530	1.279	2.28	94%
	O_2 = 7%	1.2878				
	9.31 ppm = 12 ppm					
920235	25	5	490	0.769	1.47	3.61

$TC = C \times (DV / AV) \times (V / 1000)$

ANALYST SW

DATE 10-01-92

SPECTROPHOTOMETER ANALYSIS
STANDARD CALIBRATION

CLIENT SCE - Redondo ANALYTE NH_3

PROJECT NO. 92364 WAVE LENGTH 440 nm

COMMENTS: Primary Stock: 0.314g NH_4Cl/1L 0.1 N HCL

(0.314g/L) x1000 (0.31838) = 99.97132 ug NH_3/mL or ≡ 10

Stock A: (100 ug NH_3/ml)(10mL) = Conc. A (100mL)

Conc. A = 10ug NH_3/mL

STOCK CONC ug/mL	ALIQUOT Vol. mL	FINAL Vol. mL	CONCENTRATION		ABSORBANCE
			ug	ug/mL	
10	0	25	0	0	0.080
	0.7		7	0.28	/
	1.0		10	0.40	0.191
	2.0		20	0.80	0.221
	3.0		30	1.20	0.430
	4.0		40	1.60	0.730
	6.0		60	2.40	1.352
	8.0		80	3.20	1.839
	10.0		100	4.00	2.329
					0.540

CORRELATION COEFFICIENT

ANALYST RD

METHOD SCAQMD DRAFT

DATE

SPECTROPHOTOMETER ANALYSIS

CLIENT _____ ANALYTE _____

PROJECT NO. _____ METHOD _____

TEST DATE _____ WAVE LENGTH _____

SAMPLE IDENTIFICATION	DESORP. VOLUME DV (mL)	ALIQUOT VOLUME AV (mL)	TOTAL VOLUME V (mL)	ABSORBANCE	CONC. FROM CALIB. CURVE C (ug/mL)	TOTAL CONC. TC (mg)
920237	25	5	540	0.751	1.48	4.00
				1.423	2.58	92%
920238	25	5	516	0.408	0.91	2.32
				1.105	2.06	95%

$$TC = C \times (DV / AV) \times (V / 1000)$$

ANALYST _____

DATE 10-02-92

SIERRA ENVIRONMENTAL ENGINEERING, INC.
CHAIN OF CUSTODY DOCUMENT

TEST DATE Sep 29- Oct 02, 1992 PAGE 2 OF 2

CLIENT SCE REDONDO LOCATION Flue Gas Duct Prior To Stack

PROJECT # 92364

RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
Robert Steyn	Jon Lyon	Analysis	9-29-92 10-02-92	
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME
RELINQUISHED BY:	RECEIVED BY:	FOR	DATE	TIME

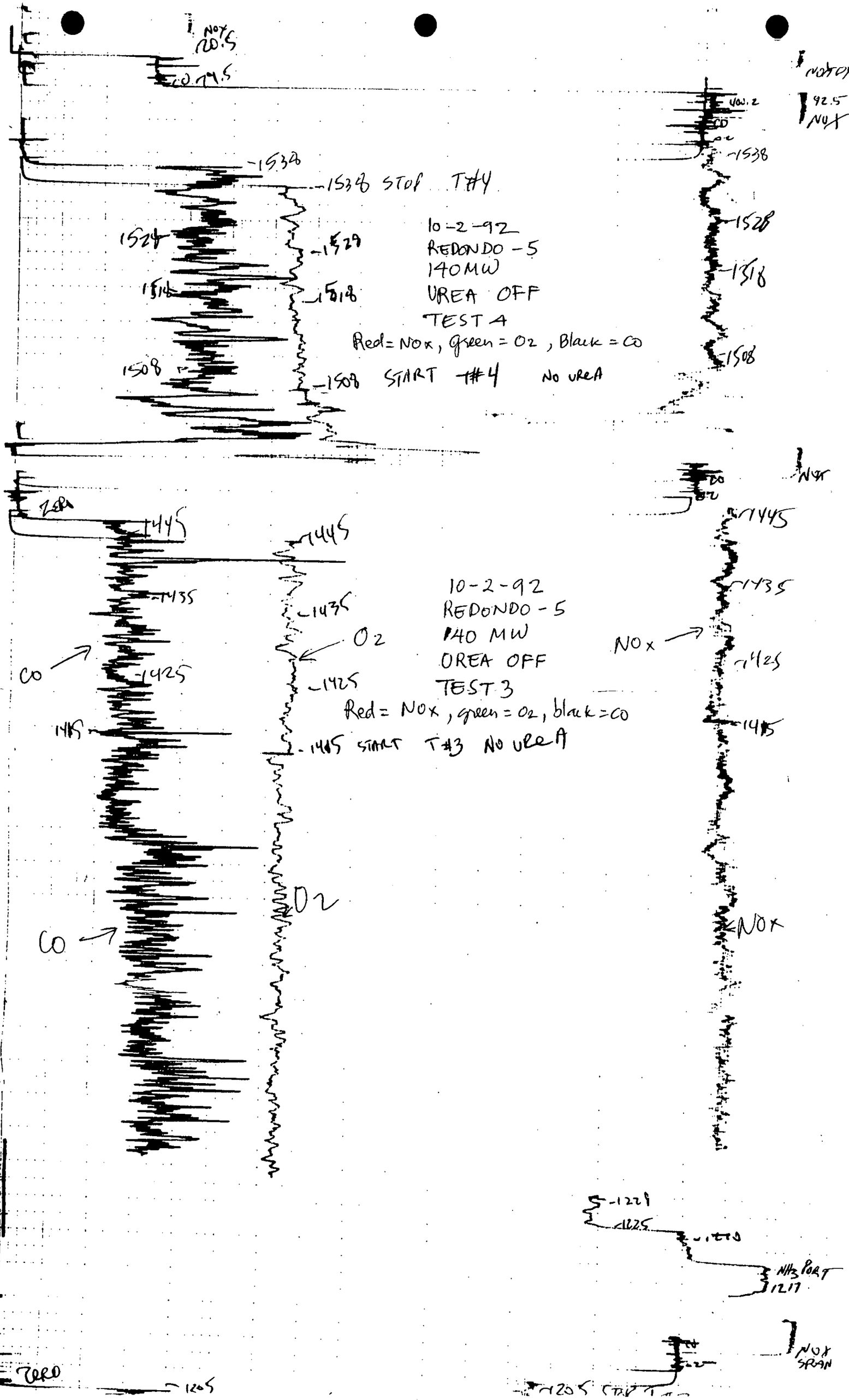
ANALYSIS REQUESTED

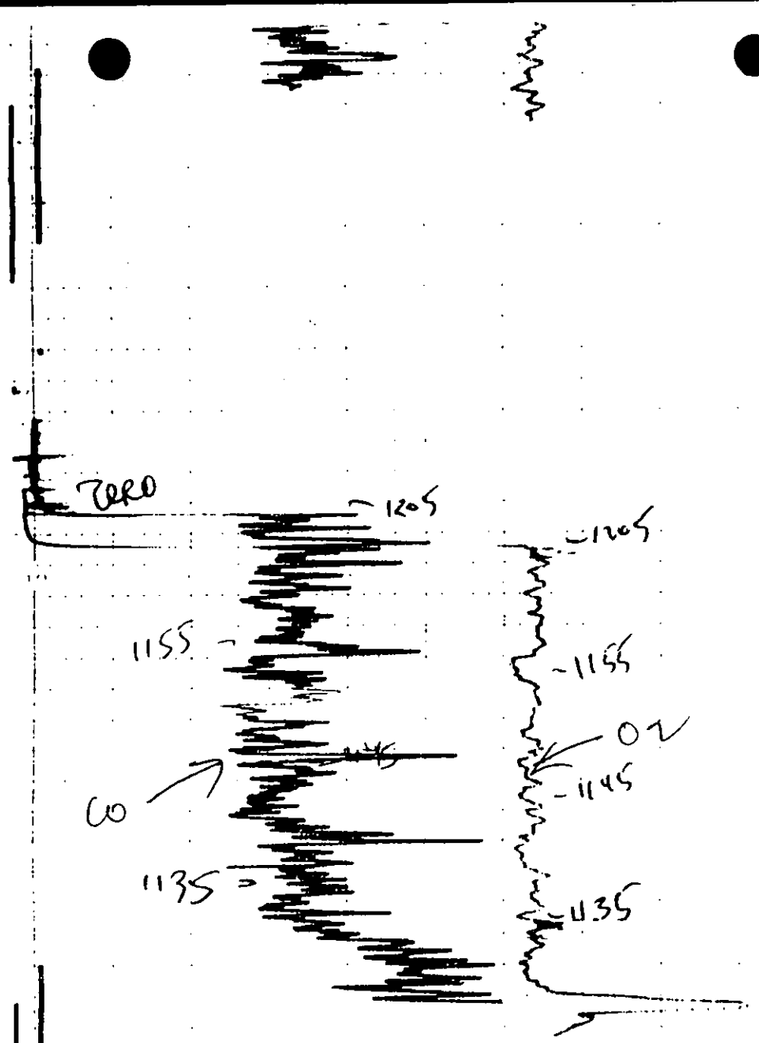
SAMPLE ID	SAMPLE DESCRIPTION	TEST NO.	DATE/TIME SAMPLED	Unit 3 SCAQMD DRAFT								SAMPLE COND.
920168	IMP CATCH	1	9-29-92/0316	✓								Good
920226	↓	2	9-29-92/0456	✓								↓
920229		1	10-01-92/1043	✓								
920230		2	10-01-92/1235	✓								
920237		1	10-02-92/1006	✓								
920238	↓	2	10-02-92/1134	✓								

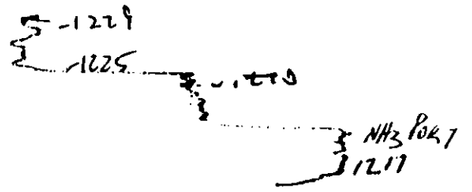
COMMENTS:

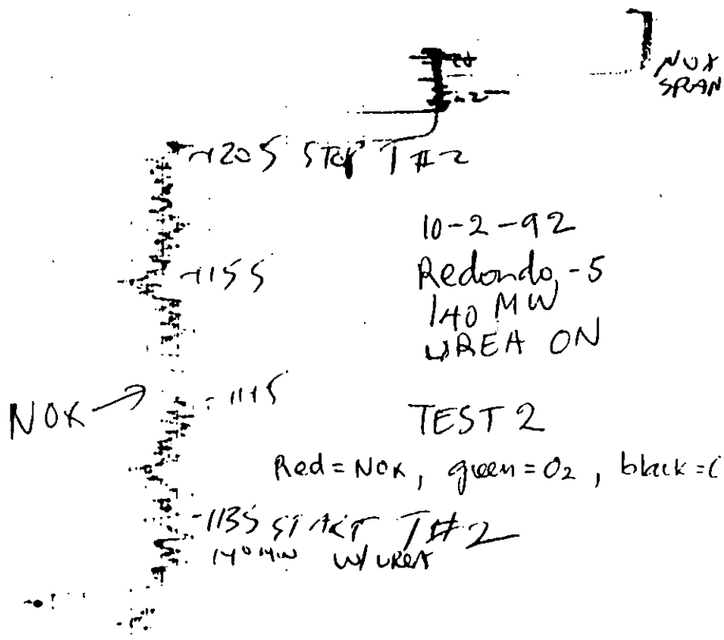
Unit #5

CUSTODY


1538
1538 STOP T#4
1528
1529
1518
1518
1508
1508 START T#4 NO UREA
10-2-92
REDONDO - 5
140 MW
UREA OFF
TEST 4
Red = NOx, green = O2, Black = CO
1538
1528
1518
1508
1445
1435
1425
1415
CO
1445
1435
1425
1415 START T#3 NO UREA
O2
CO
10-2-92
REDONDO - 5
140 MW
OREA OFF
TEST 3
Red = NOx, green = O2, black = CO
1445
1435
1425
1415
NOx
NOx
1229
1225
NH3 PORT
1217
1205
1205 START



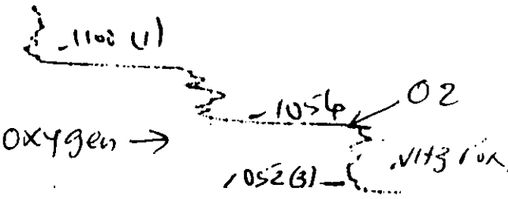


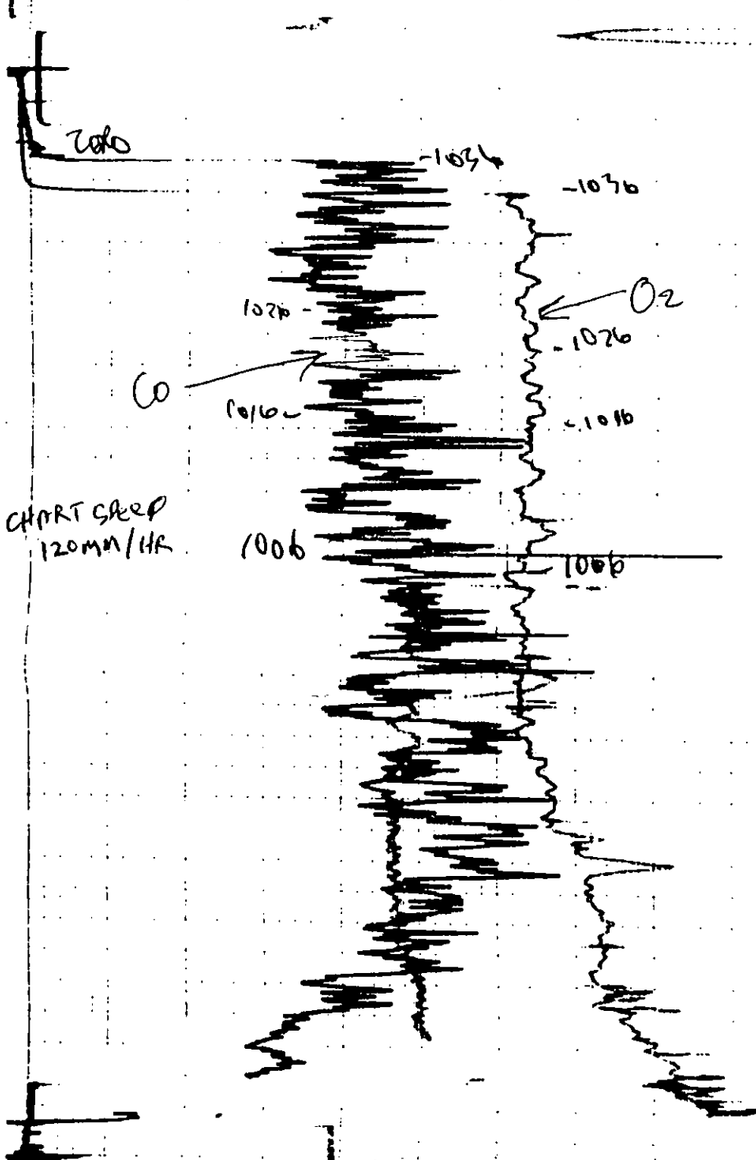


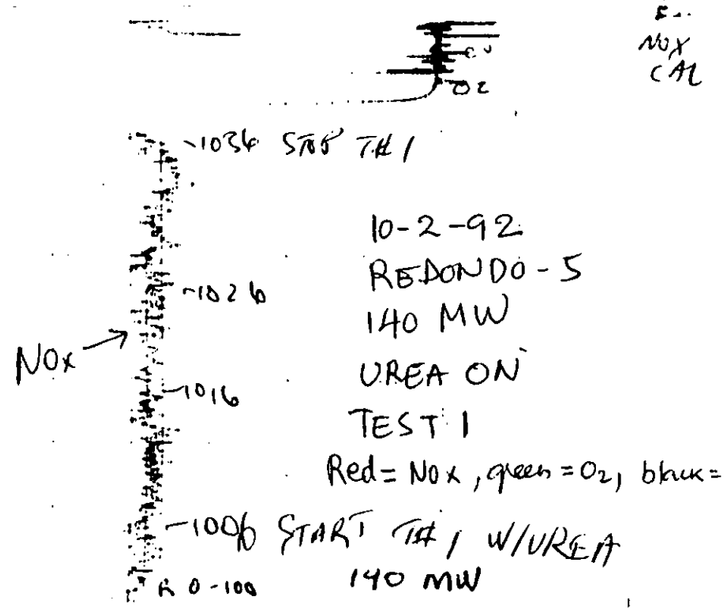
10-2-92
Redondo - 5
140 MW
UREA ON

TEST 2

Red = NOx, green = O_2, black = CO



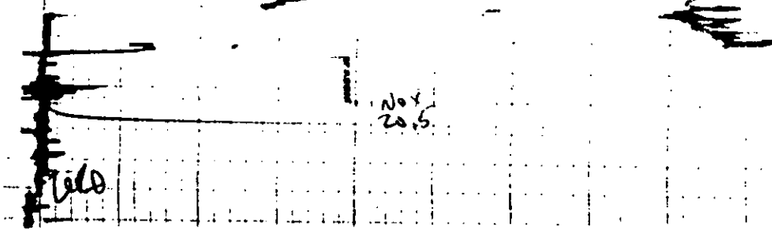


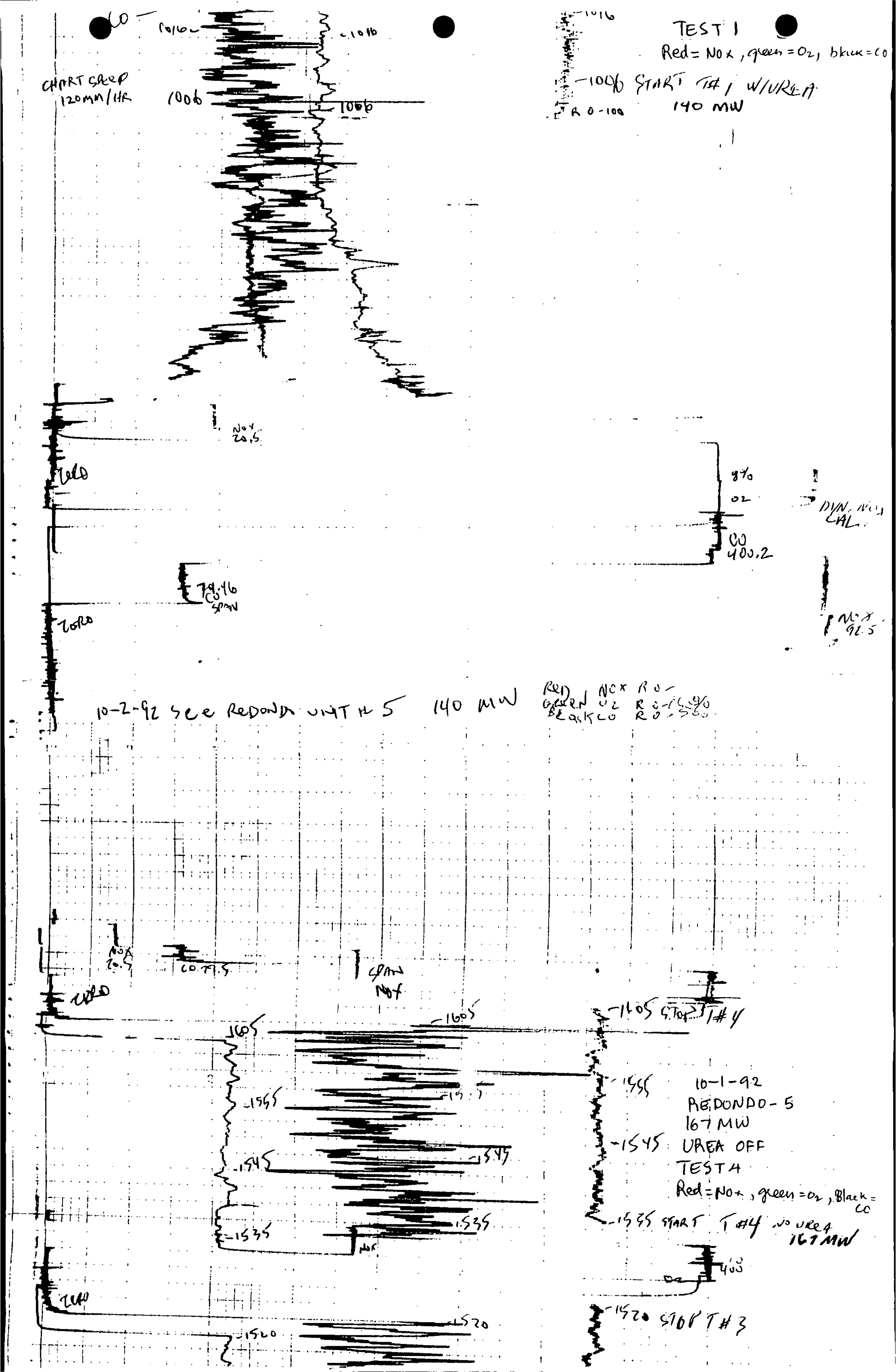


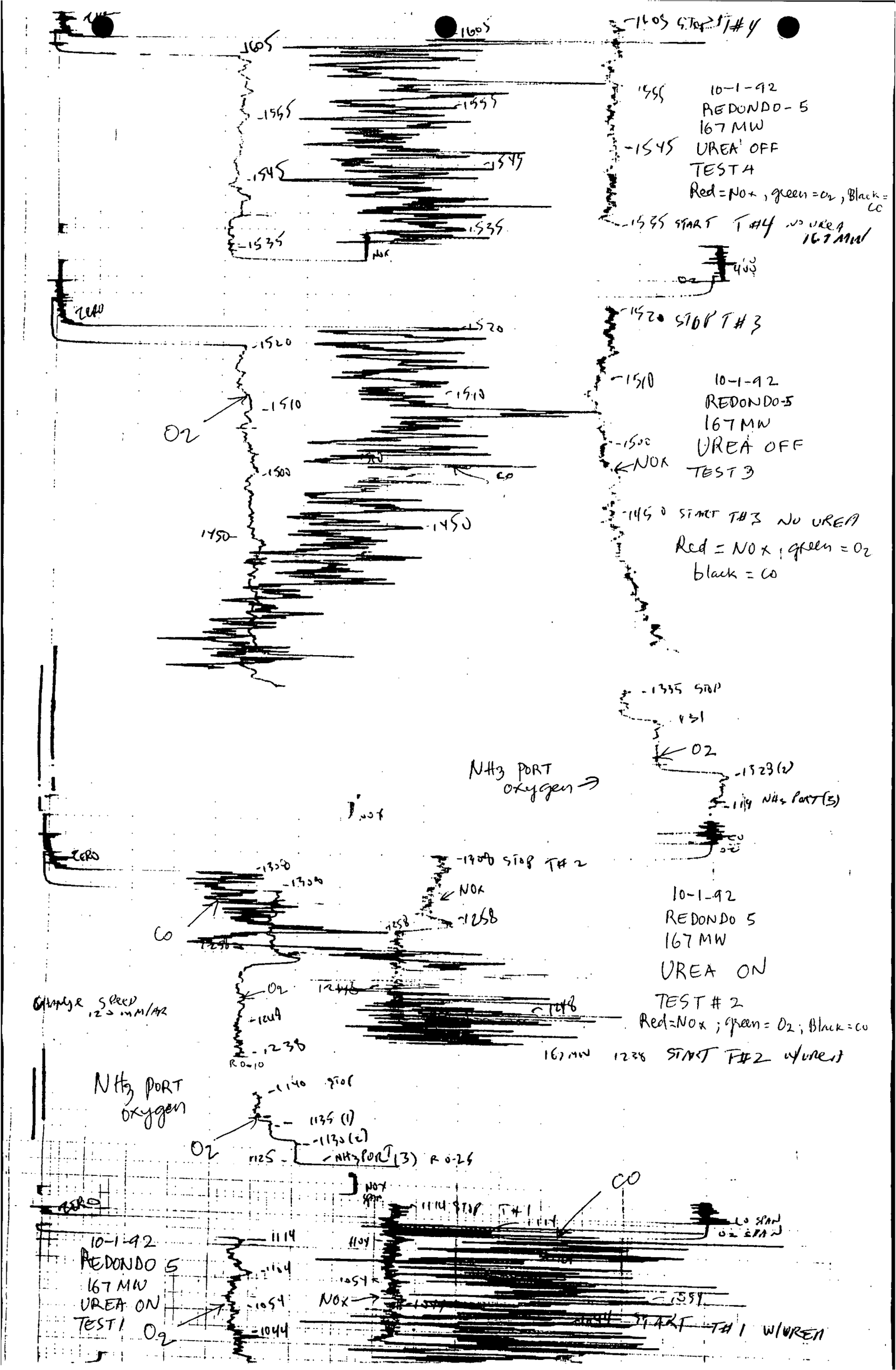
10-2-92
REDONDO - 5
140 MW
UREA ON

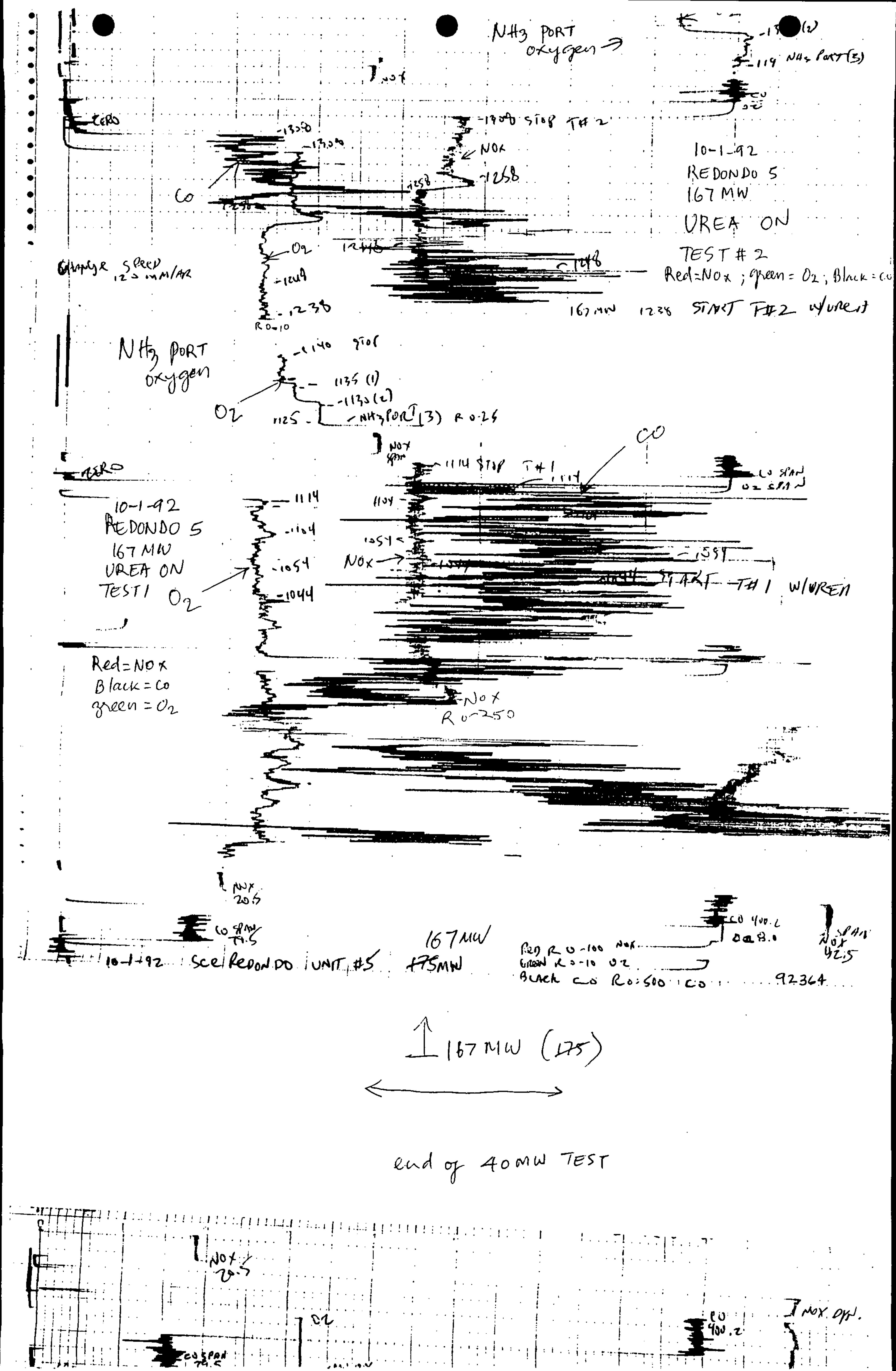
TEST 1

Red = NOx, green = O_2, black = CO

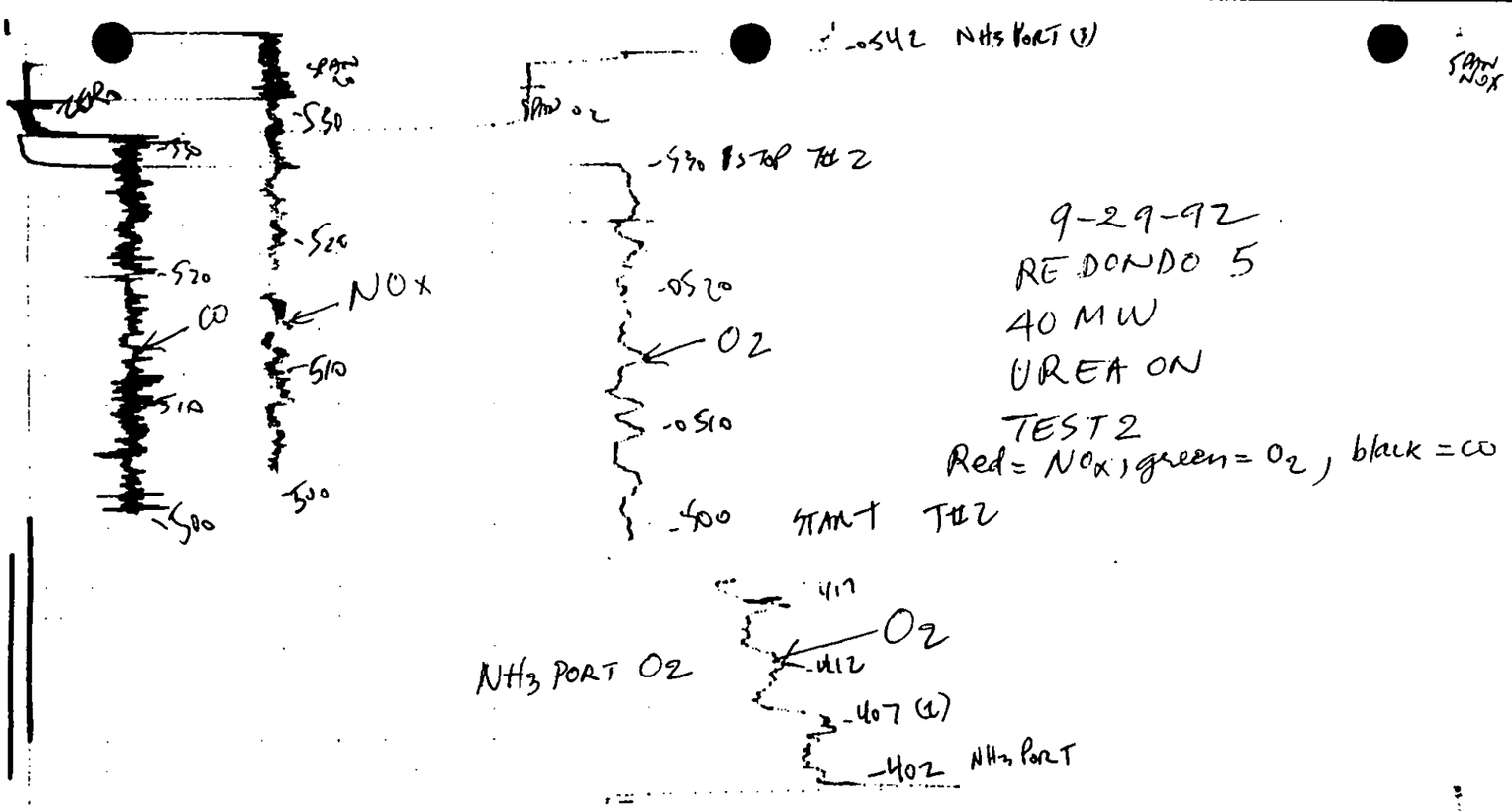


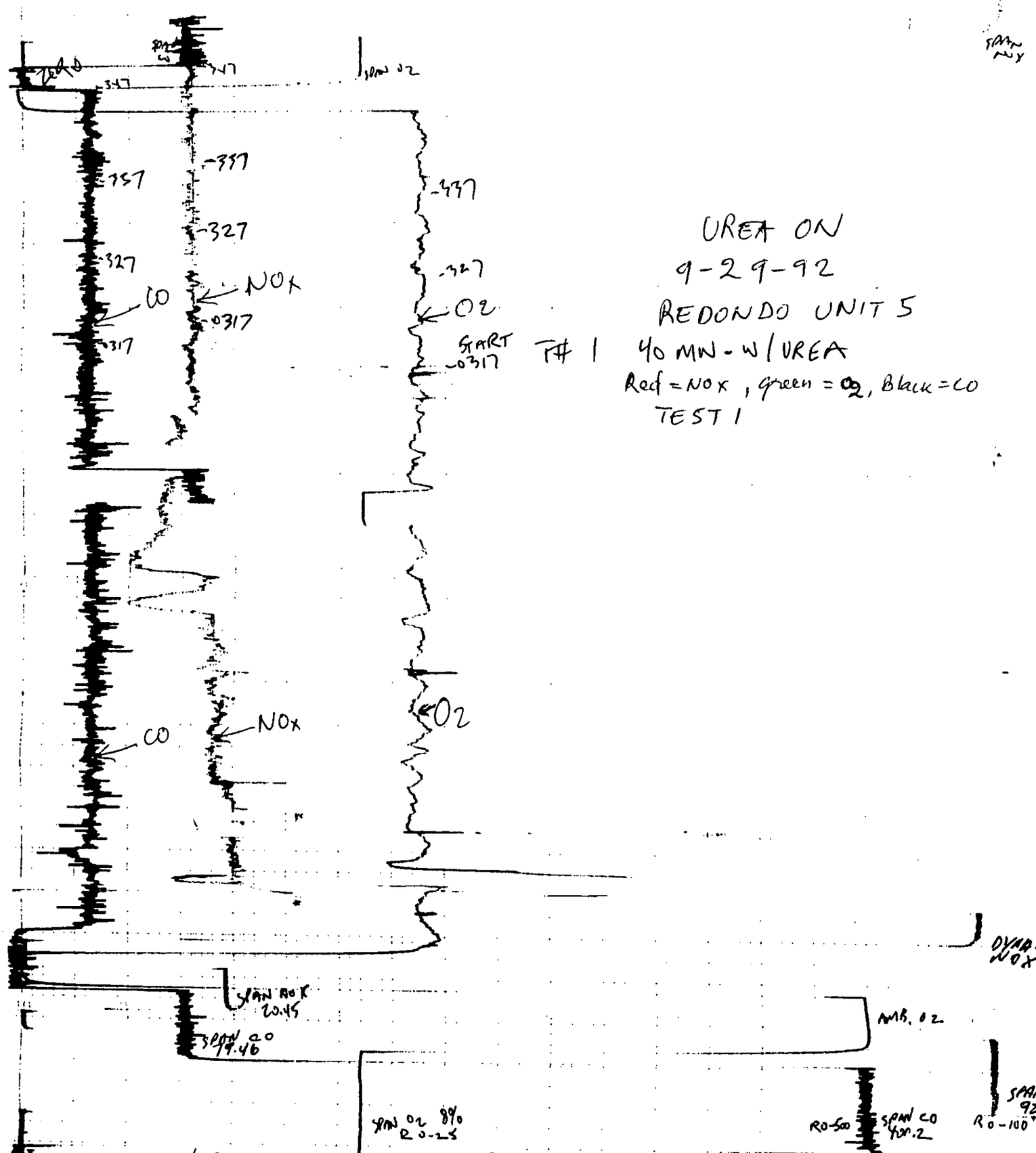

TEST 1
Red = NOx, green = O2, black = CO
1006 START T#1 W/UREA
140 MW
R 0-100
CHART SPEED
120MM/HR
1006
NOx 20.5
ZERO
8% O2
CO 400.2
DYN. NOx CAL.
79.46 CO SPAN
ZERO
NOx 92.5
10-2-92 SCE REDONDO UNIT # 5 140 MW
RED NOx R 0-
GREEN O2 R 0-
BLACK CO R 0-
NOx 20.5
CO 79.5
SPAN NOx
ZERO
1605
1605 STOP T#4
1555
10-1-92
REDONDO-5
167 MW
1545 UREA OFF
TEST 4
Red = NOx, green = O2, Black = CO
1535
1535 START T#4 NO UREA
167 MW
400
O2
ZERO
1520
1520 STOP T#3


1605
1555
1545
1535
1605 STOP T#4
1555
10-1-92
REDONDO-5
167 MW
1545 UREA OFF
TEST 4
Red = NOx, green = O2, Black = CO
1535 START T#4 NO UREA
167 MW
O2
1520
1510
1500
1450
1520 STOP T#3
1510
10-1-92
REDONDO-5
167 MW
UREA OFF
1500 NOX
TEST 3
1450 START T#3 NO UREA
Red = NOx ; green = O2
black = CO
O2
CO
1335 STOP
1331
O2
1323(2)
1314 NH3 PORT(3)
NH3 PORT
oxygen
ZERO
1350
1300
1300 STOP T#2
NOX
1258
CO
1248
O2
1238
RO-10
10-1-92
REDONDO 5
167 MW
UREA ON
TEST #2
Red=NOx ; green = O2 ; Black = CO
167 MW 1238 START T#2 W/UREA
NH3 PORT
oxygen
1140 STOP
1135 (1)
1130 (2)
1125
NH3 PORT (3) RO-25
O2
ZERO
NOX
1114 STOP T#1
CO
1114
1104
1054
1044
10-1-92
REDONDO 5
167 MW
UREA ON
TEST 1
O2
NOX
1054
START T#1 W/UREA

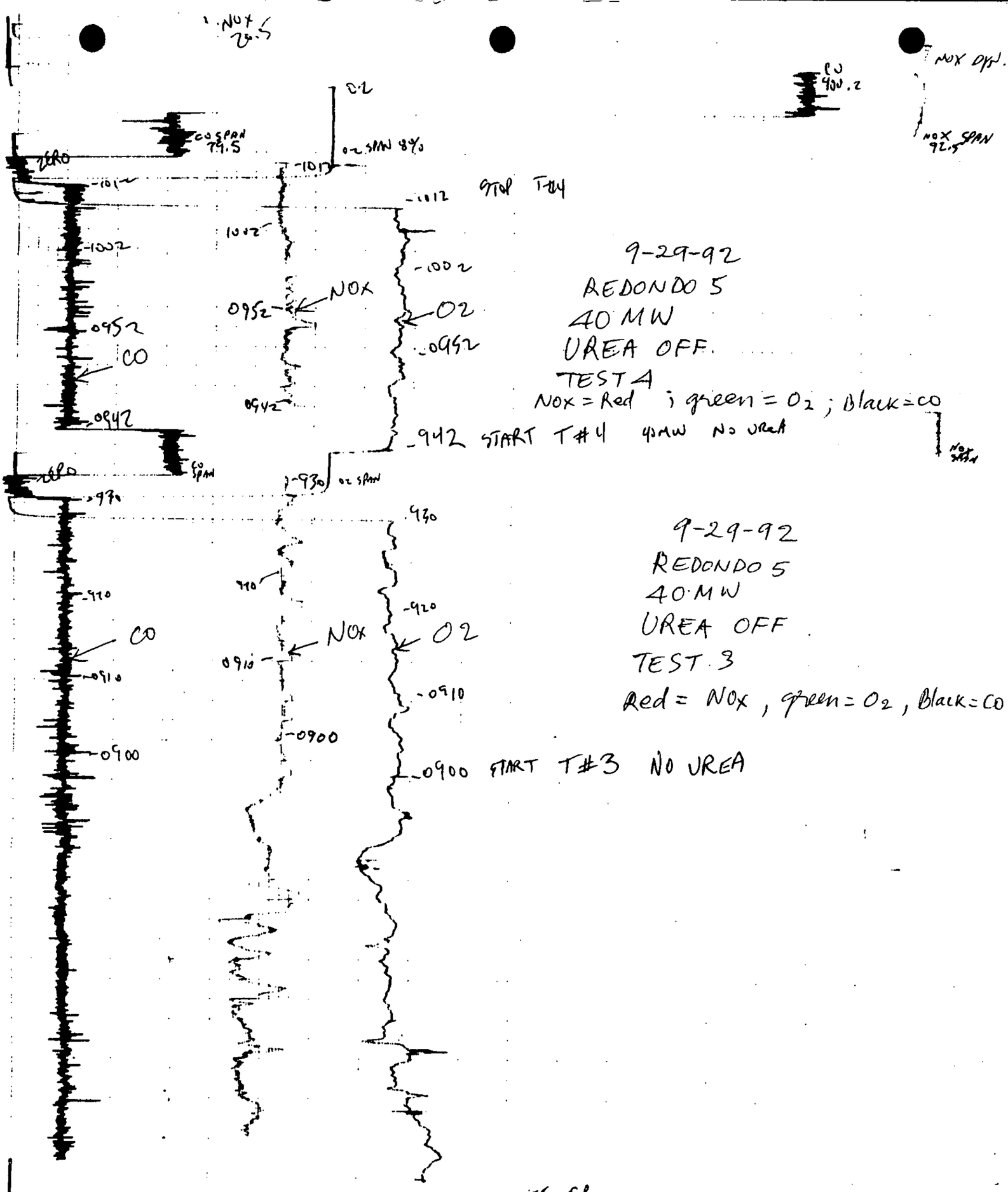


NH3 PORT oxygen
119 NH3 PORT (3)
CO
O2
ZERO
1908 STOP T#2
NOx
1258
1268
CO
O2
1248
1238
CHANGE SPEED 12.5 MM/HR
R 0-10
10-1-92
REDONDO 5
167 MW
UREA ON
TEST # 2
Red=NOx ; green= O2 ; Black=CO
167 MW 1238 START T#2 w/urea
NH3 PORT oxygen
1140 STOP
1135 (1)
1130 (2)
1125
NH3 PORT (3) R 0-25
O2
NOx SPAN
1114 STOP T#1
CO
CO SPAN
O2 SPAN
ZERO
10-1-92
REDONDO 5
167 MW
UREA ON
TEST1
O2
1114
1104
1054
1044
NOx
1059
START T#1 w/urea
Red=NOx
Black=CO
green=O2
NOx R 0-250
NOx 20.5
CO SPAN 74.5
10-1-92 SCE REDONDO UNIT #5
167 MW
175 MW
RED R 0-100 NOx
GREEN R 0-10 O2
BLACK CO R 0-500 CO
CO 400.2
O2 8.0
NOx SPAN 42.5
92364
167 MW (175)
end of 40 MW TEST
NOx 20.5
O2
CO SPAN 74.5
CO 400.2
NOx SPAN





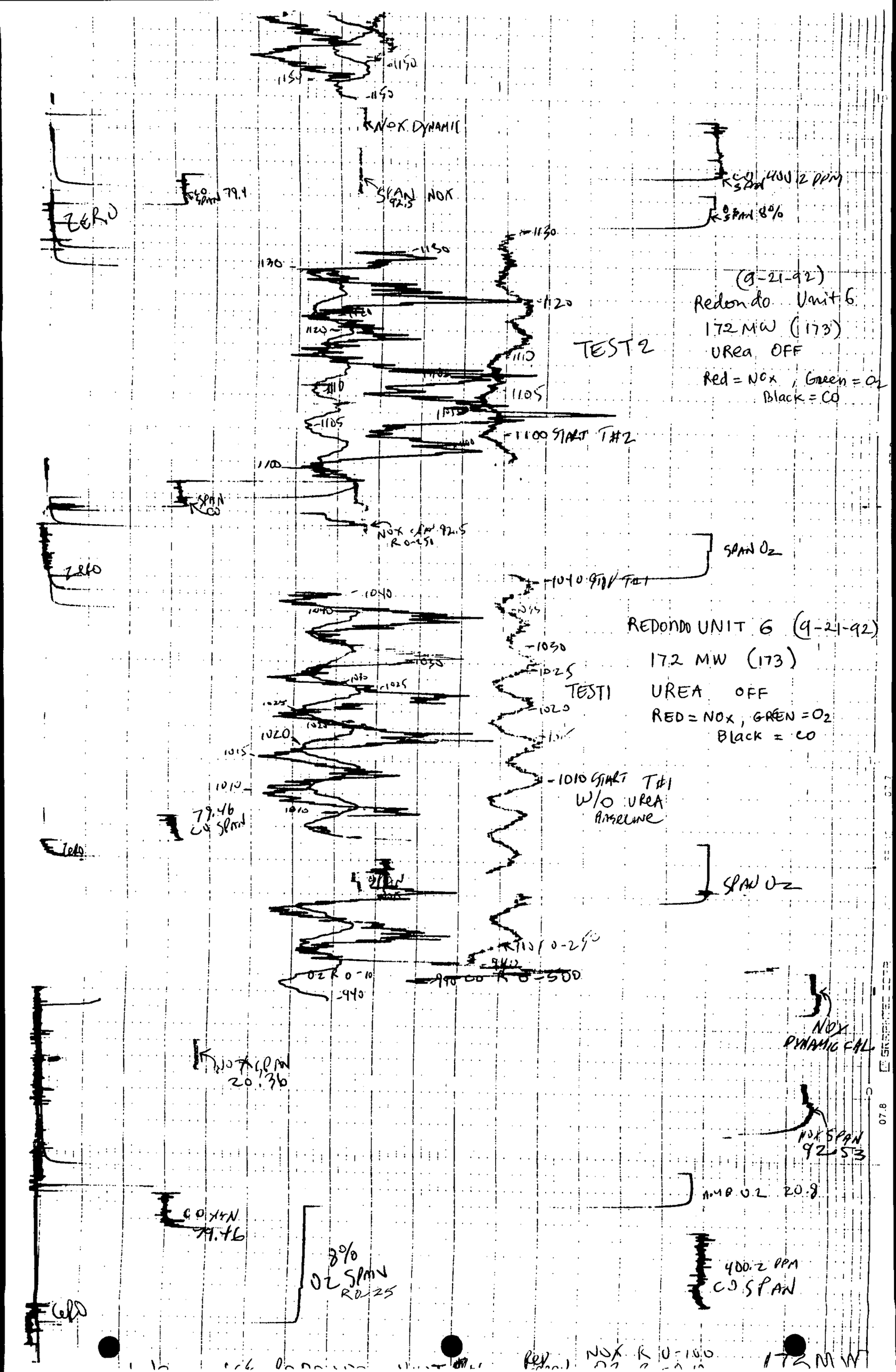
Set REDONDO UNIT #5 9-29-92 40 MW

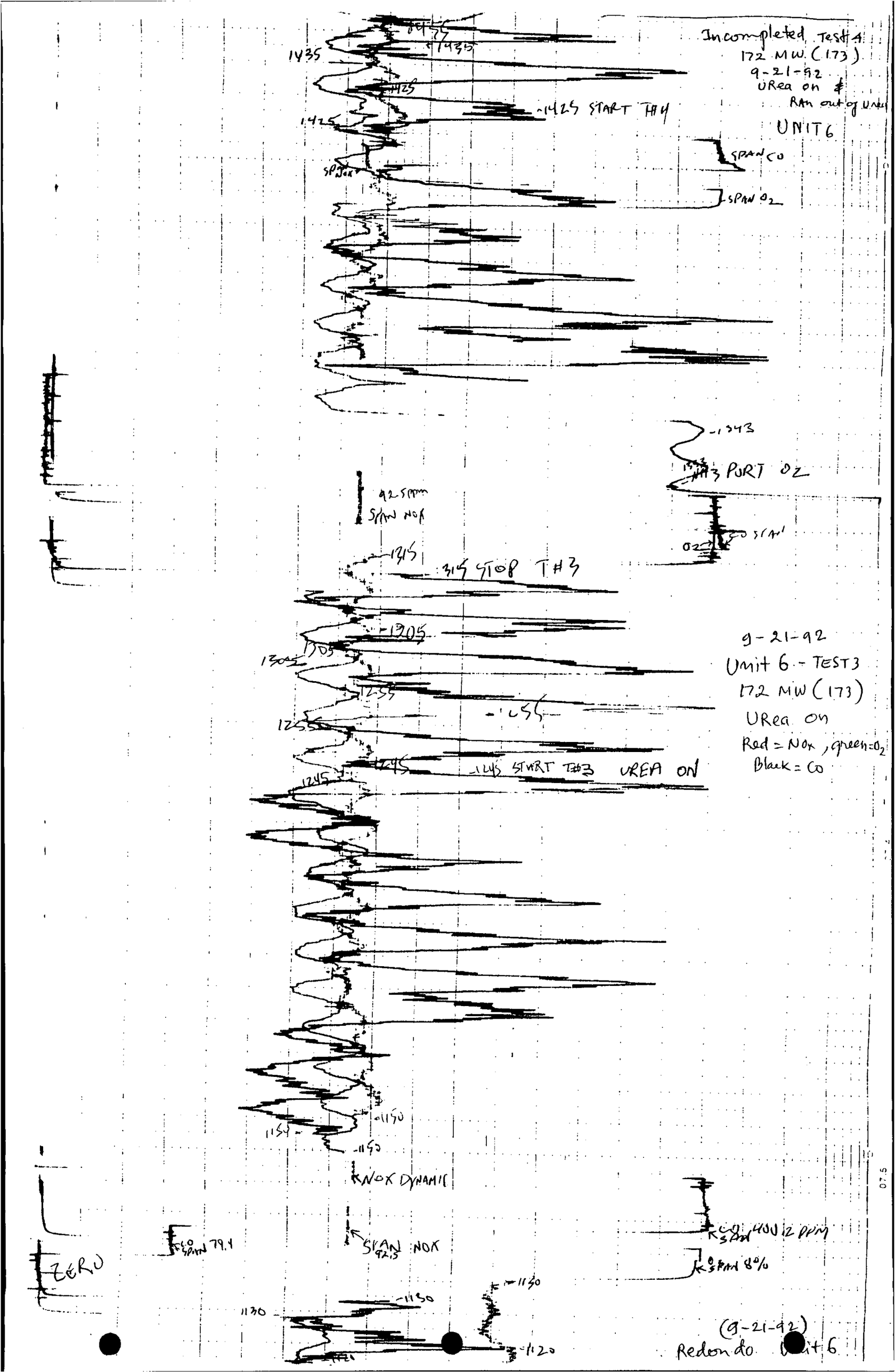


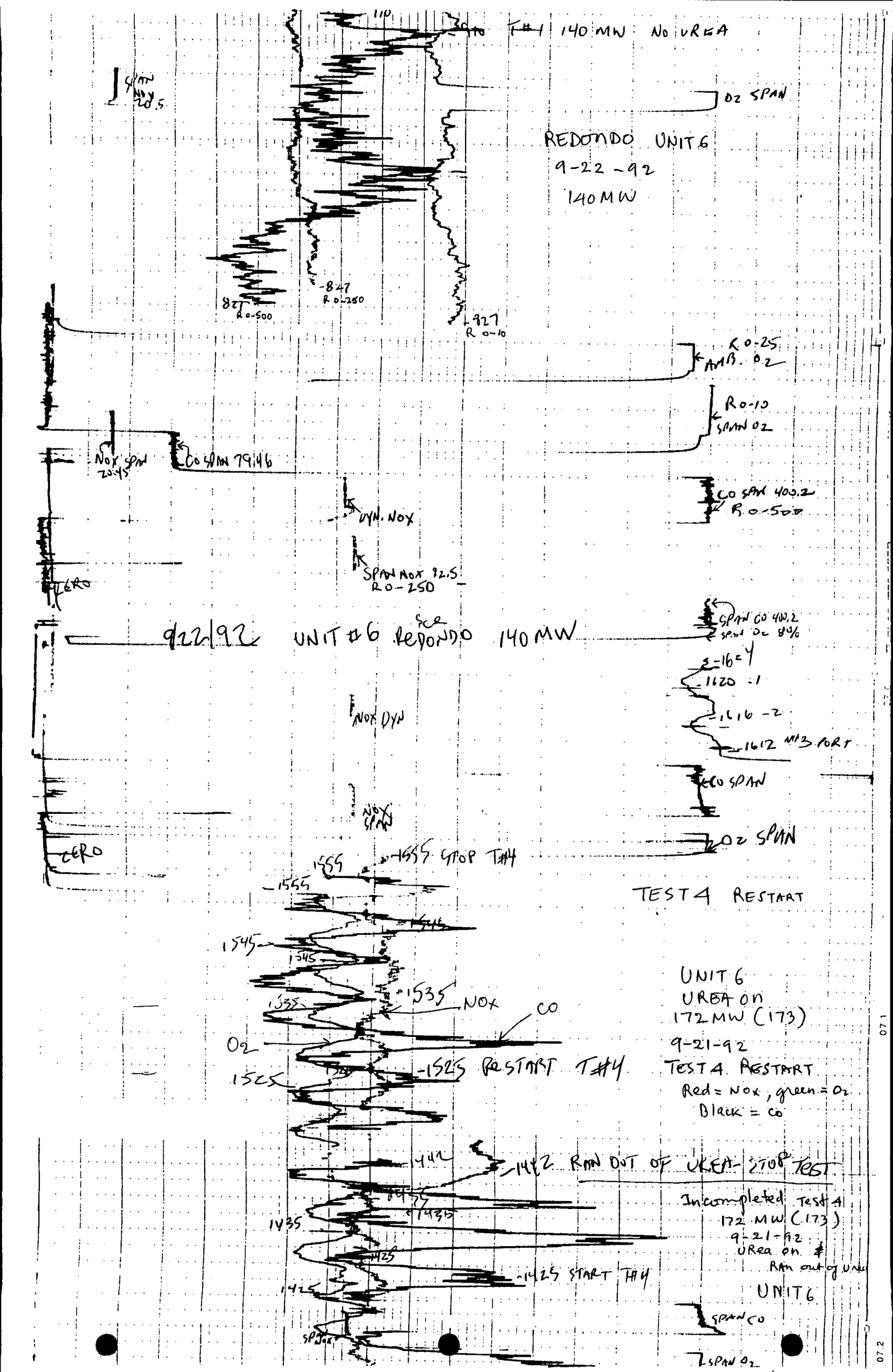
9-29-92
REDONDO 5
40 MW
UREA OFF.
TEST A
NOx = Red ; green = O_2 ; Black = CO

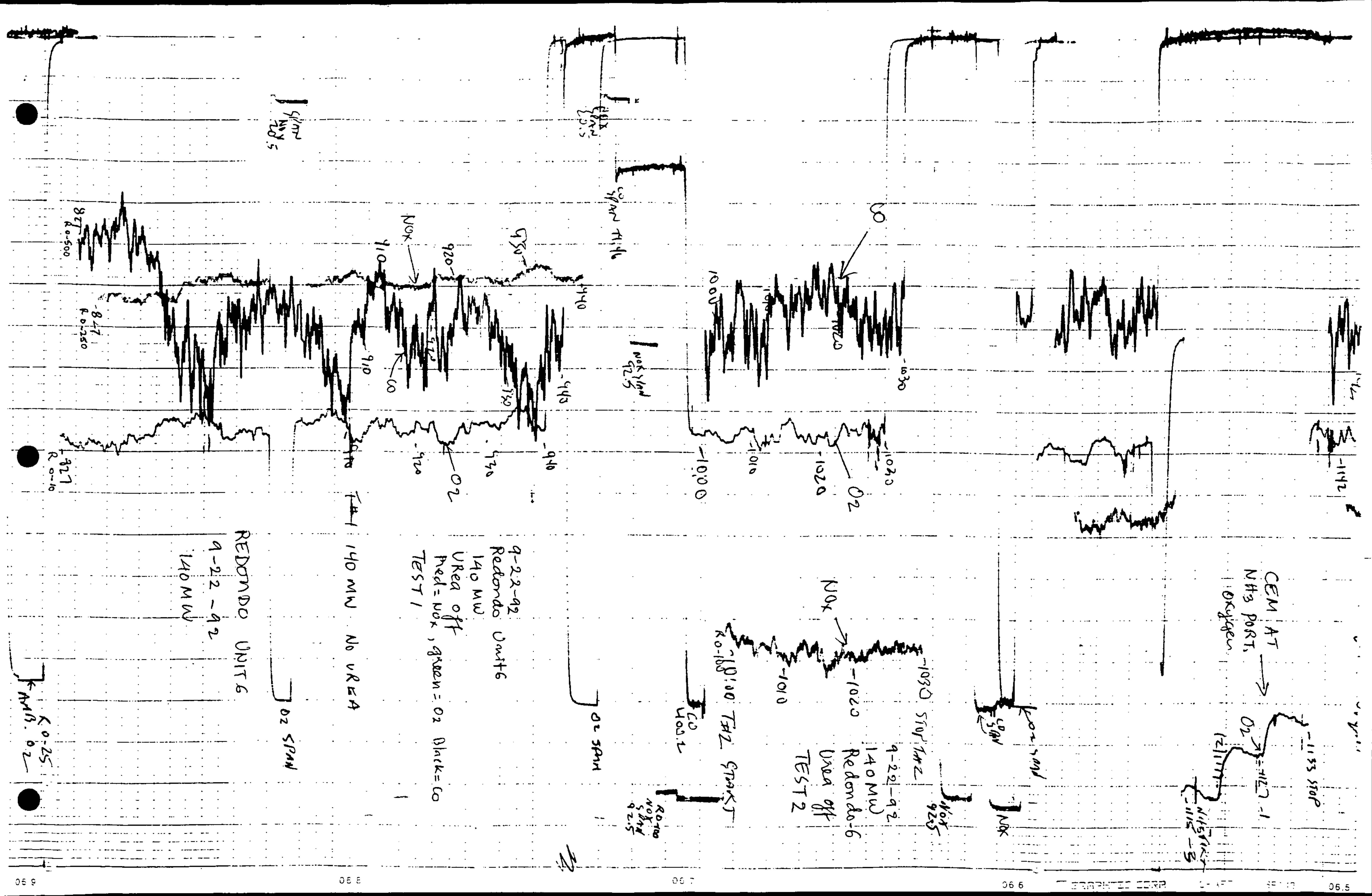
9-29-92
REDONDO 5
40 MW
UREA OFF
TEST 3
Red = NOx , green = O_2 , Black = CO

9-29-92
REDONDO 5
40 MW
UREA ON
TEST 2
Red = NOx ; green = O_2 , black = CO

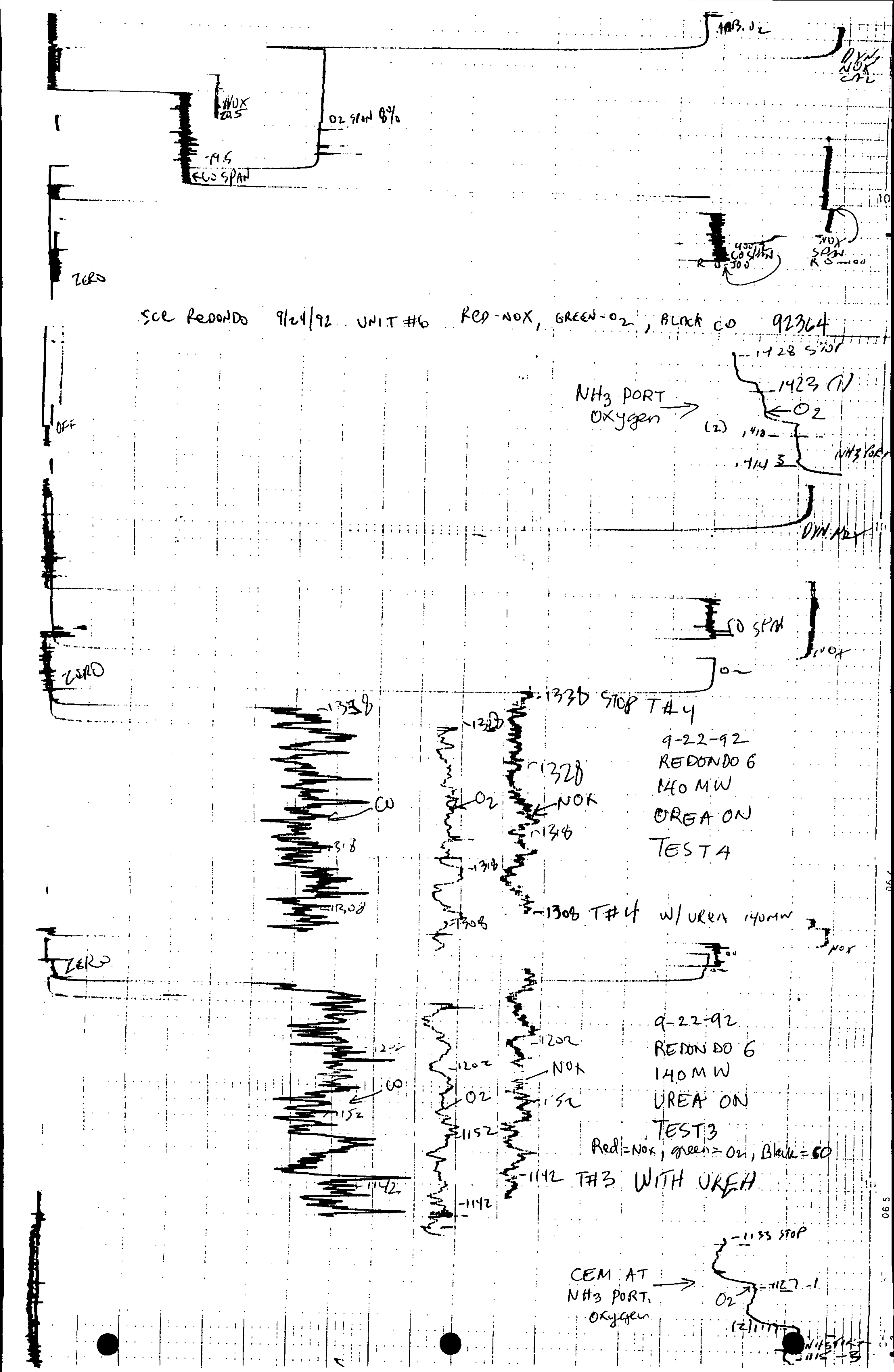

NOX DYNAMIC
SPAN NOX 92.5
ZERO
CO SPAN 79.4
CO SPAN 400.2 PPM
O2 SPAN 8%
(9-21-92)
Redondo Unit 6
172 MW (173)
UREa OFF
Red = NOx, Green = O2
Black = CO
TEST 2
1100 START T#2
SPAN CO
NOX SPAN 92.5
SPAN O2
REDONDO UNIT 6 (9-21-92)
172 MW (173)
TEST1 UREA OFF
RED = NOx, GREN = O2
Black = CO
1010 START T#1
W/O UREA
BASELINE
79.46 CO SPAN
SPAN O2
NOX DYNAMIC CAL
NOX SPAN 92.53
CO SPAN 79.46
8% O2 SPAN
400.2 PPM CO SPAN
NOX R 0-100
172 MW


Incompleted Test 4
172 MW (173)
9-21-92
URea on #
Ran out of UREA
UNIT 6
1435
1425 START TH4
1425
SPAN NOx
SPAN CO
SPAN O2
1343
NH3 PORT O2
92.5ppm
SPAN NOx
1315 STOP TH3
1305
1305
1255
1255
1245 1245 START TH3 UREA ON
1245
1150
1150
NOX DYNAMIC
9-21-92
Unit 6 - TEST 3
172 MW (173)
URea on
Red = NOx, green = O2
Black = CO
ZERO
CO SPAN 79.4
SPAN NOX 92.5
CO SPAN 400/12 ppm
O2 SPAN 8%
1130
1130
1120
(9-21-92)
Redondo Unit 6

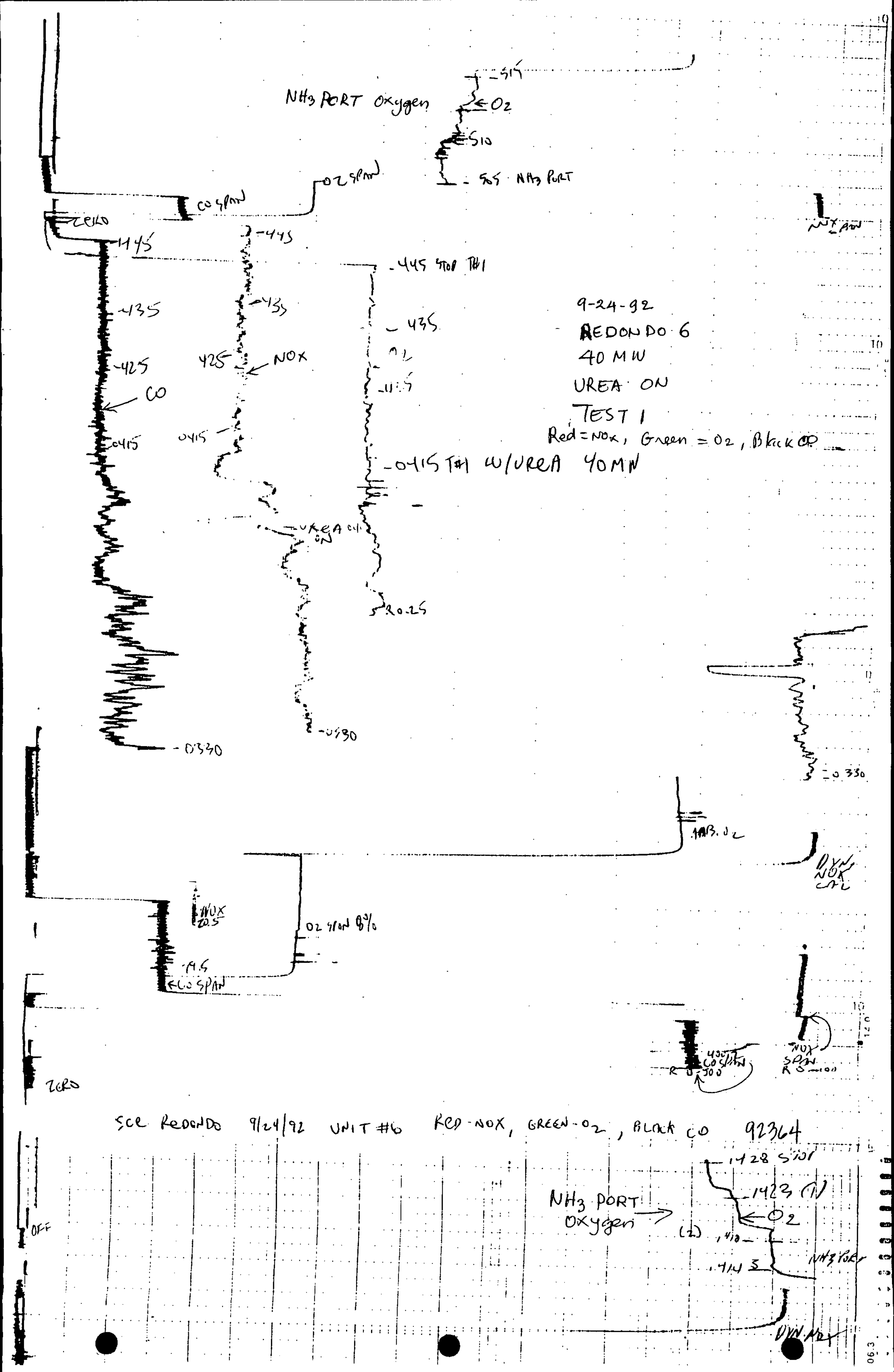

1110
T#1 140 MW NO UREA
SPAN NOx 20.5
O2 SPAN
REDONDO UNIT 6
9-22-92
140 MW
-847
R 0-250
827
R 0-500
927
R 0-10
R 0-25
AMB. O2
R 0-10
SPAN O2
NOx SPAN 20.45
CO SPAN 79.46
DYN. NOx
SPAN NOx 92.5
R 0-250
CO SPAN 400.2
R 0-500
ZERO
9/22/92 UNIT #6 SCR REDONDO 140 MW
SPAN CO 400.2
SPAN O2 8%
1620 -1
1616 -2
1612 NH3 PORT
NOx DYN
CO SPAN
NOx SPAN
O2 SPAN
ZERO
1555 STOP T#4
TEST 4 RESTART
1545
1535
NOx
CO
O2
1525 RESTART T#4
UNIT 6
UREA ON
172 MW (173)
9-21-92
TEST 4 RESTART
Red = NOx, green = O2
Black = CO
1442 RAN OUT OF UREA - STOP TEST
1435
1425 START T#4
Incompleted Test 4
172 MW (173)
9-21-92
UREa on #
Ran out of UREa
UNIT 6
SPAN CO
SPAN O2

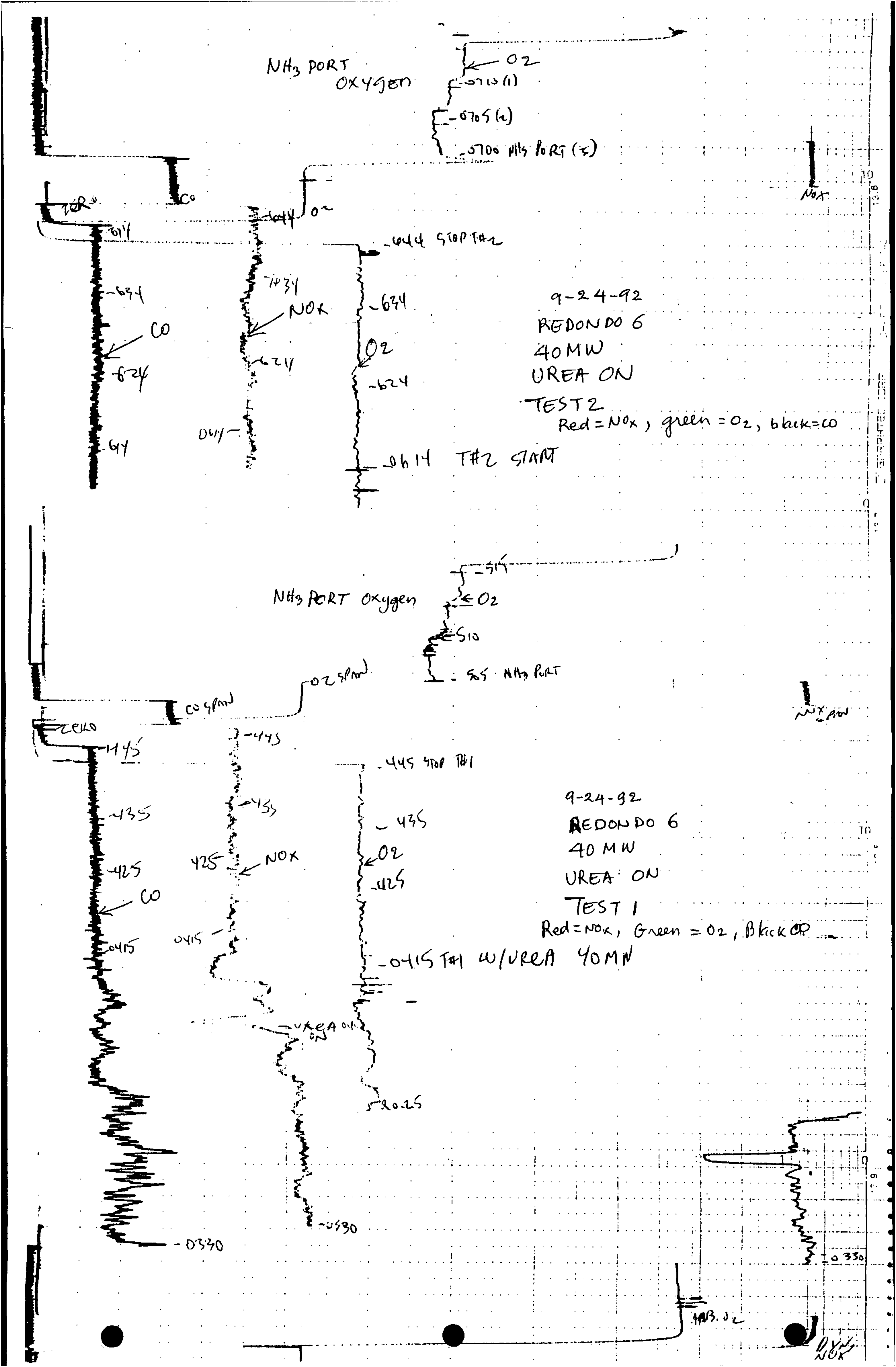


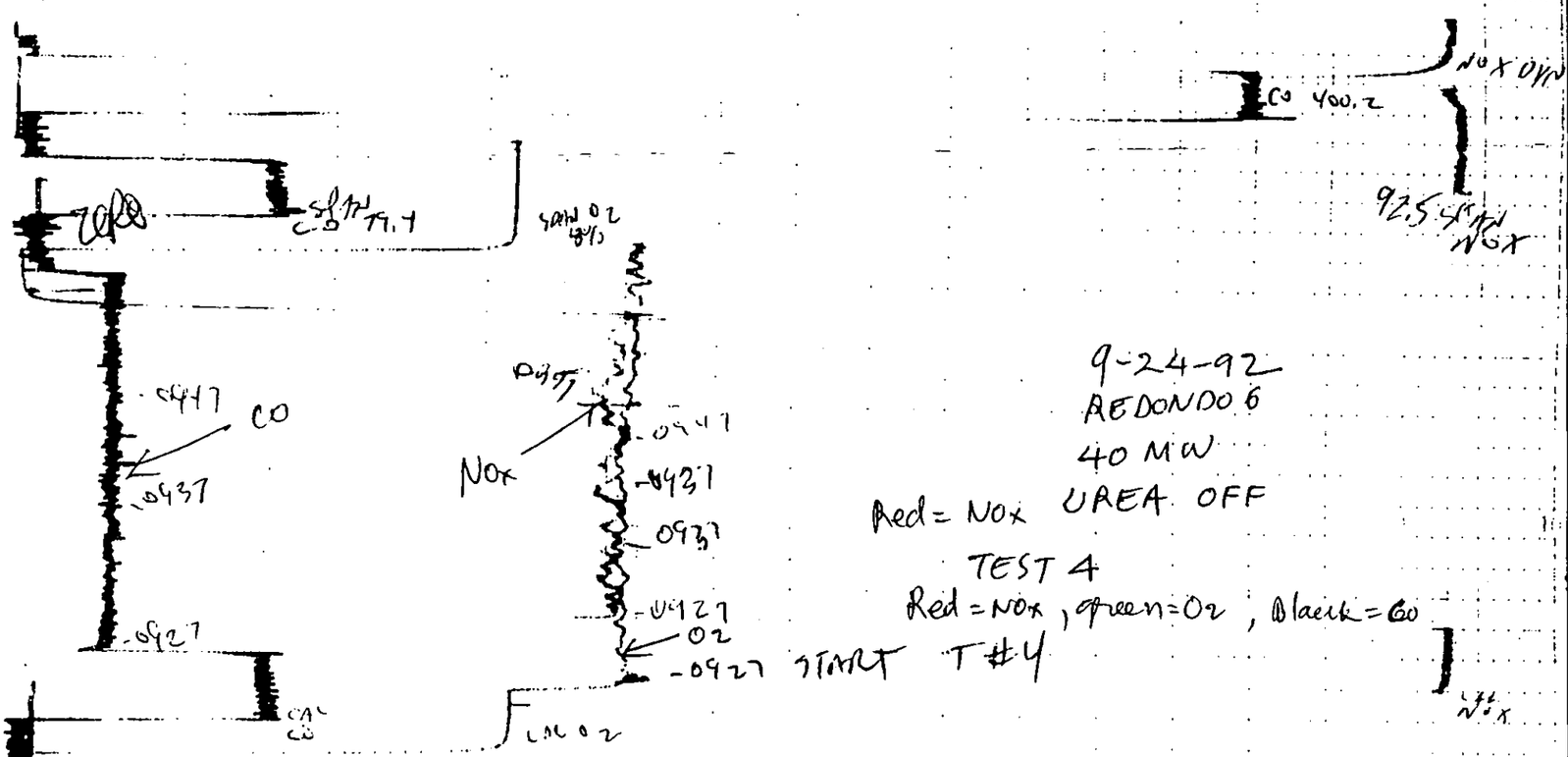
REDONDO UNIT 6
9-22-92
140 MW
140 MW NO UREA
9-22-92
Redondo Unit 6
140 MW
Urea off
Red = NOx, green = O2 black = CO
TEST 1
NOx
CO
O2
O2 SPAN
CO SPAN 41.46
10:00 TAZ STARTS
1030 STOP TAZ
9-22-92
Redondo-6
140 MW
Urea off
TEST 2
CEM AT
NH3 PORT.
Oxygen
1133 STOP



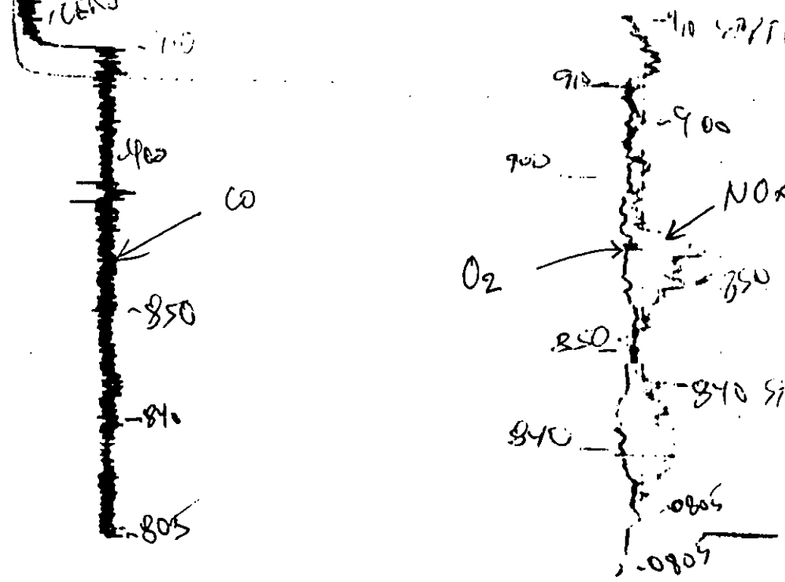
SCE REDONDO 9/24/92 UNIT #6 RED-NOX, GREEN-O2, BLACK CO 92364
ZERO
NOX 20.5
O2 SPAN 8%
CO SPAN
OFF
ZERO
CO SPAN
NOX SPAN
DYN NOX CAL
NH3 PORT Oxygen
1428 STOP
1423 (1)
O2
(2) 1418
1414 3
NH3 PORT
DYN
CO SPAN
NOX
O2
ZERO
1338 STOP T#4
9-22-92
REDONDO 6
140 MW
UREA ON
TEST 4
CO
O2
NOX
1328
1318
1308
1308 T#4 W/ UREA 140MW
NOX
ZERO
9-22-92
REDONDO 6
140MW
UREA ON
TEST3
Red=Nox, green=O2, Black=CO
CO
O2
NOX
1202
1152
1142
1142 T#3 WITH UREA
CEM AT NH3 PORT, oxygen
O2
1133 STOP
1127
1115


9-24-92
REDONDO 6
40 MW
UREA ON
TEST 1
Red = NOx, Green = O2, Black CO
-0415 T#1 w/UREA 40MW
NH3 PORT Oxygen
O2 SPAN
CO SPAN
ZERO
-445 STOP T#1
NOX
CO
UREA ON
NOX CAL
ZERO
OFF
SCE REDONDO 9/24/92 UNIT #6 RED-NOX, GREEN-O2, BLACK CO 92364
NH3 PORT Oxygen
1428 STOP
1423 (1)
O2
NH3 PORT

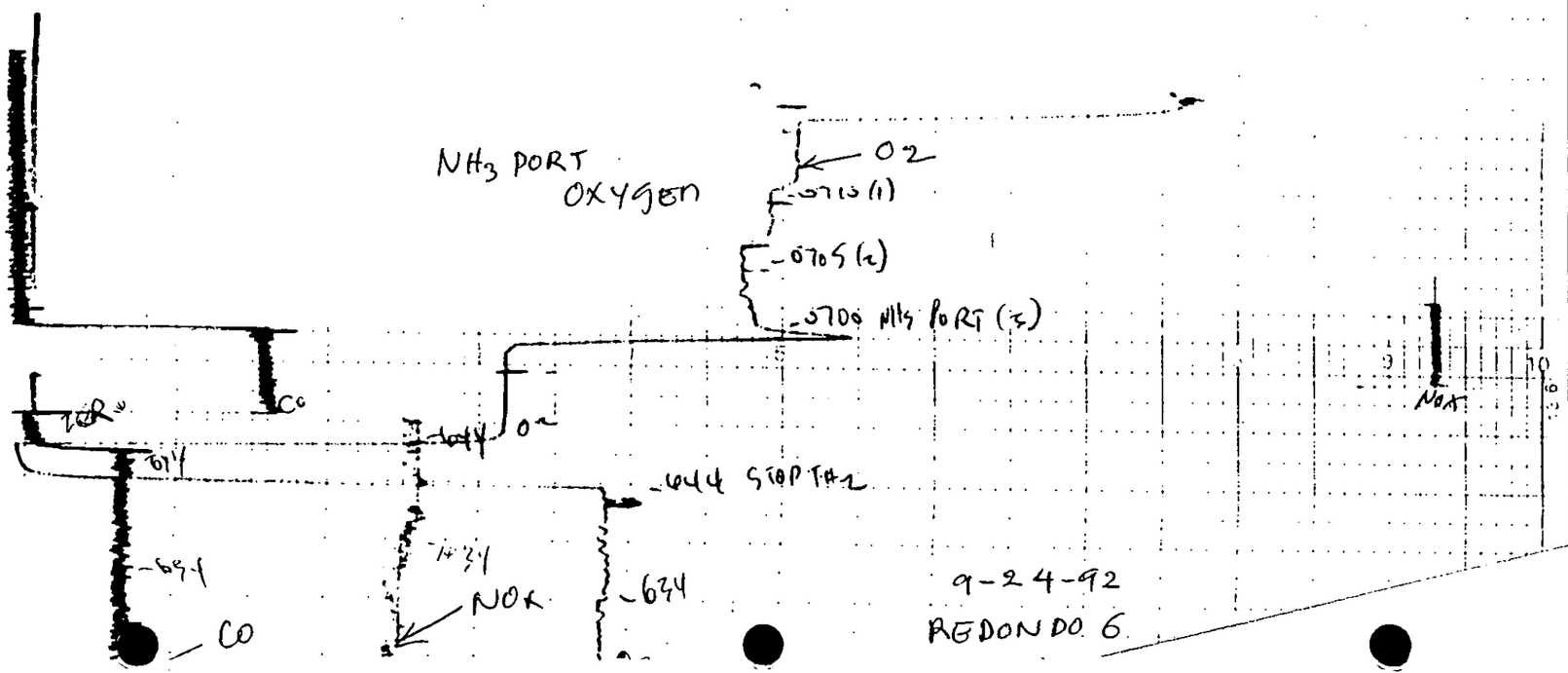

NH3 PORT OXYGEN
O2
-0710 (1)
-0705 (2)
-0700 NH3 PORT (3)
CO
ZERO
O2
NOX
-644 STOP T#2
-634
NOX
CO
O2
-624
-614 T#2 START
9-24-92
REDONDO 6
40MW
UREA ON
TEST 2
Red = NOx, green = O2, black = CO
NH3 PORT Oxygen
-514
O2
510
505 NH3 PORT
O2 SPAN
CO SPAN
ZERO
NOX SPAN
445
-435
-425
CO
0415
-0330
425
NOX
0415
-0330
-445 STOP T#1
- 435
O2
-425
-0415 T#1 W/UREA 40MW
20.25
9-24-92
REDONDO 6
40 MW
UREA ON
TEST 1
Red = NOx, Green = O2, Black CO
-0330



9-24-92
REDONDO 6
40 MW
Red = NOx UREA OFF
TEST 4
Red = NOx, Green = O2, Black = CO



9-24-92
REDONDO 6
40 MW
UREA OFF
TEST 3
Red = NOx, Green = O2, Black = CO



9-24-92
REDONDO 6

QUALITY CONTROL FOR SAMPLING AND LABORATORY ANALYSIS

I. INTRODUCTION

The Sierra Environmental Engineering, Inc. quality control program is a combination of preventive maintenance, quality assurance, and procedure validation. All data generated is important and will be utilized to validate or modify procedures and reinforce quality sampling and analytical techniques. Routine maintenance procedures are designed to insure proper instrument operation and reliability, and reduce maintenance costs. The quality control program is a systematic attempt to assure the precision and accuracy of future analyses by detecting determinate errors in analysis and preventing their recurrence.

II. SAMPLING PROCEDURE - PARTICULATE TYPE SAMPLES

Obtaining representative samples and maintaining their integrity are critical parts of any monitoring and enforcement program. Analytical methods are only as good as the sampling and the sample preservation methods. All parameters are considered in sampling: appropriate container types, sizes, container closures and holding times, along with appropriate sample preservation.

Prior to testing, all sampling train components are cleaned in the Sierra laboratory. As a minimum, each item is washed with an appropriate soap (i.e., Alconox), then rinsed with distilled water. Many of the source test procedures require additional specialized cleaning steps which are followed after the original washing and rinsing. Glassware is sealed for transport to the test site and the sample trains are charged at the sampling site. Detailed descriptions of sampling preparation and recovery for specific test methods are found in the Appendices.

Prior to a test, the sampling train, including the probe and nozzle, is heated and leak-checked at 15 inches of Hg vacuum. Acceptable leakage rates are less than 0.02 cfm. The S-type pitot tube is also leak-checked. Post-test leak checks are alsc performed at the highest vacuum used during the test.

III. SAMPLE CUSTODY

All samples are immediately labeled at the time of collection. Information on the label includes test number, date, time, and location. A chain of custody is established by sampling personnel. A sample custody form is provided by Sierra. The form indicates the sample ID number and description as well as the date

and time of collection. Space is provided for analysis instructions. The form is signed by the person who collected the sample and the person who recovered the sample with the date and time. From that point on, when the sample is relinquished or received, the chain of custody form is signed. When the sample arrives at Sierra, it is logged into a standard log book. The sample is dispersed for preservation (if needed) and then set-up for analysis at Sierra, or subcontracted to an outside certified laboratory.

IV. CALIBRATION PROCEDURES AND FREQUENCY

All equipment and instruments used in the field and in the laboratory are maintained according to the manufacturer's requirements or suggestions. The record of service, expiration dates, and calibration records are maintained on file, along with service reminders on the equipment for calibration. Equipment calibration records are included in the Appendices.

Routine maintenance at Sierra is performed by the technicians and the laboratory chemists. Major calibration or trouble-shooting is performed by service representatives. 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) and the South Coast Air Quality Management District (SCAQMD).

The laboratory has a standard operating procedure for each area which meets EPA and CARB requirements. Instrument calibration for each procedure is outlined along with a record book of working standards and preparations. The laboratory uses NBS traceable standards for calibrations.

V. ANALYTICAL PROCEDURES

The methods and procedures utilized at Sierra are as follows:

A. California Air Resources Board, "Standard Operating Procedures for Stationary Source Emission Monitoring and Testing"

B. U.S. E.P.A., "Air Pollution Measurement Systems: Vol.II Ambient Air Specific Methods"

C. U.S. E.P.A., "Methods for the Determination of Toxic Organic Compounds in Ambient Air", EPA-600/4-84-041

D. South Coast Air Quality Management District, "Source Test Manual - March 1989"

E. NIOSH, "Manual of Analytical Methods", Third Edition

F. U.S. E.P.A., 40 CFR 60, Appendix A "Test Methods"

VI. DATA REDUCTION, VALIDATION, AND REPORTING

A. Data reduction is automated by Sierra's Lotus 1,2,3 Spreadsheets

B. The data generated for routine field and laboratory analyses is recorded on forms that have been developed for each area. Field forms include all conditions, display raw data and show the calculations or method of calculation. The laboratory forms include all analytical conditions, display raw data, method number, and show the calculations or method of calculation. Each form is completely filled out and initialed and dated by the analyst. All instrumental raw data, i.e., chromatograms, recorder printouts and computer printouts, must be attached to the respective field and laboratory forms.

C. All results are reported according to Sierra's "Reporting Rules - Standard Operating Procedure". The report, along with all supporting documentation, is turned in to the Manager of Environmental Services who checks for errors and to verify compliance with QC procedures.

SAMPLING INSTRUMENTS AND EQUIPMENT CALIBRATION SCHEDULE

INSTRUMENT TYPE	FREQUENCY OF CALIBRATION	STANDARD OF COMPARISON OR METHOD OF CALIBRATION	ACCEPTANCE LIMITS
Dry Gas Meter	6 months or when repaired	Calibrated dry test meter	±2% of volume measured
S-Type Pitot (for use w/ EPA type sampling train	6 months	EPA Method 2 paragraph 4.1.1 or calibration	Cp constant (±5%) over working range Diff. between the ave. Cp for each leg must be less than 2%
Field Barometer	6 months (checked prior to each use)	Mercury barometer	±0.1" Hg
Thermocouples	6 months	NBS mercury thermometer or NBS calibrated platinum RTD	±1.5%
Temperature Readout Devices	6 months	Precision potentiometer or NBS calibrated temperature readout	±2% full scale reading
Analytical Balance	12 months (checked prior to each use)	Should be performed by manufacturer or qualified technician using NBS certified weights	±0.3 mg of stated weight
Probe Nozzles	12 months (checked prior to each use)	Nozzle diameter check micrometer	Range <±0.10 mm for three meas.
Continuous Analyzers	Depends on use frequency, and performance	As specified by manufacturers operating manuals, EPA, NBS gases and/or ref. methods	Satisfy all limits specified in operating specifications

EQUIPMENT MAINTENANCE SCHEDULE

Based on Manufacturer's Specifications
and Sierra's Experience

EQUIPMENT	PERFORMANCE REQUIREMENT	MAINTENANCE INTERVAL	CORRECTIVE ACTION
Pumps	1. Absence of leaks 2. Ability to draw mfr required vacuum & flow	Every 500 hrs of operation or 6 months whichever is less	1. Visual insp. 2. Clean 3. Replace worn parts 4. Leak check
Flow Measuring	1. Free mechanical movement 2. Absence of malfunction	Every 500 hrs of operation or 6 months whichever is less	1. Visual insp. 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero, span gas	As required by by manufacturer	As recommended manufacturer
Trailer 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

FREQUENCY OF CALIBRATION

EQUIPMENT	FREQUENCY
S-Type Pitot Tube	1. Annual Calibration: Measure the configuration & multiple point calibration, if required. 2. Reshape Pitot tube: Everytime, before & after reshaping, measure the configuration & conduct multiple point calibration, if required. 3. Semiannual measurement of config.
Differential Pressure Gauge	1. Semiannual Calibration: Multiple (5) point calibration 2. Bimonthly Calibration: 3-point check
Liquid in Glass Thermometer or Temperature Sensor	1. Annual Calibration: Multiple (3) point calibration (full span). 2. Monthly Calibration: 3-point check.
Thermocouple-Potentiometer	1. Semiannual Calibration: Multiple (3) point calibration. 2. Bimonthly Calibration: 3-point check
Aneroid Barometer	1. Before & After Use Calibration: Single point calibration (0.10 in. Hg barom.)
Dry Gas Meter (Use Secondary STD)	1. Semiannual Calibration: Multiple (4) point calibration (0.25-1.0 SCFM). 2. Monthly Calibration: 2-point check. 3. Check against dry gas meter orifice before & after every test.
Turbine Meter	1. Annual Calibration: Multiple (4) point calibration. 2. After-Test Calibration: Single point.
Dry Gas Meter Orifice	1. Annual Calibration: delta H at Multiple (4) point calibration. 2. Check against field dry gas meter before & after every test.

DRY GAS METER CALIBRATION

DATE-----07-13-92 STANDARD ID.# L749046
PBAR."HG 29.95 CALIBRATION Yds 1.010
METER BOX ID.------NUTECH 2010 #5 OPERATOR--RAY PIONESSA SR.
ORIFICE TYPE: STANDARD

DELTA H	CAL MET CU. FT.	METER CU. FT.	CAL.MET. DEG. F	METR.BX. DEG. F	TIME MIN.	Yd	DELTA H@
0.25	1.427	1.390	78.25	79.50	5.00	1.0387	1.74
0.25	1.430	1.391	78.25	80.50	5.00	1.0420	1.73
0.50	1.980	1.928	78.00	81.00	5.00	1.0417	1.81
0.50	1.986	1.950	78.25	81.75	5.00	1.0341	1.79
1.00	2.785	2.718	78.50	82.25	5.00	1.0396	1.82
1.00	2.780	2.735	78.50	83.50	5.00	1.0336	1.83
1.50	3.470	3.405	78.50	84.50	5.00	1.0369	1.76
1.50	3.560	3.473	78.50	85.50	5.00	1.0449	1.66

RESULTS

AVERAGE Yd = 1.0383

AVERAGE DELTA H@ = 1.79

CALIBRATION DUE 01-13-93

Scott Specialty Gases, Inc.

2600 CAJON BLVD., SAN BERNARDINO, CA 92411
FAX 714-887-0549
PHONE: 714-887-2571

SERRIA ENVIRONMENTAL ENG
BOB MARCORA
3505 CADILLAC, SUITE K-1
COSTA MESA, CA 92626

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 7/29/91
Our Project No: 14971
Your P.O. No: 2422
Page 1 of 1
Expiration Date: 1/93

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. AAL-4713 Cylinder Pressure 2000 PSIG Certified Accuracy ±1% % NIST Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD SRM/CRM NO.	REFERENCE STD CYL. NO.	REFERENCE STD CONC.	GAS ANALYZER MAKE/MODEL/SERIAL NO.	GAS ANALYZER LAST CAL DATE	GAS ANALYZER ANALYTICAL PRINCIPLE
NITRIC OXIDE	92.37 PPM	GMIS	AAL-2666	95.60 PPM	THERMO-ELECTRON	7/12/91	CHEMILUMINENSCENT
NOX	92.53 PPM	TRACEABLE TO CRM1684B			10 AR 14853-150		

BALANCE GAS NITROGEN

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

Component NITRIC OXIDE
First Analysis Date 7/18/91 Units mv

Z 0.00	R 95.64	T 91.83
R 95.74	Z 0.00	T 91.70
Z 0.00	T 91.55	R 95.50

Mean Test Assay 91.67 PPM

Second Analysis Date 7/26/91 Units mv

Z 0.00	R 95.75	T 92.60
R 95.90	Z 0.01	T 92.62
Z 0.02	T 92.68	R 95.96

Mean Test Assay 92.37 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: [signature]

DRY GAS METER CALIBRATION

DATE-----07-13-92 STANDARD ID.# L74904
PBAR."HG 29.95 CALIBRATION Yds 1.010
METER BOX ID.------NUTECH 2010 #4 OPERATOR--RAY PIONESSA SR.
ORIFICE TYPE: STANDARD

DELTA H	CAL MET CU. FT.	METER CU. FT.	CAL.MET. DEG. F	METR.BX. DEG. F	TIME MIN.	Yd	DELTA H@
0.25	1.428	1.416	75.50	85.00	5.00	1.0360	1.71
0.25	1.429	1.412	75.50	85.00	5.00	1.0397	1.70
0.50	1.976	1.948	75.50	84.25	5.00	1.0400	1.77
0.50	1.986	1.970	75.50	83.75	5.00	1.0326	1.77
1.00	2.772	2.732	75.50	83.75	5.00	1.0380	1.77
1.00	2.791	2.744	75.50	84.50	5.00	1.0420	1.79
1.50	3.471	3.394	75.50	85.00	5.00	1.0474	1.73
1.50	3.491	3.431	75.50	85.50	5.00	1.0430	1.71

RESULTS

AVERAGE Yd = 1.0380

AVERAGE DELTA H@ = 1.76

CALIBRATION DUE 01-13-93

Scott Specialty Gases, Inc.

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

2600 CAJON BLVD., SAN BERNARDINO, CA 92411

SIERRA ENVIRONMENTAL ENGR.
3505 CADILLAC SUITE K-1
COSTA MESA, CA 92626

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 8/15/91
Our Project No: 14973
Your P.O. No: 2422
Page 1 of 1
Expiration Date: 2/93

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM-7307 Cylinder Pressure 2000 PSIG Certified Accuracy ±1% % NIST Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD SRM/CRM NO.	REFERENCE STD CYL. NO.	REFERENCE STD CONC.	GAS ANALYZER MAKE/MODEL/SERIAL NO.	GAS ANALYZER LAST CAL. DATE	GAS ANALYZER ANALYTICAL PRINCIPLE
NITRIC OXIDE	20.36 PPM	GMIS	ALM-7733	22.32 PPM	THERMO-ELECTRON	7/12/91	CHEMI-LUMINENSCENT
NOX	20.45 PPM	TRACEABLE TO SRM1683B			10 AR 14853-150		

BALANCE GAS NITROGEN

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

Component NITRIC OXIDE
First Analysis Date 8/6/91 Units mv

Z 0.00	R 85.88	T 77.76
R 85.78	Z 0.00	T 77.78
Z 0.01	T 77.65	R 85.74

Mean Test Assay 20.22 PPM

Second Analysis Date 8/13/91 Units mv

Z 0.00	R 89.50	T 81.62
R 89.41	Z -0.03	T 81.55
Z 0.00	T 81.60	R 89.38

Mean Test Assay 20.36 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: R S Cady

LIR

5/7

Scott Specialty Gases, Inc.

Shipped from: 2600 CAJON BLVD. SAN BERNARDINO CA 92411-0000
Phone: 714-887-2571 Fax: 714-887-0549

CERTIFICATE OF ANALYSIS

SIERRA ENVIRONMENTAL ENGR
JOE ADMIAK
3505 CADILLAC
SUITE K-1
COSTA MESA CA 92626

PROJECT #: 02-16738
PO#: 2512
ITEM #: 0202C3000702AL
DATE: 11/06/91

CYLINDER #: AAL1631

ANALYTICAL ACCURACY: +/-1%

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
CARBON DIOXIDE	15.0	PCT	15.00	PCT
OXYGEN	8.0	PCT	8.000	PCT
NITROGEN		BAL		

CYLINDER PRESSURE=2000PSI

ANALYST: FV
FRANK VILIMAS

APPROVED BY: James Ross
JAMES ROSS

Scott Specialty Gases, Inc.
2600 CAJON BLVD., SAN BERNARDINO, CA 92411
FAX 714-887-0549
PHONE: 714-887-2571

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 02/24/92
Our Project No: 18059
Your P.O. No: 2563
Page 1 of 1
Expiration Date: 08/93

SIERRA ENVIRONMENTAL ENGR
JOE ADMIAK
3505 CADILLAC
SUITE K-1
COSTA MESA CA 92626-0000

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM018895 Cylinder Pressure 2000 PSIG Certified Accuracy ±1% % NIST Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD SRM/CRM NO.	REFERENCE STD CYL. NO.	REFERENCE STD CONC.	GAS ANALYZER MAKE/MODEL/SERIAL NO.	GAS ANALYZER LAST CAL. DATE	GAS ANALYZER ANALYTICAL PRINCIPLE
CARBON MONOXIDE	400.2 PPM	CRM1680	ALM013394	475.0 PPM	HORIBA AIA-24 4564403	02/11/92	INFRA-RED

BALANCE GAS NITROGEN

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

Component CARBON MONOXIDE
First Analysis Date 02/13/92 Units mv

Z 00.00	R 93.2	T 80.9
R 93.2	Z 00.00	T 80.9
Z 00.03	T 80.9	R 93.2

Mean Test Assay 400.2 PPM

Second Analysis Date 02/20/92 Units mv

Z 00.00	R 93.2	T 80.9
R 93.2	Z 00.00	T 80.9
Z 00.00	T 80.9	R 93.2

Mean Test Assay 400.2 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 M. JOHNSON

Approved By: _____
A.F. LANGE, PH.D., MANAGER, QA

Scott Specialty Gases, Inc.

2600 CAJON BLVD., SAN BERNARDINO, CA 92411

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

Shipped From: Scott SAN BERNARDINO, CA
Date Shipped 01/03/92
Our Project No: 17247
Your P.O. No: 2528
Page 1 of 1
Expiration Date: 06/93

SIERRA ENVIRONMENTAL ENGR
ATTN: JOE ADMIAK
3505 CADILLAC
COSTA MESA CA 92626-0000

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM018025 Cylinder Pressure 1950 PSIG Certified Accuracy ±1% % NIST Traceable

		REFERENCE STD			GAS ANALYZER		
COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.	MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
CARBON MONOXIDE	79.46 PPM	CRM1679	ALM016524	96.67 PPM	HORIBA AIA-24 4564403	10/23/91	INFRA-RED

BALANCE GAS NITROGEN
ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component CARBON MONOXIDE
First Analysis Date 12/23/91 Units mv

Z 00.00	R 40.2	T 33.2
R 40.2	Z 00.01	T 33.2
Z 00.02	T 33.2	R 40.2

Mean Test Assay 79.33 PPM

Second Analysis Date 12/30/91 Units mv

Z 00.00	R 40.2	T 33.3
R 40.2	Z 00.01	T 33.3
Z 00.04	T 33.3	R 40.2

Mean Test Assay 79.58 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 M. JOHNSON

Approved By: _____
A.F. LANGE, PH.D., MANAGER, QA

State of California
AIR RESOURCES BOARD

Executive Order G-757

Approval to Sierra Environmental Engineering, Inc.
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 Sierra Environmental Engineering, Inc. meets the requirements of the Board for conducting ARB Test Methods 1, 2, 3, 4, 5, 6, 8, 10, 100 (NOx, O2), and Visible Emissions Evaluations when the following conditions are met:

1. Sierra Environmental Engineering Inc. conducts ARB Test Method 100 for O2 using a Teledyne 326RA analyzer with either a A5 or a B1 sensor, or a paramagnetic analzyer.

2. The person performing VEE is certified to conduct VEE at the time of the test and the certification is on file with the Compliance Division of the Air Resources Board.

NOW, THEREFORE, BE IT ORDERED that Sierra Environmental Engineering, Inc. 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 30th day of July 1992, at Sacramento, California.

James J. Morgester, Chief
Compliance Division

State of California
AIR RESOURCES BOARD

Executive Order G-707

Approval to Sierra Environmental Engineering, Inc.
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 Sierra Environmental Engineering, Inc. meets the requirements of the Board for conducting ARB Test Method 430.

NOW, THEREFORE, BE IT ORDERED that Sierra Environmental Engineering, Inc. is granted an approval, from the date of execution of this order, until June 30, 1993 to conduct the test 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 18th day of February 1992, at Sacramento, California.

James J. Morgester, Chief
Compliance Division

State of California
AIR RESOURCES BOARD

Executive Order G-717

Approval to Sierra Environmental Engineering
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 Sierra Environmental Engineering meets the requirements of the Board for conducting ARB Test Method 100 for SO2, CO2 and THC.

NOW, THEREFORE, BE IT ORDERED that Sierra Environmental Engineering 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 1ST day of MAY 1992, at Sacramento, California.

James J. Morgester, Chief
Compliance Division

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client SCE | Test Method S. C. AQMD - PAR | Date Sept 22, 1992

Facility REDONDO | Test Number 4 | Job Number 92364

Unit #6 | Description 110 MW / W-4654 | Page 1 of 1

Location EG DUCT PRIOR TO STACK | Start/Stop Time 1307 / 1337 | Operator(s) R. G. Primera Sr.

PRE-TEST DATA

T_{AMB}: 75-81 = 16 % RH °F

P_{BAR}: 30.29 in Hg

ASSUMED MOIST. ____ %

MOL. WT.: ____ g/mole

P_{STACK} ____ in H_2O

SAMPLE TIME 30 min.

METER BOX # 2010-4

SAMPLE BOX # ____

FILTER # ____

ΔH@: 1.76

METER FACTOR: 1.0380

PITOT COEFF.: ____

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	577.1	579.3	____
#2	615.7	594.6	____
#3	478.8	476.8	____
#4	943.5	935.5	____
#5	____	____	____
#6	____	____	____
TOTAL	2637.0	~~2586.2~~	50.8

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	0	28.5	RGP	1300
POST-TEST	0	28.5	RGP	1345

RUN	1	2	3	Avg.
O_2	____	____	____	____
CO_2	____	____	____	____

Sample Point	Time (min)	ΔP (in H_2O)	ΔH (in H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
3	0		.92	473.835	23.2	330			69	94	92
2	10		.90	479.1	23.2	362			74	95	93
1	20		.93	484.4	23.2	385			79	96	93
	30			489.734							
Total/ Average											

COMMENTS/OBSERVATIONS

93.8 °F

920521 Imp. Catch

RE6-4 File #

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client: SC Edison | Test Method: SCAQMD Draft | Date: Sept 24, 1992

Facility: Redondo | Test Number: 1 | Job Number: 92364

Unit: # 6 | Description: with Urea 40MW | Page: 1 of 1

Location: Flue Gas duct prior to stack | Start/Stop Time: 0415 / 0445 | Operator(s): R.G. Pioneer Sa. R

PRE-TEST DATA

T_{AMB}: 66-75=64 °F %RH

P_{BAR}: 30.15 in Hg

ASSUMED MOIST.: ____ %

MOL WT.: ____ g/mole

P_{STACK}: ____ in H_2O

SAMPLE TIME: 30 min.

METER BOX #: 2010-4

SAMPLE BOX #: ____

FILTER #: ____

ΔH@: 1.76

METER FACTOR: 1.0380

PITOT COEFF.: ____

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	638.0	613.9	
#2	593.4	590.0	
#3	480.0	477.4	
#4	872.9	863.6	
#5			
#6			
TOTAL	2584.3	2544.9	39.4

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	⊘	28.5	RGP	0401
POST-TEST	⊘	28.5	RGP	0453

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (in H_2O)	ΔH (in H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
3	0		1.0	559830	23.0	321			59	85	84
2	10		.95	565.7	23.5	304			58	85	84
1	20		.99	571.1	23.3	301			71	86	84
	30			576.643							
Total/ Average											

COMMENTS/OBSERVATIONS

Position 2 = 264-305 °F

84.7°F

920178 Imp Catch

File # RE6-9

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client: S C Edison | Test Method: SCAQMD Draft | Date: Sept. 24, 1992

Facility: Redondo | Test Number: 2 | Job Number: 92364

Unit: #6 | Description: With Urea 70 MW | Page: 1 of 1

Location: Flue gas duct, priority stack | Start/Stop Time: 0613 / 0643 | Operator(s): R.G. Provencher

PRE-TEST DATA

T_{amb}: 68-72 = 82% RH °F

P_{bar}: 30.18 in Hg

ASSUMED MOIST. ____ %

MOL. WT.: ____ g/mole

P_{stack} ____ in H_2O

SAMPLE TIME 30 min.

METER BOX # 2010-4

SAMPLE BOX # ____

FILTER # ____

ΔH@: 1.76

METER FACTOR: 1.0380

PITOT COEFF.: ____

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	627.2	594.0	
#2	605.8	601.4	
#3	478.1	476.7	
#4	910.0	902.0	
#5			
#6			
TOTAL	2621.1	2578.1	43.0

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	0	28.5	RGP	0610
POST-TEST	0	28.5	RGP	0648

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (In H_2O)	ΔH (In H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
3	0		1.0	577200	23.0	321			62	89	85
2	10		.97	582.7	23.0	359			58	88	85
1	20		.98	587.9	23.0	388			62	88	85
	30			593.543							
Total/ Average											

COMMENTS/OBSERVATIONS

86.7°F

~~Emp~~

920179 > Imp Catch

920170

File # RF6-10

SCE REDONDO UNIT 5

UREA COMPLIANCE TESTS

Load ≈ 167 MW

TEST No.	1	2	3	4
DATE	10/1/92	10/1/92	10/1/92	10/1/92
TIME	10:45	12:35	14:50	15:35
FUEL TYPE	Nat. Gas	Nat Gas.	Nat. Gas	Nat. Gas
BOS	15	15	15	15
LOAD (MW)	167	167	167	167
AUX LOAD (MW)	8.1	8.1	8.1	8.1
FUEL FLOW (10^6 SCFH)	152	152	152	153
SOUTH O_2 (%)	1.6 - 2.0	1.7-2.0	1.7-2.0	1.6-2.0
NORTH O_2 (%)	3.2-3.4	3.3-3.6	3.2-3.6	3.3-3.7
SO. APH OUT (°F) 19	340	338	340	340
NO. APH OUT (°F) 18	330	328	324	325
WB/FURN. ΔP	4.5	4.7	4.5	4.4
MAIN STM. PRESS.	1805	1803	1806	1805
SO. ID FAN (AMPS)	136	140	134	134
SO. FD FAN (AMPS)	60	60	60	60
NO. ID FAN (AMPS)	134	134	137	137
NO. FD FAN (AMPS)	50	50	50	50
UREA SYS. ON/OFF	ON	ON	off	off
UREA LOOP	2	2	-	-
UREA FLOW (GPM)	1.90-2.25	1.90-2.65	-	-
H_2O FLOW (GPM)	6.0	5.9	-	-
UREA SYS. PRES. (PSI)	30	30	-	-
UREA CONC. (%)	21	21	-	-
FGR (AMPS)	215	215	214	214

SCE REDONDO UNIT 5

UREA COMPLIANCE TESTS

140 MW

TEST NO.	1	2	3	4
DATE	10/2/92	10/2/92	10/2/92	10/2/92
TIME	10:05	11:35	14:15	15:10
FUEL TYPE	Nat. Gas	Nat. Gas	Nat. Gas	Nat Gas
BOS	13-16	13-16	13-16	13-16
LOAD (NMW)	140	140	140	140
AUX LOAD (MW)	7.4	7.4	7.4	7.4
FUEL FLOW (10^6SCFH)	126	127	126	127
SOUTH O_2 (%)	1.9-2.3	1.9-2.3	2.0-2.5	1.9-2.4
NORTH O_2 (%)	5.0-5.4	5.0-5.5	5.0-5.5	5.0-5.4
SO. APH OUT (°F)	330	335	338	338
NO. APH OUT (°F)	300	300	300	300
NO/FURN. ΔP	3.4	3.4	3.4	3.4
MAIN STM. PRESS.	1805	1808	1806	1805
SO. ID FAN (AMPS)	120	120	121	121
SO. FD FAN (AMPS)	50	50	50	50
NO. ID FAN (AMPS)	112	111	112	112
NO. FD FAN (AMPS)	50	50	50	50
UREA SYS. ON/OFF	ON	ON	~~OFF~~	~~OFF~~
UREA LOOP	2	2	—	—
UREA FLOW (GPM)	1.32	1.32	—	—
H_2O FLOW (GPM)	6.7	6.7	—	—
UREA SYS PRES. (PSI)	29.0	30.0	—	—
UREA CONC. (%)	21	21	—	—
FGR (AMPS)	220	220	220	220

SCE REDONDO UNIT 5
UREA COMPLIANCE TESTS
LOAD ≈ 40 MW

TEST NO.	1	2	3	4
DATE	9/29/92	9/29/92	9/29/92	9/29/92
TIME	0330	0510	0915	1000
FUEL TYPE	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS
BOOS	9-16	9-16	9-16	9-16
LOAD (NMW)	40	41	40	39.5
AUX LOAD (MW)	5.7	5.7	5.7	5.7
FUEL FLOW (10^6 SCFH)	53.0	53.0	52.5	52.0
SOUTH O_2 (%)	8.4-9.8	8.5-9.8	8.4-9.8	8.5-9.8
NORTH O_2 (%)	10+	10+	10+	10+
SO. APH OUT (°F) 18	290	290	290	290
NO. APH OUT (°F) 19	360	370	370	370
WB/FURN. ΔP	1.1	1.1	1.1	1.1
MAIN STM. PRESS.	1805	1806	1805	1805
SO. ID FAN (AMPS)	77	77	77	76
SO. FD FAN (AMPS)	39	39	39	39
NO. ID FAN (AMPS)	82	83	82	83
NO. FD FAN (AMPS)	45	45	45	45
UREA SYS. ON/OFF	ON	ON	OFF	OFF
UREA LOOP	1	1	—	—
UREA FLOW (GPM)	.48	.48	—	—
H_2O FLOW (GPM)	3.82	3.82	—	—
UREA SYS PRES. (PSI)	30.0	30.0	—	—
UREA CONC. (%)	21	21	—	—
FGR (AMPS)	300	300	300	300

SCE REDONDO UNIT 6
UREA COMPLIANCE TESTS

TEST NO.	1	2	3	4	5
DATE	9/21/92	9/21/92	9/21/92	9/21/92	9/21/92
TIME	1015	1100	1250	1425	1535
FUEL TYPE	GAS	GAS	GAS	GAS	GAS
BOOS	14,15	14,15	14,15	14,15	14,15
LOAD (NMW)	172	171	172	171	172
AUX LOAD (MW)	9	9	9	9	9
FUEL FLOW (10^6SCFH)	125.0	125.0	125.0	125.0	125.0
SOUTH O_2 (%)	2.6-3.3	2.6-3.4	2.6-3.4	2.6-3.3	2.5-3.4
NORTH O_2 (%)	2.6-3.4	2.6-3.5	2.5-3.4	2.6-3.5	2.6-3.5
SO. APH OUT (°F) [18]	390	390	390	390	390
NO. APH OUT (°F) [19]	370	370	370	380	380
W/FURN. ΔP	3.7	3.6	3.5	3.5	3.7
MAIN STM. PRESS.	1805	1810	1805	1810	1815
SO. ID FAN (AMPS)	175	175	175	177	177
SO. FD FAN (AMPS)	52	53	53	54	54
NO. ID FAN (AMPS)	180	180	182	182	182
NO. FD FAN (AMPS)	64	64	64	64	64
UREA SYS. ON/OFF	OFF	OFF	ON	ON	ON
UREA LOOP	—	—	2	2	2
UREA FLOW (GPM)	—	—	2.4	2.4	2.4
H_2O FLOW (GPM)	—	—	4.3	4.3	4.3
UREA SYS PRES. (PSI)	—	—	30.8	30.2	30.0
UREA CONC. (%)	—	—	22	22	22

NOTE: TEST NO. 4 ABORTED DUE TO UREA SYS. SHUT-OFF BECAUSE OF LOW TANK LEVEL. THIS OCCURRED 15 MIN. INTO TEST.

SCE REDONDO UNIT 6
UREA COMPLIANCE TESTS

TEST No.	1	2	3	4
DATE	9/22/92	9/22/92	9/22/92	9/22/92
TIME	0915	1015	1155	1320
FUEL TYPE	GAS	GAS	GAS	GAS
LOADS	13-16	13-16	13-16	13-16
LOAD (NMW)	140	140	140	139
AUX LOAD (MW)	8.2	8.3	8.2	8.2
AIR FLOW (10^6SCFH)	110.0	110.0	110.0	110.0
SOUTH O_2 (%)	4.0-4.4	3.9-4.4	3.9-4.4	4.0-4.5
NORTH O_2 (%)	3.5-4.0	3.4-4.0	3.3-4.0	3.4-4.0
18. APH OUT (°F)	400	405	405	405
19. APH OUT (°F)	340	340	340	340
FURN. ΔP	2.7	2.8	2.7	2.7
MAIN STM. PRESS.	1805	1810	1805	1805
20. ID FAN (AMPS)	150	150	150	150
FD FAN (AMPS)	51	51	51	51
20. ID FAN (AMPS)	168	168	168	168
20. FD FAN (AMPS)	61	61	61	61
UREA SYS. ON/OFF	OFF	OFF	ON	ON
UREA LOOP	—	—	2	2
BYA FLOW (GPM)	—	—	1.4	1.4
2ND FLOW (GPM)	—	—	5.4	5.3
UREA SYS PRES. (PSI)	—	—	30.0	30.0
UREA CONC. (%)			22.0	22.0

SCE REDONDO UNIT 6
UREA COMPLIANCE TESTS

LOAD ≈ 41 MW

EST No.	1	2	3	4
2 TE	9/24/92	9/24/92	9/24/92	9/24/92
TIME	0430	0630	0855	0945
FUEL TYPE	GAS	GAS	GAS	GAS
ODS	10 & 11, 13-16	10 & 11, 13-16	10 & 11, 13-16	10 & 11, 13-16
LOAD (NMW)	41	41	41.5	41
UX LOAD (MW)	6.2	6.2	6.2	6.2
U L FLOW (10^6SCFH)	41.5	41.5	41.5	41.5
OUTH O_2 (%)	8.2-9.6	8.4-9.8	8.6-9.8	
RTH O_2 (%)	9.7	9.7	9.7	
APH OUT (°F) 'A'	440	430	425	425
APH OUT (°F) 'B'	330	330	330	330
/FURN. ΔP	0.8	0.8	0.8	0.8
AIN STM. PRESS.	1810	1810	1810	1805
ID FAN (AMPS)	105	105	105	105
FD FAN (AMPS)	44	45	44	44
0. ID FAN (AMPS)	79	79	79	80
. FD FAN (AMPS)	45	45	44	44
UREA SYS. ON/OFF	ON	ON	OFF	OFF
UREA LOOP	1	1	—	—
EA FLOW (GPM)	0.45	0.43	—	—
O FLOW (GPM)	3.7	3.7	—	—
SYS PRES. (PSI)	29.6	29.6	—	—
FR (AMPS)	350	350	350	350

SIERRA ENVIRONMENTAL ENGINEERING, INC.

Client: SCE REDONDO 5 | Test No: | Page | of
Date: 10-1-92 | Project No: | Lotus file:
Test Location: APH INLET UNIT #5 | Fuel: NAT GAS | Operator: S.A.
Test Condition: 167 MW | Barometric Pressure: 30.25 in. Hg
Ambient Temp: DB WB RH% | Duct Static Pressure: in. WC

Test #	Time 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						At 3.0 % O2	
			O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
W/UREA 1	1044-1054	12PT. COMP.	2.4	9.9	300			108	290.3	104.5
	1054-1104	"	2.3	9.8	285			108	274.3	103.5
	1104-1114	"	2.3	9.9	300			105	288.7	101.1
		ZERO SPAN	0 / 6.0	0 / 14.6	0 / 400			0 / 94		
	NH3 PORT 3	1125-1130	7.6							
	2	1130-35	6.8	7.0						
	1	1135-40	6.5							
W/UREA 2	1238-1248	COMP.	2.3	10.4	255			105	245.4	101.1
	1248-1258	"	2.4	10.1	215			108	208	104.5
	1258-1308	"	2.7	10.0	120			116	118	114
			-.1 / 6.0	0 / 15.0	0 / 400			-.5 / 94.3		
NO UREA 3	1455-1500	COMP.	2.4	10.3	210			168	203.2	162.6
	1500-1510	"	2.3	10.4	225			163	216.5	156.9
	1510-1520	"	2.2	10.4	210			165	201.0	157.9
		ZERO SPAN	-.1 / 7.9	0 / 14.8	0 / 400			0 / 92.5		
W/UREA 4	1535-1545	COMP.	2.1	10.7	220			165	209.4	157.1
	1545-1555	"	2.2	10.8	220			168	210.6	160.8
	1555-1605	"	2.2	10.7	220			168	210.6	160.8
		ZERO SPAN	-.1 / 8.0	0 / 14.9	0 / 400			0 / 93.0		

Span Gas Data:

Species:	Zero (N2)	NOx HIGH	NOx MED.	O2 HIGH	O2 MED.	CO HIGH	CO MED.	CO2 HIGH	CO2 MED.	SO2 HIGH	SO2 MED.
PPM or %	VEZ	92.53	20.45	20.7	9%	1003.2	79.46	15%			
Cylinder #	N2	[illegible] 4713	ALM 7307	AMB.	ALM 1631	ALM0 14995	ALM0 18025	ALM 1631			
Exp. Date											

PPM 3 SLIP
1)
2)

COMMENTS: NH3 PORT O2 1319-1323 8.1% → 7.4%

SIERRA ENVIRONMENTAL ENGINEERING, INC.

Client: SCE Redondo 5 Test No: _____ Page 1 of 1

Date: 10-2-92 Project No: _____ Lotus file: _____

Test Location: APH Fuel: NAT. GAS Operator: S. A.

Test Condition: 140 MW Barometric Pressure: 30.27 in. Hg

Ambient Temp: DB ___ WB ___ RH% ___ Duct Static Pressure: _____ in. WC

Test #	Time 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						At 3.0 % O2	
			O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
w/UREA 1	1006 1016	12 Pt. COMP.	3.2	9.6	110			61	111.2	61.7
	1016 1026	COMP.	3.2	9.6	105			62	106.2	62.7
	1026 1036	COMP.	3.2	9.8	115			62	116.3	62.7
		Zero / SPAN	0 / 8.0%	0 / 14.6	-5 / 400			+.5 / 94		
w/urea										
	1052 1056	NH_3 PORT 3	8.9							
	1056 1100	2	8.0	7.9%						
	1100 1104	1	6.9							
W/UREA 2	1135 1145	COMP.	3.2	9.9	90			63	91	63.7
	1145 1152	"	3.2	9.9	90			62	91	62.7
	1152 1205	"	3.2	9.9	90			62	91	62.7
		Zero / SPAN	-.1 / 8.0	0 / 14.8	0 / 400			0 / 93		
W/O UREA 3	1415 1425	COMP.	3.2	10.0	70			83		83.9
	1425 1435	"	3.2	10.0	70			93		83.9
	1435 1445	"	3.2	9.9	70			84		84
		Zero / SPAN	0 / 7.9	0 / 15.1	/ 400			/ 92		
W/O UREA 4	1308 1318	COMP.	3.3	10.1	115			81		
	1318 1328	"	3.2	10.1	110			91		
	1328 1338	"	3.2	10.0	110			91		
		Zero / SPAN	0 / 8.0	0 / 15.0	0 / 400			0 / 92		

Span Gas Data:

Species:	Zero (N2)	NOx HIGH	NOx MED.	O2 HIGH	O2 MED.	CO HIGH	CO MED.	CO2 HIGH	CO2 MED.	SO2 HIGH	SO2 MED.
PPM or %											
Cylinder #											
Exp. Date											

COMMENTS:

NH_3 PORT O2 1217-1220 9.0% / 8.0%

SIERRA ENVIRONMENTAL ENGINEERING, INC.

Client: SCE REDONDO 5 Test No: AS LISTED Page 1 of 1

Date: 9-29-92 Project No: 92369 Lotus file:

Test Location: APHING UNIT #5 Fuel: NAT GAS Operator: JA

Test Condition: 40MW Barometric Pressure: 30.24 in. Hg

Ambient Temp: DB 74 WB 78 RH% 82 Duct Static Pressure: in. WC

Test #	Time 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						At 3.0 % O2	
			O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
W/UREA 1	0317-0327	12FT. COMP.	9.3	6.5	30			16	46.3	24.7
	0327-0337	"	9.3	6.5	30			16	46.3	24.7
	0337-0347	"	9.3	6.4	30			16	46.3	24.7
		ZERO/SPAN	0/8.0	0/15.1	0/30			0/92.5		
	0402-0407	NH_3 PORT 3	12.5							
	0407-0412	2	12.0		-0					
	0412-0417	1	11.5							
W/UREA 2	0503-0513	COMP.	9.5	6.4	30			16	47.1	25.1
	0513-0523	"	9.5	6.6	33			16	51.8	25.1
	0523-0532	"	9.5	6.4	33			16	51.8	25.1
		ZERO/SPAN	0/8.0	0/15.0	0/30			0/93		
W/UREA 3	0900-0910	COMP.	9.8	6.1	25			27	40.3	43.5
	0910-0920	"	9.5	6.3	25			27	39.3	42.4
	920-930	"	9.5	6.7	25			28	39.3	44.0
		ZERO/SPAN	0/8.0	0/15.0	0/30			0/93		
W/UREA 4	0942-0952	COMP.	9.8	6.3	25			27	40.3	43.5
	0952-1002	"	9.5	6.3	25			27	39.3	42.4
	1002-1012	"	9.5	6.2	25			26	39.3	40.8
		ZERO/SPAN	0/8.0	0/15.2	0/30			0/91		

Span Gas Data:

Species:	Zero (N2)	NOx HIGH	NOx MED.	O2 HIGH	O2 MED.	CO HIGH	CO MED.	CO2 HIGH	CO2 MED.	SO2 HIGH	SO2 MED.
PPM or %	ZERO	9253	20.45	20.7	8%	400.2	19.7%	15%			
Cylinder #	N2										
Exp. Date											

COMMENTS: O_2

NH3 SLIP 5.0PPM NH_3 PORT → 0542-0546 13.0% > 12.2%

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client SCE | Test Method SCAQMD DRAFT | Date 10-01-92

Facility REDONDO | Test Number 1 | 167 M.W | Job Number 92386

Unit 5 | Description NH3 | Page 1 of 1

Location STACK | Start/Stop Time 1043 / | Operator(s) Robert / Sean

PRE-TEST DATA

T_{amb}: ____ °F

P_{bar}: 30.25 in Hg

ASSUMED MOIST. ____ %

MOL. WT.: ____ g/mole

P_{stack} ____ in H_2O

SAMPLE TIME 30 min.

METER BOX # 2010-5

SAMPLE BOX # -0-

FILTER # -0-

ΔH@: 1.79

METER FACTOR: 1.0383

PITOT COEFF.: -0-

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	613.7	572.1	
#2	567.8	563.9	
#3	500.3	499.5	
#4	929.1	917.2	
#5			
#6			
TOTAL	2605.9	2552.7	53.2

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	-0-	30"	RL	1025
POST-TEST	-0-	30"	KL	1115

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (in H_2O)	ΔH (in H_2O)	Meter Reading (ACF) 452 → 923	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Impp. Out	Meter In	Meter Out
0	0			452.923							
3	10		.96	458.46	24"	320			70	100	99
2	20		.97	463.94	24"	318			70	104	101
1	30		.98	469.463	24"	318			70	106	102
Total/ Average											

COMMENTS/OBSERVATIONS

102.0 °F

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client: SCE
Facility: Redondo
Unit: 5
Location: STACK

Test Method: S.C.A.Q.M.D Draft
Test Number: 2 167MW
Description: DH3
Start/Stop Time: 1235 / 1305

Date: ~~9-30-92~~ 10-01-92
Job Number: 92386
Page: 1 of 1
Operator(s): Robert / SEAN

PRE-TEST DATA

T_{AMB}: ____ °F
P_{BAR}: 30.25 In Hg
ASSUMED MOIST.: ____ %
MOL WT.: ____ g/mole
P_{STACK}: ____ In H_2O
SAMPLE TIME: 30 min.

METER BOX #: 2010-5
SAMPLE BOX #: ~~0~~
FILTER #: ~~0~~
ΔH@: 1.79
METER FACTOR: 1.0383
PITOT COEFF.: ~~0~~

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	606.1	560.3	
#2	581.5	577.5	
#3	479.9	~~478.3~~	
#4	891.5	~~887.6~~	
#5			
#6			
TOTAL	2558.5	2503.5	55.0

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	~~0~~	15"	RL	1230
POST-TEST	~~0~~	30"	RL	1207

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (In H_2O)	ΔH (In H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
0	0			470.00							
3	10		1.1	475.47	24"	319			66	104	103
2	20		1.1	480.10	24"	319			67	106	103
1	30		1.1	486.810	24"	317			68	107	103
Total/ Average											

COMMENTS/OBSERVATIONS

104.3
O_2 7.98 = 1.3259
10.87
Corrected 14.4 ppm

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client: SCE | Test Method: SCAQMD DRAFT | Date: 10-02-92
Facility: REDONDO | Test Number: 140 HW / W UREA (1) | Job Number: 92364
Unit: 5 | Description: | Page: 1 of 1
Location: STACK | Start/Stop Time: 1006 / | Operator(s): SW

PRE-TEST DATA

T_{AMB}: ____ °F
P_{BAR}: 30.26 in Hg
ASSUMED MOIST.: ✓ %
MOL. WT.: ✓ g/mole
P_{STACK}: ✓ in H_2O
SAMPLE TIME: 30 MIN min.

METER BOX #: 2010-5
SAMPLE BOX #: ✓
FILTER #: ✓
ΔH@: 1.79
METER FACTOR: 1.0383
PITOT COEFF.: NA

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	611.1	573.9	
#2	576.1	567.8	
#3	502.6	500.0	
#4	929.8	929.1	
#5			
#6			
TOTAL	2619.6	2565.3	54.3

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	0.00	18	R.L.	1551
POST-TEST	0.021	29"	R.L.	1642

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (in H_2O)	ΔH (in H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
—	0	|	1.0	487.409							
1	10	|	1.0	493.180	25	291			83	100	96
2	20	|	1.0	498.671	24	307			81	105	99
3	30	|	—	504.661	24	319			80	105	99
Total/ Average	30	NA	1.0								

COMMENTS/OBSERVATIONS

100.7

16.1
~~16.6~~ ppm Corrected
11.7 ppm
O_2 = ~~8.38~~ ~~1.4806~~
7.9 % 1.3769

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client SCE | Test Method SCAQMD DRAFT | Date 10-02-92
Facility REDONDO | Test Number 140 MW (2) | Job Number 92364
Unit 5 | Description NH3 | Page 1 of 1
Location STACK | Start/Stop Time 1134 / 1206 | Operator(s) Robert / SEAN

PRE-TEST DATA

T_{amb}: ____ °F | METER BOX # 2010-5
P_{bar}: 36.26 in Hg | SAMPLE BOX # ____
ASSUMED MOIST. ____ % | FILTER # ____
MOL. WT.: ____ g/mole | ΔH@: 1.79
P_{stack} ____ in H_2O | METER FACTOR: ____
SAMPLE TIME 20 min. | PITOT COEFF.: ____

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	611.6	578.4	
#2	603.0	595.4	
#3	480.0	477.4	
#4	899.6	891.5	
#5			
#6			
TOTAL	2589.2	2542.7	46.5

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	0	15"	RL	1115
POST-TEST	0	29"	RL	1206

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (in H_2O)	ΔH (in H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
0	0	|	1.0	505.135							
3	10	|	1.0	510.892	24		293		76	113	108
2	20	|	1.0	516.61	24"		309		75	113	108
1	30.1	|	—	522.353	-4		317		22	112	107
Total/ Average	30	N/A	1.0								

COMMENTS/OBSERVATIONS

110.2 °F
8.0 O_2% = 1.3876
6.90 ppm
9.6 corrected

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client: Southern Co. Edison — Test Method: NH_3 — Date: 9-29-92

Facility: Redondo Beach — Test Number: #1 — Job Number: 92364

Unit: #5 — Description: 40 mw w/ urea — Page: 1 of 1

Location: Flue Gas Duct PRIOR TO STACK — Start/Stop Time: 0316 / 0346 — Operator(s): ROGER & BRIAN

PRE-TEST DATA

T_{amb}: 74°/78° = 82% °F — METER BOX #: 2010.5

P_{bar}: 30.25 in Hg — SAMPLE BOX #: ∅

ASSUMED MOIST.: ____ % — FILTER #: ∅

MOL WT.: ____ g/mole — ΔH@: 1.79

P_{stack}: ____ in H_2O — METER FACTOR: 1.0383

SAMPLE TIME: 30 min. — PITOT COEFF.: ____

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	621.6	588.1	
#2	568.6	565.4	
#3	477.3	476.1	
#4	916.3	909.8	
#5			
#6			
TOTAL	2583.8	2539.4	44.4

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	.00	15"	RL	0314 !!
POST-TEST	.000	25"	BD	0350

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (in H_2O)	ΔH (in H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
	0			400.474							
3	10		1.1	406.04	24"	329			60	89	89
2	20		1.1	411.65	24"	301			60	90	88
1	30		1.1	417.312	24"	290			65	90	88
Total/ Average											

COMMENTS/OBSERVATIONS

0316 / 0346

890F/

920168 Imp. Catch

File # RE5-1

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client Southern Ca. Edison — Test Method NH3 — Date 9-29-92

Facility Redondo Beach — Test Number #2 — Job Number

Unit #5 — Description 40 MW w/ urea — Page 1 of 1

Location — Start/Stop Time 0456 / — Operator(s) RL / B.D.

PRE-TEST DATA

T_{amb}: — °F — METER BOX # 2010-5

P_{bar}: 30.25 In Hg — SAMPLE BOX # ~~4383~~

ASSUMED MOIST. — % — FILTER # 0

MOL. WT.: — g/mole — ΔH@: 1.79

P_{stack} — In H_2O — METER FACTOR: 1.0383

SAMPLE TIME 30 min. — PITOT COEFF.: NA

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	594.9	557.5	
#2	601.9	596.0	
#3	510.0	508.7	
#4	880.0	872.5	
#5			
#6			
TOTAL	2586.8	2534.7	52.1

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	0	24"	RL	0455
POST-TEST	0	~~30"~~	RL	0530

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (In H_2O)	ΔH (In H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
C	0			417.716							
B	10		1.1	423.42	24"	334			65	93	90
2	20		1.1	429.05	24"	300			75	95	91
1	30		1.1	434.791	24"	290			75	95	91
Total/ Average											

COMMENTS/OBSERVATIONS

920226

File # RES-2

92.5°F

SIERRA ENVIRONMENTAL ENGINEERING, INC.

Client: SCE Redondo 6 — Test No: As Listed — Page 1 of 1

Date: 9-21-92 — Project No: 92364 — Lotus file:

Test Location: API Inlet Unit 6 — Fuel: Nat. Gas — Operator: SA

Test Condition: N 172 MW — Barometric Pressure: 30.21 in. Hg

Ambient Temp: DB 72 WB 68 RH% 82% — Duct Static Pressure: in. WC

Test #	Time 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						At 3.0 % O2	
			O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
w/o urea 1	10:00AM 1020	12-Point	3.5	10.0	180			142.5	185.2	146.6
	1020-1030	Composite	3.4	9.9	190			140.0	194.4	143.2
	1030-1042	"	3.4	9.8	195			141.3	197.4	144.5
		Zero/Span	0/3.0	0/15.2	0/390			-.2/95		
w/o urea 2	1100-1110	Comp.	3.3	10.0	240			135.0	244.1	137.3
	1110-1120	"	3.4	9.8	185			140	189.2	143.2
	1120-1130	"	3.3	9.9	205			137.5	208.5	139.8
		Zero/Span	0/1.9	0/15.2	0/80			0/92.5		
w/ urea 3	1245-1255	Comp.	3.4	9.5	260			95	266	97.2
	1255-1305	"	3.3	9.0	260			92.5	264.4	94.1
	1305-1315	"	3.4	9.2	230			95	235.3	97.2
		Zero/Span	0/3.0	0/15.0	0/402			0/80		
* 4	1425-1435	Comp.	3.4	10.5	240			97.5		
	1435-1445	"	STOP TEST							
		"								
restart										
w/ urea 4	1525-1535	Comp.	3.5	10.7	220			100.0	226.3	102.9
	1535-1545	"	3.6	10.4	180			102.5	186.2	186.1
	1545-1555	"	3.5	10.6	200			100.0	205.7	102.9
		Zero/Span	0/9.0	0/16.3	0/395			0/92.5		

Span Gas Data:

Species:	Zero (N2)	NOx HIGH	NOx MED.	O2 HIGH	O2 MED.	CO HIGH	CO MED.	CO2 HIGH	CO2 MED.	SO2 HIGH	SO2 MED.
PPM or %	Zero	92.53	20.3%	Ambient	8%	400.2	79.4%		15.0		
Cylinder #	N2	NAL 4713	NAL 7307		NAL 1031	ALM0 19995	ALM0 19025		NAL 1031		
Exp. Date											

COMMENTS:

NH3 for CO 1333-43 7.7%

* 1442 RAN OUT OF UREA

SIERRA ENVIRONMENTAL ENGINEERING, INC.

Client: SCE REDONDO - 6 | Test No: AS LISTED | Page 1 of 1

Date: 9-22-92 | Project No: | Lotus file:

Test Location: SPLIT INLET NH3 | Fuel: NAT. GAS | Operator: J. A

Test Condition: 140 MW | Barometric Pressure: 30.28 in. Hg

Ambient Temp: DB WB RH% | Duct Static Pressure: in. WC

	Test #	Time 24hr	Sample Point	Emission Measurement: Dry, Uncorrected O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	At 3.0 % O2 CO ppm	NOx ppm
W/O UREA	1	910 AM 920	COMP.	4.7	9.3	180			75	198.9	82.9
		920 930	"	4.7	9.2	195			72.5	204.4	80.1
		930 940	"	4.6	9.2	200			72.5	219.6	79.6
			ZERO/SPAN	0/9.0	0/15.0	0/[illegible]			0/92.5		
W/O UREA	2	1000 1010	COMP.	4.9	8.7	180			74	200.1	82.3
		1015 1020	"	4.8	8.6	160			75	177.9	83.4
		1020 1030	"	4.8	8.7	175			74	194.6	82.3
			ZERO/SPAN	0/8.0	0/14.8	0/403			-.2/92		
		1114 1119	NH3 PORT	9.1							
		1117 1127	2	8.7	=8.7						
		1127 1133	1	8.3							
W/UREA	3	1142 1152	COMP.	4.8	9.5	170			57	189.0	63.4
		1152 1202/1A	"	4.9	9.6	175			57	194.6	63.8
		1202 1212	"	4.8	9.6	180			57	200.1	63.4
			ZERO/SPAN	0/9.0	0/16.4	2/415			0/94		
W/UREA	4	1309 1318	COMP.	4.8	8.6	160			57	177.9	63.4
		1319 1328	"	4.9	8.6	160			56	179.0	62.7
		1329 1336	"	4.8	8.6	160			56	177.9	62.3
			ZERO/SPAN	0/9.0	0/14.8	0/[illegible]			0/92		

Span Gas Data:

Species:	Zero (N2)	NOx HIGH	NOx MED.	O2 HIGH	O2 MED.	CO HIGH	CO MED.	CO2 HIGH	CO2 MED.	SO2 HIGH	SO2 MED.
PPM or %	Zero	92.53	20.16	AMBIENT	9%	400.2	79.46				
Cylinder #	N2										
Exp. Date											

COMMENTS: NH3 INJ. O2 1410 - 1413 = 9.0%
1413 - 1412 = 8.1
= 8.6%

SIERRA ENVIRONMENTAL ENGINEERING, INC.

Client: SCE - REDNDO 6 Test No: AS USED Page ___ of ___

Date: 9-24-92 Project No: ___ Lotus file: ___

Test Location: APH INLET Fuel: NAT GAS Operator: J. A.

Test Condition: 40 MW Barometric Pressure: 30.18 in. Hg

Ambient Temp: DB 73 WB 67 RH% 83% Duct Static Pressure: ___ in. WC

Test #	Time 24hr	Sample Point	Emission Measurement: Dry, Uncorrected						At 3.0 % O2	
			O2 %	CO2 %	CO ppm	SO2 ppm	NO ppm	NOx ppm	CO ppm	NOx ppm
W/UREA 1	0415 0425	COMP.	9.4	5.6	~~35~~			24	56.4	38.7
	0425 0435	"	9.6	5.5	35			23	55.4	36.4
	0435 0445	"	9.4	5.6	35			24	56.4	38.7
		~~ZERO~~ SPAN	~~0~~ 9.0	~~0~~ 14.9	~~0~~ 80			~~0~~ 925		
	0505 0515	NH3 PORT 3	11.75							
	0510 0515	2	12.0	12.0						
	0515 0520	1	12.5							
W/UREA 2	0614 0624	COMP.	9.5	6.3	35			25	55.0	39.3
	0624 0634	"	9.5	6.2	35			25	55.0	39.3
	0634 0644	"	9.5	6.2	35			26	55.0	40.8
		~~ZERO~~ SPAN	~~0~~ 9.0	~~0~~ 15.1	~~0~~ 80			~~0~~ 93		
NO UREA 3	0850 0900	COMP.	9.3	5.7	28			40	45.2	64.5
	0900 0910	"	9.4	5.6	28			41	45.2	66.1
	0910 0920	"	9.3	5.6	28			40	45.2	64.5
		~~ZERO~~ SPAN	~~0~~ 8.0	~~0~~ 14.7	~~0~~ 80			~~0.5~~ 93		
NO UREA 4	0927 0937	COMP.	9.8	6.2	~~30~~			38	48.4	61.3
	0937 0947	"	9.9	6.2	30			39	48.4	61.3
	0947 0957	"	10.0	6.2	30			40	49.3	65.7
		~~ZERO~~ SPAN	~~0~~ 9.0	~~0~~ 15.4	~~0~~ 80			0.3 TE		

Span Gas Data:

Species:	Zero (N2)	NOx HIGH	NOx MED.	O2 HIGH	O2 MED.	CO HIGH	CO MED.	CO2 HIGH	CO2 MED.	SO2 HIGH	SO2 MED.
PPM or %	ZERO	925	203	MAG.	9%	400.2	77.6		15.0		
Cylinder #	N2										
Exp. Date											

COMMENTS:

NH3 PORT 3 = 11.75%

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client SCE
Facility REDONDO
Unit 6
Location flue gas duct prior to stack

Test Method SCAQMD DRAFT
Test Number #3 - UREA ON 172HW
Description NH3
Start/Stop Time 1245 / 1315

Date Sept 21, 1992
Job Number 92364
Page 1 of 1
Operator(s) R. Guerra Jr.

PRE-TEST DATA

T_{AMB}: 86-77 = 68 °F %RH
P_{BAR}: 30.20 in Hg
ASSUMED MOIST. ____ %
MOL. WT.: ____ g/mole
P_{STACK} ____ in H_2O
SAMPLE TIME 30 min.

METER BOX # 2010-4
SAMPLE BOX # 920162
FILTER # ____
ΔH@: 1.76
METER FACTOR: 1.0380
PITOT COEFF.: ____

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	638.4	593.4	
#2	587.9	581.6	
#3	477.8	475.6	
#4	935.9	928.6	
#5		2	
#6			
TOTAL	2640	2579.2	60.8

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	0	10	RGP	1200
POST-TEST	0	28	RGP	1333

RUN	1	2	3	Avg.
O_2				
CO_2				

~60

Sample Point	Time (min)	ΔP (in H_2O)	ΔH (in H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
3	0		1.0	412.940	23.5	365			64	90	90
2	10		.87	418.000	23.5	371			57	93	91
1	20		.90	423.240	23.5	372			63	95	91
	30		.92	428.517	23.5	379			72	95	92
Total/ Average											

COMMENTS/OBSERVATIONS

92.1
Probe is all the way in at position 3.

920162 Imp. Catch

File# RE6-1

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client SCE | Test Method SCAQMD DRAFT | Date Sept. 21, 1992

Facility REDONDO | Test Number #4 172 W/Urea | Job Number 92364

Unit #6 | Description NH_3 | Page 1 of 1

Location Flue gas duct prior to stack | Start/Stop Time 1525 / 1555 | Operator(s) R. G. Primeau Jr.

PRE-TEST DATA

T_{amb}: 80-75 = 80% RH °F | METER BOX # 2010-4

P_{bar}: 30.20 in Hg | SAMPLE BOX #

ASSUMED MOIST. % | FILTER #

MOL WT.: g/mole | ΔH@: 1.76

P_{stack} in H_2O | METER FACTOR: 1.0380

SAMPLE TIME 30 min. | PITOT COEFF.:

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	622.9	587.7	
#2	574.9	567.3	
#3	481.3	477.8	
#4	857.2	847.5	
#5			
#6			
TOTAL	2536.3	2480.3	56.0

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	0	28.5	RGP	1517
POST-TEST	0	28.5	RGP	1600

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (in H_2O)	ΔH (in H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
3	0		1.0	438.461	23.0	364			54	91	90
2	10		.99	443.9	23.0	364			61	94	91
1	20		1.0	449.4	23.0	372			76	97	92
	30			455.030		376					
Total/ Average											

COMMENTS/OBSERVATIONS

92.5°F

920519 Imp. Catch

File # RE6-2

SIERRA ENVIRONMENTAL ENGINEERING, INC.

STACK TEST DATA SHEET

Client SCE
Facility REDONDO
Unit # 6
Location EGR DUCTS PRIOR TO STACK

Test Method SCAQMD DRAFT
Test Number #3
Description 140 - w/Urea
Start/Stop Time 1142 / 1212

Date 9-22-92
Job Number 92364
Page 1 of 1
Operator(s) RG Pioneer

PRE-TEST DATA

T_{AMB}: 77-86 = 68 °F RH
P_{BAR}: 30.28 in Hg
ASSUMED MOIST. ____ %
MOL. WT.: ____ g/mole
P_{STACK} ____ in H_2O
SAMPLE TIME 30 min.

METER BOX # 2010-4
SAMPLE BOX # ____
FILTER # ____
ΔH@: 1.76
METER FACTOR: 1.0380
PITOT COEFF.: ____

MATERIAL WEIGHT (g)

IMPINGER	END	START	DIF.
#1	629.5	593.7	
#2	587.2	582.3	
#3	479.2	476.4	
#4	867.7	857.4	
#5			
#6			
TOTAL	2563.6	2509.8	53.8

LEAK CHECK	CFM	VAC.	INIT.	TIME
PRE-TEST	0	26.0	RGP	1130
POST-TEST	.001	28.5	RGP	1225

RUN	1	2	3	Avg.
O_2				
CO_2				

Sample Point	Time (min)	ΔP (in H_2O)	ΔH (in H_2O)	Meter Reading (ACF)	Vacuum (inHg)	Temperature (°F) Stack	Probe	Filter	Imp. Out	Meter In	Meter Out
3	0		1.0	456.664	23.2	329			65	90	90
2	10		.98	462.1	23.2	360			69	92	90
1	20		1.1	467.7	23.2	385			85	95	92
	30			473.220							
Total/ Average											

COMMENTS/OBSERVATIONS

91.5

[redacted]

920520 Imp. Catch

File # RE6-3